

Policy Brief

Impact analysis on multidimensional poverty index: Do we necessarily need to make targeting more complex? A Moroccan illustration

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The targeting of public policies, particularly those related to the reform of the social protection system in Morocco, is a major challenge, especially in assessing the impact of these measures on multidimensional poverty. By developing two targeting methods to approach the impact of the reform of the social protection system in Morocco on multidimensional poverty as measured by the Multidimensional Poverty Index (MPI), we show that the three simulated reforms on education and health, reduce the multidimensional poverty measures, regardless of the approach used, especially when the measures put in place are moderate.

Impact analysis on multidimensional poverty index: Do
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Moroccan illustration

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1 Introduction

Since the adoption of the Sustainable Development Goals (SDGs), many countries have been forced to review their social protection systems. The United Nations highlights the direct contribution of social protection on 6 of the 17 Goals (ESCWA, 2022a). These systems make it possible to fight poverty (monetary or multidimensional). Concerning the impact on monetary poverty, the tools capture the effect through variations in household income and expenditure. However, by definition, social protection programs target mainly non-monetary dimensions of the population's well-being, notably by providing access to basic services such as health and education. As a result, the poverty measures to be considered to approach the impact of reforms should also be non-monetary. These dimensions are taken into account in the Multidimensional Poverty Index (MPI) and its components initially developed by the Oxford Poverty and Human Development Initiative (OPHI) (Alkire and Foster (2007), Alkire and Santos (2014)). However, the link between social protection reforms and the more complex multidimensional poverty measures has not been addressed in the literature.

We develop two *ex ante* original approaches and microsimulated to measure such impact. These methods are distinguished by their principle of targeting beneficiaries of the programs. The first method consists in selecting randomly the beneficiaries from among those initially deprived according to one or more indicators. The second one is more objective since the identification of individuals who change status (from deprivate to non-deprivate) as a result of a social protection measure are those with the highest probability of benefiting from it (or the lowest probability of being deprivate). It is the first time that this method is applied in the context of measuring the impact of social protection programs on multidimensional poverty.

To illustrate these approaches, we calculate the MPI for Morocco using the *Enquête Nationale sur la Population et la Santé Familiale* (ENPSF) of 2018 and propose three reform scenarios as extension and generalization of social protection in Morocco targeting two health indicators and one education indicator. The methods developed are very relevant for explicitly identifying and assessing the link between social protection programs and multidimensional poverty.

2 Multidimensional Poverty Measure - MPI - and social protection

The *Global MPI* is based on non-monetary deprivation and has three dimensions: health, education and standard of living. These three dimensions are declined into ten indicators. For the Arab World Poverty Report, ESCWA (2017) adopted a revised multidimensional poverty index (MPI) for Arab countries. This revised MPI is composed of the

three dimensions and include 14 indicators (13 for Morocco). To classify a household as deprived or not on an indicator, its value is compared with a pre-established deprivation threshold. Different indices can be calculated to measure poverty: 1- the incidence of multidimensional poverty (H); 2- the average poverty gap or poverty intensity (A); and 3- the adjusted incidence or MPI (M). This revised MPI is useful to guide public policies in prioritizing actions to be taken and in allocating scarce resources.

No matter what form they take, social protection measures are intended to have an impact on poor and vulnerable populations. By crossing these social protection measures with the dimensions and indicators of the MPI, it is possible to see how, depending on the objectives in terms of the fight against multidimensional poverty, the measures could be designed. The two dimensions (health - nutrition and education) can be achieved by all forms of social protection, whether monetary or in kind.

Like many countries, Morocco has since 1942, a social protection system with insurance and assistance dimensions. Since then, several reforms have been initiated and more recently, the Kingdom has undertaken a broad reform of its social protection system exacerbated by the pandemic.

