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# **Targeting Household Deprivations for Multidimensional Poverty Alleviation: An Application to Tunisian Data**

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## **Abstract:**

This paper proposes a targeting methodology focused on household's deprivations that helps the public decision-maker in Tunisia to alleviate multidimensional poverty. In the first part of this research, we intend to decipher the relationship between official poverty measurement and anti-poverty programs currently implemented in Tunisia, with special emphasis on their targeting performance and on the divergence observed between the beneficiary selection process at the regional level and the official identification of poor households. Next, we will outline the proposed targeting methodology using the counting identification approach and we estimate three groups of potential beneficiaries reflecting three degrees of poverty. Our empirical findings show that if a household becomes deprived in one dimension, then he will automatically be considered a potential beneficiary of the anti-poverty program. In terms of budget allocation, categorizing beneficiaries by group allows the public decision-maker to prioritize the most urgent situations in the country, even in the case of an austerity policy. On the other hand, to eradicate poverty in all its forms everywhere, it would be useful to strengthen the targeting of the poor population through a forward-looking policy targeting households living in vulnerability to poverty.

**Keywords:** Multidimensional Poverty Alleviation; Targeting; Counting Approach; Tunisia

**JEL Code:** C54, C43, I18, H12

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## **1. Introduction**

Improving the standard of living of poor households is one of the important objectives that justify government intervention (Devereux, 2002, Singh and Chudasama, 2020, and Hanna and Olken, 2018). Given the rising public deficits and shrinking public resources, especially in developing countries, targeting may be a viable way to allocate resources in order to alleviate poverty (Bigman and Fofack, 2000). Targeting is defined as a process by which benefits are channeled to members of the high priority groups that a program aims to serve on the basis of available financial resources (Lavalley et al., 2010). However, this recommendation has not always been respected and is strongly linked to the targeting methods and mechanisms used to transfer the aid to potential beneficiaries.

In some developing countries, central governments delegate the task of choosing program beneficiaries to local and regional commissions while the center controls the allocation of funds and quotas to each region (see, for example, Crook and Sverrisson, 2001; Conning and Kevane, 2002; Bardhan and Mookherjee, 2005). Proponents of decentralized targeting have claimed that efficiency can be increased and leakage to the nonpoor reduced substantially by decentralized social programs. Furthermore, local authorities tend to be more accountable to the locals and hence have an incentive to use the locally available information to improve the targeting performance (Galasso and Ravallion, 2001).

However, this does not seem to be the case; because the identification of beneficiaries at the local level is carried out using a several household characteristics as proxies or indicators of poverty, it cannot be linked to the official identification of what defines the poor at the central level. In this regard, Notten (2015), based on data from European countries, argues that poverty indicators used in the beneficiary selection regularly disagree about a person's poverty status. Moreover, the risk of overlooking the divergence between the selection process and the actual poverty situation of social program beneficiaries may introduce targeting errors by including households that are not officially identified as poor and paradoxically exclude poor households at the same time (Nasri, 2020).

In a multidimensional framework, the targeting of poverty has also been debated on the concordance between the goals sought by the policy maker and the design of social programs (see for example; Stiglitz, Sen, and Fitoussi, 2009; Ravallion, 2011, and Duclos et al., 2013). In this regard, Alkire and Seth (2013) emphasized the importance of ensuring consistency between beneficiary identification methods and the identification of households living in deprivation.

In this paper, we intend to decipher the relationship between official poverty measurement and anti-poverty programs currently implemented in Tunisia, with special emphasis on their targeting performance and on the divergence observed between the beneficiary selection process at the regional level and the official identification of poor households. Next, we will outline the proposed targeting methodology using the counting identification approach that satisfies a set of axioms and overcome the problem of divergence observed between the selection process of social program beneficiaries and the official identification of poor households in Tunisia.

Although multidimensional poverty in Tunisia has been the subject of some academic work (see, for example, Ayadi et al., 2007; Chtioui and Ayadi, 2013 and Nasri and Belhadj, 2017), to the best of our knowledge, no study has addressed the multidimensional poverty alleviation issue and how to rethink social programs so that they can achieve the first sustainable development goal (SDG-1) in Tunisia until now. This paper aims at bridging this gap. With the suggested design, if a household becomes deprived in one dimension, then he will automatically be considered a potential beneficiary. In addition, public decision-makers can limit or expand the scope of their interventions, depending on the country's economic and financial situation.

