

Economic and Social Commission for Western Asia

Obstructed poverty reduction: growth-passthrough analysis

Hassan HAMIE

Poverty, Inequality and Human Development projects

Gender Justice, Population and Inclusive Development Cluster



UNITED NATIONS

الاسواق
ESCWA

Shared Prosperity **Dignified Life**





Outline

- I. Problem definition
- II. Challenges
- III. Data & Facts at regional level
- IV. Methodology
- V. Results
- VI. Analysis & concluding remarks

I – Problem definition

Survey mean income/consumption grows at the same rate as the predicted change in private consumption expenditure from national accounts, is it perfect?

$$\frac{\% \text{ annualized growth in survey} - (\text{as measured by mean income over a spell})}{\% \text{ annualized growth in PCE over the same spell}}$$

Imperfect relationship
~
[over space and time]

National accounts and survey data are collected differently and at different levels

Systematic underreporting, and unit and item nonresponse

Sudden economic shocks that are not captured in survey mean growth

Survey sampling not being representative and survey measurement errors

II – Challenges

- ❑ How can it be measured (*Measurement and methodological challenges*)
- ❑ At which level: Country, Regional, Global (*Interpretation and assumption challenges*)
- ❑ Any other levels, Sub-group perhaps?
- ❑ If so, how should we defined the sub-group: economic attributes, others? (*Measurement and methodological challenges*)
- ❑ Any remaining challenges? post-computation? Etc.

III – Data

Variable	Min.	Q1	Median	Mean	Q3	Max.	NAs	Standard deviation
Headcount (<i>percentage</i>)	0.7783	15	25.3	29.77	41.85	83.3	26	17.89
Poverty line (PPPS/day)	0.7297	2.23	4.06	6.71	7.27	36.38	26	6.99
Mean income (PPPS/month)	22.6	124.5	259.2	478.4	564.2	3294.3	1	545.65
Median income (PPPS/month)	16.07	90.05	181.97	367.64	398.87	3106.87	6	450.38
Gini index (<i>percentage</i>)	24.63	32.86	37.66	39.13	44.14	65.76	3	8.37
Population (millions)	10,279	3,400,434	10,474,410	52,951,301	38,041,757	859,247,883	-	129,109,433
Population density	1.48	30.244	73.425	160.375	144.14	6987.238	-	462.91
Urban population (<i>percentage</i>)	7.83	36.65	54.54	54.31	73.67	100	-	22.76
Age dependency ratio (<i>percentage</i>)	16.31	48.56	57.03	63.38	78.66	112.51	-	19.18

Source: Authors' calculations.

Region	Number of countries	Welfare measurement		Poverty lines		Income group classification			
		Consumption expenditure	Income	Absolute	Relative	High	Upper middle	Lower middle	Low
Arab region	21	17	4	13	-	6	3	8	4
East Asia and the Pacific	30	22	8	24	3	8	10	12	-
Europe and Central Asia	51	17	34	23	28	31	15	4	1
Latin America and the Caribbean	27	4	23	27	-	6	16	4	1
North America	2	-	2	2	-	2	-	-	-
South Asia	10	10	-	9	1	-	2	7	1
Sub-Saharan Africa	42	41	1	41	-	2	4	16	20
Total	183	111	72	137	34	55	50	51	27