Using microsimulated approaches, we develop and implement two impact analysis methods to measure the impact of social protection programs on the MPI taking into account two mechanisms of targeting. Indeed, the first problem facing the decision-maker is to identify who should or should not benefit from the measure. The first method consists of randomly selecting households (and therefore individuals) from among those that were initially deprived on one or more of the indicators and that, because of the social protection measures, are no longer in a situation of deprivation for this or these indicators. The second approach more objective is based on statistical and econometric mechanism. The identification of households that change status (from deprivate to non-deprivate) following the introduction of a social protection measure is done among those with the highest probability of benefiting from it (and therefore the lowest probability of being deprivate). We evaluate the ponctual effects of social protection programs on H , A and the MPI, M . We also construct confidence intervals to test the statistical significance.¹

3 Data, scenarios and results

Using the 2018 *Enquête Nationale sur la Population et la Santé Familiale* (ENPSF), we find that the incidence of multidimensional poverty (H) is less than 20% (19.30%). The intensity is 42.67% and the multidimensional poverty index, M in Morocco in 2018 is equal to 8.24% (Table 1). When we look at the shares of deprived individuals by dimensions (Table 2), the highest deprivations are associated with the dimensions relating to the level of education of those over 18 years of age (56.02%) as well as the means of

¹For methodological details, we invite the reader to read our article available on <https://erf.org.eg/publications/impact-of-social-protection-programs-on-multidimensional-poverty/>

mobility (61.57%). The indicators for which deprivation is lowest in Morocco in 2018 are child pregnancy (0.97), means of communication (0.82), and child mortality (1.06).

Table 1: Multidimensional Poverty in Morocco - Situation in 2018

	Incidence of poverty (H)	Intensity (A)	Multidimensional poverty index (M)
Morocco 2018	0,1930	0,4267	0,0824

Source: Authors based on ENPSF data - 2018

The indicators considered in three scenarios expected to be impacted are infant mortality, malnutrition of children under 5 years of age, and school enrollment of children aged 6 to 17 years.²

The three scenarios are : 1- Morocco will achieve a 50% reduction in the infant mortal-

Table 2: Frequency of deprive individuals (in percent) - 2018

Dimensions	Health and nutrition Indicators	Percentage rate
Health and nutrition	Child mortality	1.06
	Early pregnancy	0.97
	Child Nutrition	7.94
Education	School attendance	14.62
	Age schooling gap	-
	Educational attainment	56.02
Housing	Overcrowding	20.19
	Type of dwelling	18.60
Access to services	Improved drinking water	29.22
	Improved sanitation	33.91
	Electricity	2.66
Assets	Communication assets	0.82
	Mobility assets	61.57
	Livelihood assets	5.83

Source: Authors based on ENPSF data - 2018

ity deprivation rate from its 2018 level (from 1.06% to 0.53%) and in the malnutrition deprivation rate from its 2018 level (from 7.94% to 3.97%) ; 2- Deprivation rate in terms of schooling for children aged between 6 and 17 falls from its 2018 level of 14.62% to 7.31% in the future ; 3- Combination of the two previous scenarios.

Not surprisingly, the three simulations have a positive effect on the A , H and M measures, regardless of the approach chosen. Moreover, the variations obtained under random targeting are all statistically significant whereas the variations are statistically non-significant for H and M under the objective identification approach. This phenomenon occurs because even when a household is no longer deprived on one or more indicators, it can remain poor (H is less impacted while A is reduced). *A priori*, a social protection policy should be more effective when it objectively targets the beneficiaries of the reform. However, the relative variations obtained are always greater in absolute values under random targeting than under objective identification. This result corroborates

²Note that the scenarios are assumed to be the result of different programs or actions contained in the welfare reform and do not propose measures that would achieve the simulated objectives.