This paper is structured as follows: Section 2 provides an overview of Poverty Measurement and anti-poverty programs in Tunisia; Section 3 presents our data and empirical strategy; Section 4 discusses the empirical Results, and Section 5 concludes the paper.

## **2. Poverty Measurement and anti-poverty programs in Tunisia: An overview**

For this paper, it is crucial to understand poverty measurement in Tunisia, how it has been addressed in empirical research, and how the beneficiaries of poverty alleviation-programs are selected.

In 2011, a Tunisian household was officially defined as poor if its consumption was below the threshold of poverty set at 1277 TND (equivalent to 851 USD) per year per individual in large cities, or 820 TND (equivalent to 546 USD) per year per individual in the non-communal environment. The threshold of extreme poverty is set at 757 TND (equivalent to 504 USD) per year per individual in major cities, or 571 TND (equivalent to 380 USD) per year per individual in non-communal areas.

Within the empirical literature, poverty in Tunisia has been addressed in two distinct ways. According to the first perspective, poverty is an identification of those who are vulnerable and poor, and their distribution between Tunisian regions (e.g., Ayadi et al., 2007; Ayadi and

Amara, 2009; Belhadj and Limam, 2012; Zedini and Belhadj, 2015 and Nasri and Belhadj, 2018). It is an acknowledgment of deprivation in the multidimensional case (Chtioui and Ayadi, 2013; and Nasri and Belhadj, 2017). It may also lead to policy recommendations, but that is a derived feature, and the first exercise is one of deciding who is poor. The second view introduces poverty as an outcome reflecting the impact of social programs on the well-being of the poor, or as an indicator to assess the impact of proposed reforms to these programs in order to improve their targeting effectiveness (see for example, Muller and Bibi, 2010) or to universal subsidy policies (see, World bank, 2015).

Indeed, the social protection system in Tunisia is organized around a relatively well-structured and comprehensive system composed of two pillars. The first pillar is contributory and is composed of three schemes (CNRPS, CNSS, and CNAM). The second pillar consists of a non-contributory system, excluded from energy and food subsidy, considered the main anti-poverty programs in Tunisia. More specifically, these anti-poverty programs are mainly based on a direct transfer's scheme, known as the PNAFN (Assistance Program for Needy Families, Elderly and Disabled) and on a health access program providing access to public medical institutions either free of charge (AMGI), or at a reduced rate (AMGII).

The PNAFN is a direct cash transfer program providing social safety net for poor households. The program was introduced in 1986 to counterbalance the negative effects of the Structural Adjustment Programs. It aims to provide direct financial assistance to families that meet the eligibility criteria fixed by the ministry, as well as free access to public health care (AMGI).

Moreover, in the context of the of children's recognizing from needy families' rights to education and protection against failure and dropping out of school, Tunisia consolidated the PNAFN program by introducing an increase of 30 dinars per child per quarter (within the limit of 3 children) granted to needy families with children of school age (UNICEF, 2014).

It is important to note that households eligible for the PNAFN should also benefit from free health cards (AMGI). This health care benefit is a component of another program known as AMG (Free Medical Assistance). According to COMCEC (2013), the non-contributory social protection program with the widest coverage in Tunisia is the Assistance Médicale Gratuite (AMG), with its two components (AMGI and AMGII). Contrary to AMGI, AMGII provides access to reduced fees at public health centers for eligible households.

The program benefits are awarded on the basis of requests made by families, and they involve several actors. The selection process generally flows as follows: (i) the family makes a claim the cash transfer, declaring that their household income falls below the poverty threshold ;(ii) social workers carry out an investigation of the household income, considering the additional