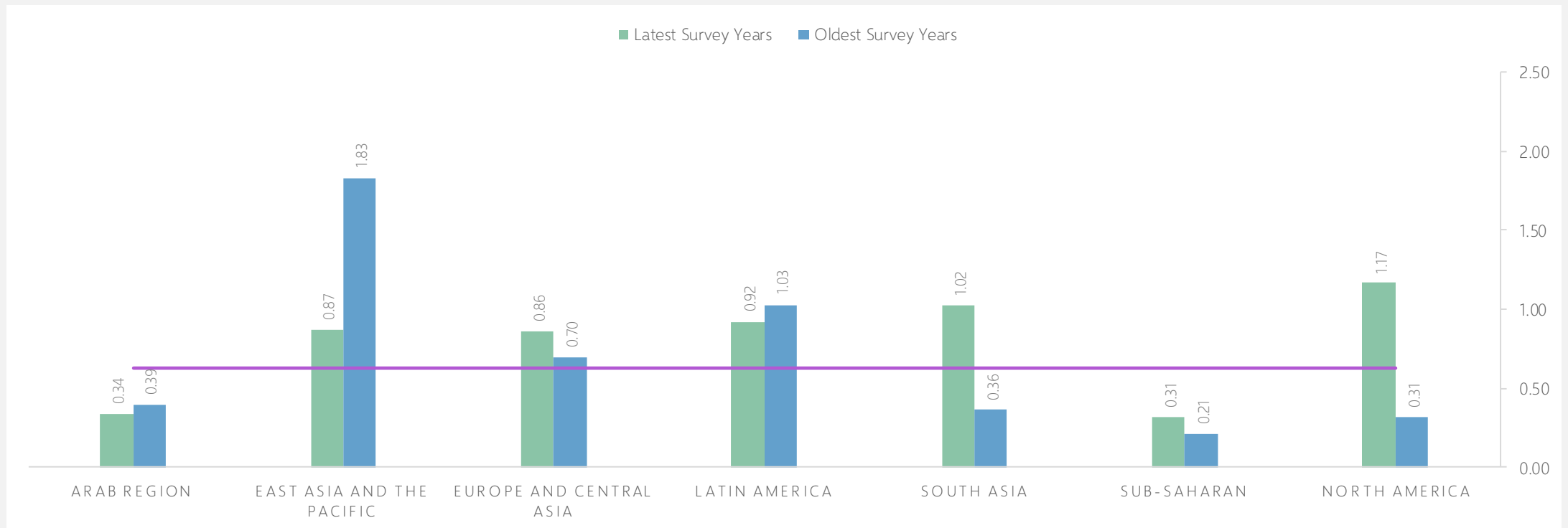
Source: Compiled by the authors.

III – Data

	T_{oldest}	T_{latest}
Minimum spell length, years [country(ies) to which the minimum spell-length belongs]	1 Uzbekistan [2002-2003]	1 Honduras [2018-2019] Thailand [2018-2019] Türkiye [2018-2019] Etc.
Maximum spell length, years	18 Islamic Republic of Iran [1998- 2016]	16 Algeria [1995-2011] Central African Republic [1992- 2008]
Range	[1990,2018]	[1992,2019]
Arithmetic average, years	3.8	6.04

Source: Authors' calculations.

III. Facts - Observed Passthroughs Across World Regions (Country population weighted)



IV. Methodology

Regression based methods



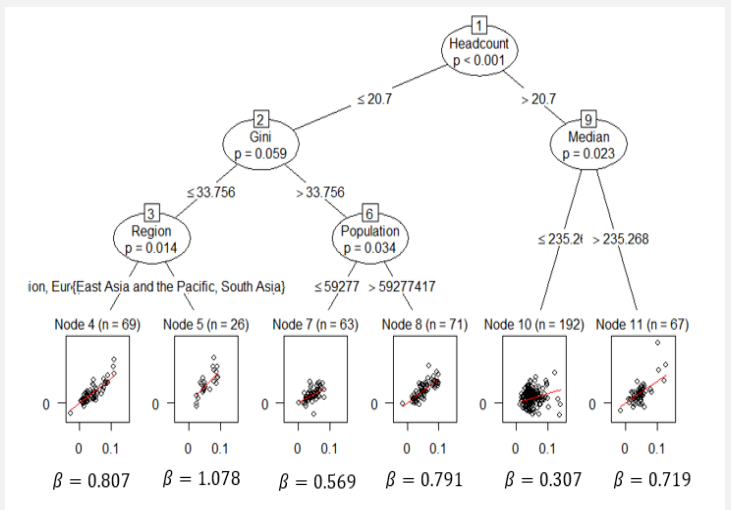
$$g_{mean\ income} = \beta_0 + \beta_1 * g_{PCE\ per\ capita} + \epsilon$$

$$\frac{\% \text{ growth in survey-based mean income over a spell}}{\text{annualized \% growth in PCE over the same spell}} = \sum \beta * Region\ Dummy + \epsilon$$

Clustering method A – Partitioning around medoids (PAM)