Table 3: Multidimensional poverty in Morocco - Situation at 2018 and simulations results

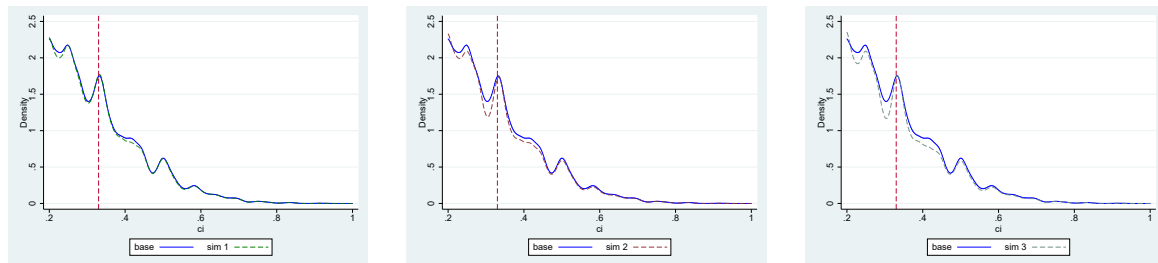
			H			A			M		
			Inf	Value	Sup	Inf	Value	Sup	Inf	Value	Sup
Random selection targeting	Baseline - Survey		-	0.1930	-	-	0.4267	-	-	0.0824	-
	Simulation 1	Ponctual values	0.1843	0.1859	0.1874	0.4221	0.4231	0.4241	0.0781	0.0786	0.0792
		Variation %	-	-3.71%	-	-	-0.86%	-	-	-4.53%	-
	Simulation 2	Ponctual values	0.1626	0.1649	0.1671	0.4068	0.4089	0.4110	0.0666	0.0674	0.0682
		Variation %	-	-14.57%	-	-	-4.19%	-	-	-18.14%	-
	Simulation 3	Ponctual values	0.1545	0.1572	0.1599	0.4027	0.4050	0.4072	0.0627	0.0637	0.0646
Variation %		-	-18.56%	-	-	-5.10%	-	-	-22.72%	-	
Objective identification targeting	Baseline - bootstrap		0.1325	0.1993	0.2660	0.4253	0.4268	0.4283	0.0565	0.0850	0.1135
	Simulation 1	Ponctual values	0.1300	0.1956	0.2611	0.4241	0.4257	0.4272	0.0553	0.0832	0.1112
		Variation %	-	-1.86%	-	-	-0.27%	-	-	-2.12%	-
	Simulation 2	Ponctual values	0.1261	0.1896	0.2530	0.4243	0.4259	0.4275	0.0537	0.0807	0.1078
		Variation %	-	-4.85%	-	-	-0.22%	-	-	-5.06%	-
	Simulation 3	Ponctual values	0.1237	0.1860	0.2482	0.4231	0.4247	0.4263	0.0525	0.0790	0.1054
Variation %		-	-6.68%	-	-	-0.50%	-	-	-7.14%	-	

Source: Authors based on ENPSF data - 2018

the conclusions of Hoddinott (1999) and can be explained by unbalanced samples. For example, in the case of Morocco in 2018, six out of 13 deprivation rates are below 10% (Table 2). This result could also be observed because of the homogeneity of deprive households on each indicator targeted by the reform. It is also clear that the variations recorded under simulation 3 are simply the accumulation of the other two variations (simulations 1 and 2) by construction of the MPI.

The ponctual and interval analysis conducted depends on the chosen threshold to identified deprived from non deprived. To go beyond the arbitrariness associated with this setting, we do a distributional analysis by comparing the distribution of scores for the reference situation with those obtained with the three simulations. Examination of the density functions shows that, using the objective approach, the three simulated curve lies to the left of the reference curve. The first-order stochastic dominance analysis based

Figure 1: Density curves of $score_i^*$



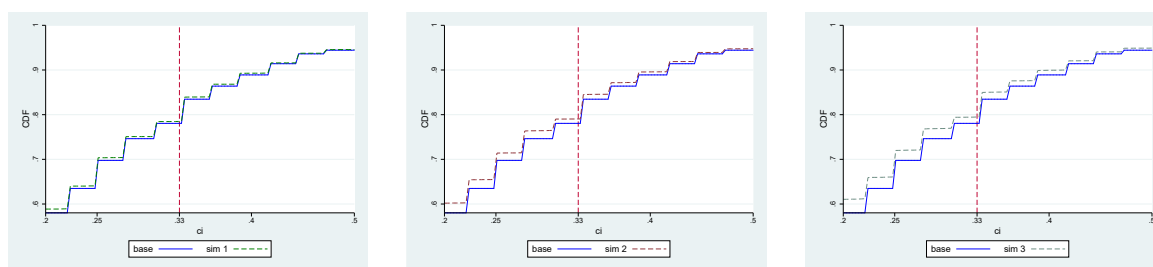
Source: Authors based on ENPSF data - 2018