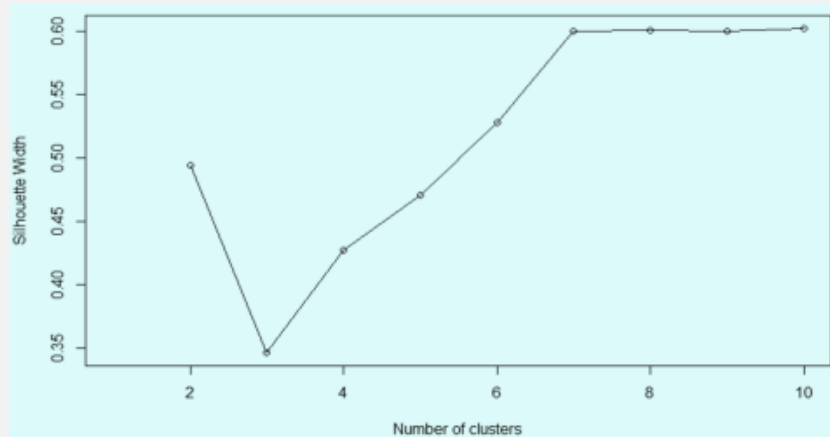


Clustering method B – Model based recursive partitioning (MOB)



IV. Methodology – Hyperparameters tuning

Clusters to partition the data into



Source: Authors' calculations.

Similarity measure type (Gower, Euclidian)

Picking the centroid of the cluster

p -value

It evaluates whether the passthrough factor (represented by the coefficient β) differs across different subgroups/ clusters using a statistical test based on a chosen p -value. A low p -value below 5% (say 0.01), means that there is only 1% chance that the null hypothesis is valid, and 99% that the difference in passthroughs between clusters is significant. Thus, the model can proceed to the splitting stage.

Minimum number of observations per node

V. Results – Regression based methods

Region	Arab Region	East Asia & the Pacific	Europe & Central Asia	Latin America & the Caribbean	North America	South Asia	Sub-Saharan Africa	Worldwide (Population weighted)
Simple Ratio	0.258	0.733	0.603	0.612	0.595	0.562	0.388	0.620
Regression Model – Region specific	0.323	0.694	0.785	0.607	0.608	0.465	0.343	0.558
Regression Model – region as dummy variable	0.257	0.673	0.761	0.519	0.630	0.711	0.454	0.558

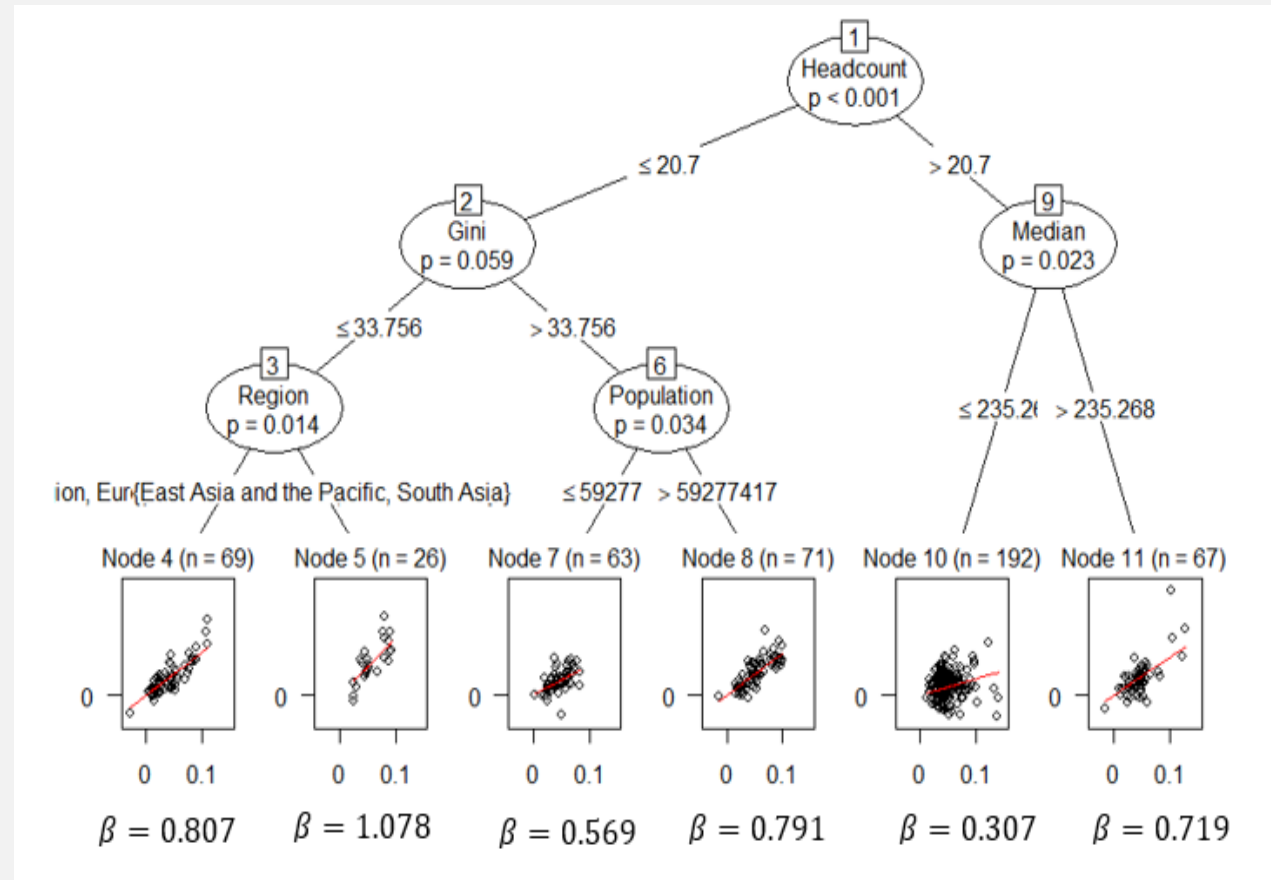
V. Results - PAM

Cluster	Pass through	Welfare measure	Population (mil.)	Headcount ratio (percentage)	Poverty line (\$/day)	Median income/ consumption expenditure	Mean income/ consumption expenditure	Gini index (percentage)
I	0.304 (0.040)	Consumption	20	40	2.16	75	100	42
II	0.675 (0.032)	Consumption	21	15	3.83	187	240	32
III	0.629 (0.052)	Income	15	23	6.9	330	450	45
IV	0.651 (0.07)	Income	63	13	23	1 400	1 700	33
V	0.789 (0.04)	Income	600	11.2	2.3	180	200	35

Source: Authors' calculations.

Note: The covariate values under each cluster represent the medians of each cluster.

V. Results – MOB



V. Results - Cross validation - PAM

- ❑ Data split into training (80%) and testing (20%) data subsets
- ❑ Three runs, each with randomly selected data for each subset
- ❑ Regional stratification was applied (To avoid misrepresentation, for less-frequent country-year observations)
- ❑ The different runs performed for each clustering methods were tuned similarly – same hyperparameters configuration for each of run within each method; also different hyperparameters tuning, for each run within each method were tested, each time, with the observations (training and tested) preserved - **set. Seed()**
- ❑ Results are computed and compared at the regional level

PAM			
Clusters	Run I	Run II	Run III
I	0.30	0.26	0.30
II	0.67	0.58	0.59
III	0.65	0.61	0.63
IV	0.63	0.69	0.74
V	0.79	0.74	0.83

Source: Authors' calculations.