*The focus is on $scores > 0.2$ for more clarity.

on the comparison of the curves of the score distribution functions confirm results since

the curves representing the simulated cases are systematically to the left of the reference one. Moreover, the gap between the curves is greater when the reform affects the enrollment indicator (simulation 2) and more when both indicators are impacted (simulation 3) (Figures 2). We also note that the gap between the curves narrows as the scores increases. This is explained by the targeting based on objective identification that favors individuals with the highest probability of not being deprived on each indicator. The last concept used to approach the simulated effects of social protection reform are

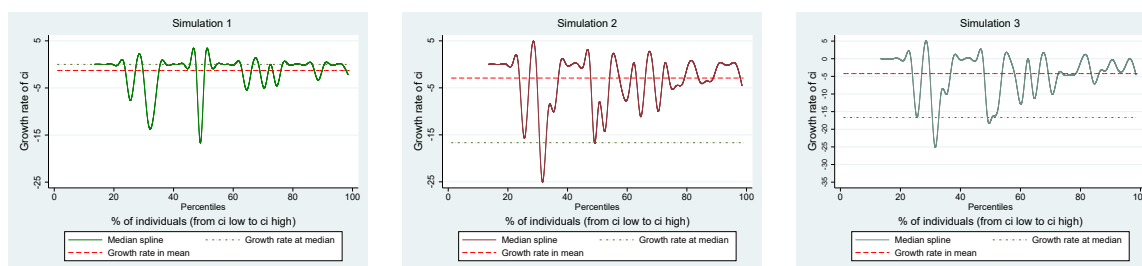
Figure 2: Stochastic dominance curves - Order 1*



Source: Authors based on ENPSF data - 2018 *Focus is on the $0.2 < score_i > 0.5$ for more clarity.

incidence curves (IC) introduced by Ravallion and Chen (2003). Given the definition of multidimensional poverty based on the vector of deprivation scores, the incidence curve is the representation of the relationship between each population percentile and the corresponding growth rate of the scores, between the reference situation and the simulated scenario. The analysis of the incidence curves shows that the least poor individuals

Figure 3: Reform Incidence Curves



Source: Authors based on ENPSF data - 2018

would benefit the most from the simulated reforms in terms of the growth rate of scores (Figure 3). Finally, the growth rates recorded are logically higher in absolute terms for simulation 3 than for simulations 1 and 2.

4 Conclusion

We approach the impact of the reform of the social protection system in Morocco on multidimensional poverty measured by the MPI developing two innovative targeting approaches for the individuals benefiting from the reforms conducted. Based on the recommendations of the *Assises nationales de la protection sociale* in Morocco, which are currently being implemented, we have selected three target indicators, two related to health and one related to education. Based on the *Enquête Nationale sur la Population et la Santé Familiale* (ENPSF) of 2018, we shows that targeting by objective identification does not necessarily dominate random targeting more easy to implement. In both cases, the variations obtained by cumulating programs are greater in absolute values than those obtained on each of the reforms taken individually. We constat also that with the implementation of the social protection reforms, deprivations according to the targeted indicators may decrease for some households but leave the incidence of multidimensional poverty unchanged. However, all the results obtained with the two methods developed are based on the hypothesis of independence of the effects on the indicators. This assumption may not always be plausible since correlations between indicators may exist. The approaches would have to be adjusted to incorporate these correlations in order to refine the evaluation of the impact of the social protection reform.

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