V. Results - Cross validation - MOB

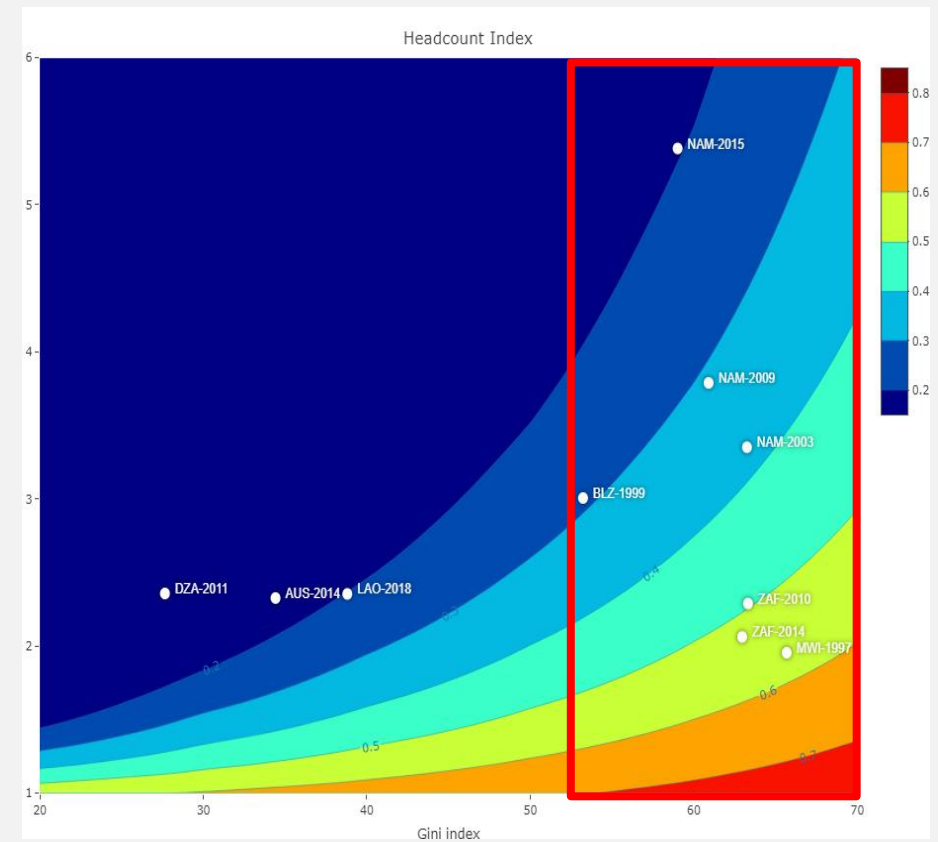
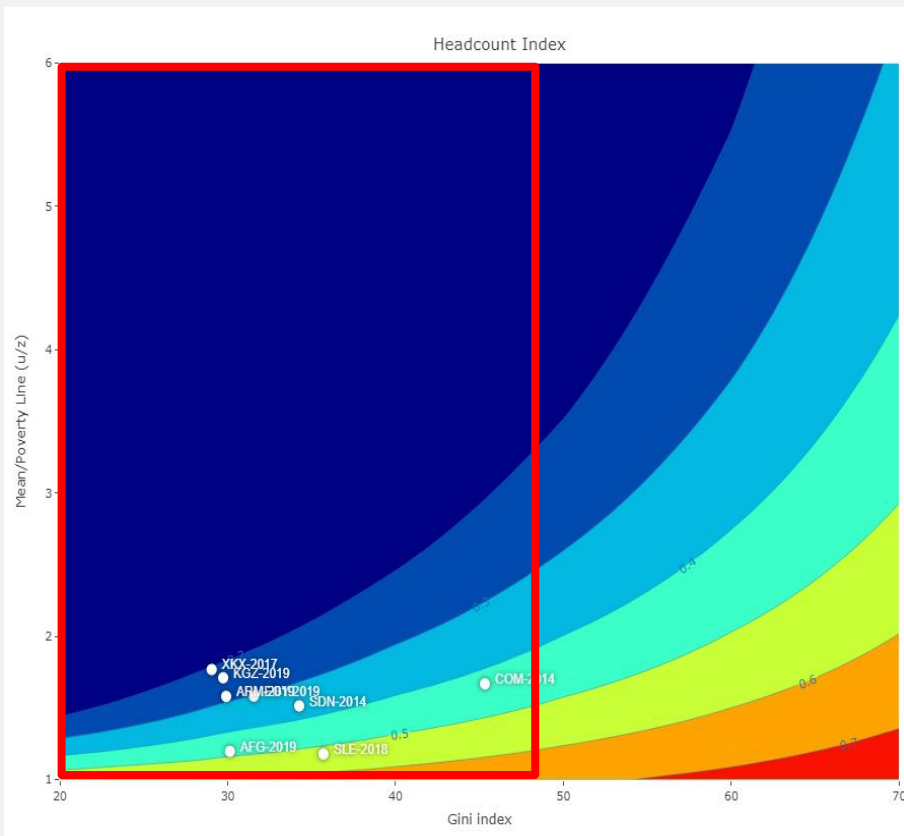
Regions	Run II		Run III	
	Training	Testing	Training	Testing
Arab region	0.57	0.53	0.57	0.48
East Asia and the Pacific	0.71	0.69	0.78	0.77
Europe and Central Asia	0.59	0.39	0.62	0.62
Latin America and the Caribbean	0.61	0.69	0.63	0.74
North America	0.69	0.61	0.74	0.63
South Asia	0.65	0.67	0.67	0.35
Sub-Saharan Africa	0.42	0.57	0.37	0.35

Source: Authors' calculations.

VI. Analysis & concluding remarks

- ❑ Passthrough rates do not appear to be clustered by geographic region per se, but by economic and demographic divides, forming distinct sub-groups.
- ❑ For developing countries, the higher the poverty headcount, the lower the typical passthrough. However, having a high poverty headcount ratio does not guarantee a low passthrough coefficient. In fact, high poverty headcounts combined with medium-level median incomes are associated with higher passthroughs.
- ❑ Developed countries with low poverty rates have high passthrough rates, meaning that a large portion of the growth rate in national accounts in such countries is passed through to household incomes/expenditures as reflected by surveys.
- ❑ Other factors such as population density, Gini index, among others, become relevant at the deeper level of clustering.

VI. Analysis & concluding remarks – Policy impact



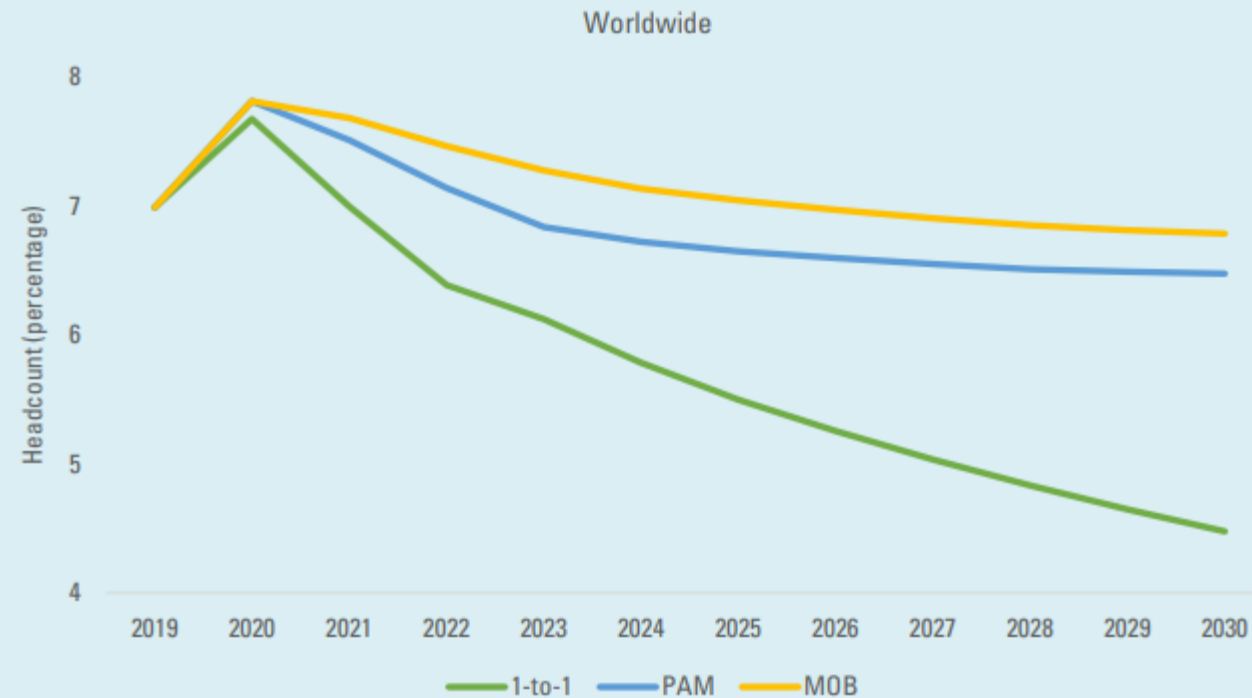
VI. Analysis & concluding remarks – Policy impact

Subgroup level clusters	Passthrough rate	Pre-adjustment, including the effect of passthrough – percentage of countries whose headcount is more elastic		Post adjustment – percentage of countries whose headcount is more elastic	
		To mean income (<i>percentage</i>)	To Gini index (<i>percentage</i>)	To mean income (<i>percentage</i>)	To Gini index (<i>percentage</i>)
I	0.304	56	44	23	77
II	0.629	33	67	21	79
III	0.651	35	65	0	100
IV	0.675	44	56	15	85
V	0.789	40	60	0	100

Source: Authors' calculations.

Concluding remarks

Extreme headcount poverty (1.9 USD PPP, 2011)



Source: Authors' calculations.

Headcount poverty (National poverty lines)



Source: Authors' calculations.



Shared Prosperity **Dignified Life**



Thank you