socio-economic criteria (eligibility criteria are listed in Table 1); (iii) a list of eligible families is drawn up and sent to local and regional commissions, where a final list of beneficiaries and excluded families is prepared, taking into consideration the regional budget allocated by the MSA. However, the circular setting of these criteria states that it is not necessary that all these criteria be met for the family to be eligible, leaving a discretionary margin to the social worker. The evaluation of these programs has been the subject of several studies. Together, PNAFN and AMGII excluded 48.9% of poor families in Tunisia (Silva, Levin and Morgandi, 2013). Arfa and Elgazzar (2013) also noted that there is very little monitoring of the AMG program, and that the eligibility criteria are not clear. These shortcomings make the program prone to leakages and inefficiency. Furthermore, the system is not efficient in terms of exclusion errors, as there is no official appeal system (Ibid.). By observing the distribution of the beneficiaries of the various programs according to the quintiles of expenditure, INS, CRES, and AfDB (2013) also mentioned that half of the poor population and two-fifths (39.4%) of the population living in extreme poverty in Tunisia do not benefit from any component of the PNAFN program. In search of better targeting of Tunisian social program, world Bank (2015) proposed a new targeting approach based on the multidimensional eligibility test (PMT). By comparing the targeting of the PNAFN with that of the PMT approach, they found that the PMT would be much more effective, it manages to target, with the same budget, nearly 50% of the low-income population. Also, AfDB and CRES (2013) defined a standard of living index for selecting potential beneficiaries of direct transfers in Tunisia.

### **3. Data and Methodology**

#### **3.1 Data and Descriptive Statistics**

The data used in this work is drawn from the survey on the budget, consumption and standard of living of Tunisian households, conducted by the INS in 2010. This survey covers the entire country (large cities, small and medium towns and rural areas). It is a primary source of information on the nutritional situation of the Tunisian population and on their access to public services such as health care, education, and transport at the regional level. Additionally, the "access to services" component offers a variety of complementary information describing the accessibility of different public services and social programs to households. The "access to services" component covers a total sample of 5,690 households, i.e., half of the sample covered by the budgetary component (11,281 households).

In the first part of this analysis, we will use the "access to services" component, in order to decipher the relationship between official poverty measurement and anti-poverty programs currently implemented in Tunisia. Households with a "free care card" are considered

beneficiaries of the Assistance Program for Needy Families (PNAFN). This part of the program is known as the AMG1. Other households do not benefit from direct assistance, but they have a “reduced-rate care card” (AMGII). It is worth noting here that each household that received benefits of the (PNAFN) must benefit from the AMG1. However, those benefiting from AMGII should not receive the benefits of PNAFN.

Nonetheless, potential beneficiaries will be identified from the sample covered by the budgetary component, using the proposed new approach described below. To this end, we will remove, first, the amounts received by each household who is currently beneficiary of programs and included in the sample that allow us to neutralize the impact of programs on the beneficiary’s achievements.

The distribution of beneficiaries between the two social programs is shown in Table 2. 6.91% of households benefited from the PNAFN in 2011; this rate is similar to the rate calculated from the administrative data which estimated at 169,624 households (6.94% of the total population). Based on administrative data, the coverage rates of these two programs vary by region. As shown in Figure 1, the PNAFN covered 3.6% of families living in Greater Tunis, 5.43% of households living in the Northeast, and 13.5%, 8.1%, 4.13%, 10.45%, and 11.8% of households living respectively in South West, South East, Center East, Center West and North West of Tunisia. On the other hand, the AMGII program provides a higher coverage rate than the PNAFN. We find that AMGII covered 7.72% of households living in Greater Tunis and 20.83% of households in North East. For the North West, Center West and South West, the AMGII coverage rate is estimated at 45.65%, 37.42%, and 27.83%, respectively. The variation observed between the coverage rates of both programs is mainly due to the quotas allocated by the MSA to each region which the local commission must respect in the beneficiary’s selection. on the other hand, in order to determine the amount received by each beneficiary, we have decomposed the social programs by type of transfer. As shown in Table 3, in addition to free medical care cards, a total transfer (T1) equal to 840 TND (equivalent to 583 USD) for each household eligible for the PNAFN. In 2011, 169624 Tunisian households received a transfer for their basic food needs T (1). 18.62% of whom are also benefited from the second type of transfer T (2), in the name of the realization of the right of children from needed families to be educated. If the number of children enrolled in school is equal to one, then the household benefits from an additional annual amount equal to 120 TND (equivalent to 83 USD). This amount increases to 240 TND (equivalent to 166 USD) for two children and 360 TND (equivalent to 249 USD) for three or more children. The total budget for the second type of transfer is estimated at 7243.8 million TND (equivalent to USD 5030 million).

The last column of Table 3 shows the third category of households receiving only reduced-rate care card noted by T (3). According to official statistics, 575700 households have verified the eligibility criteria for AMG2.

Based on the World Bank (2016), the average expenditure borne by the public health service varies according to the coverage scheme. The average annual expenditure for a beneficiary of AMGI is estimated at 954 TND, (equivalent to 662.5 USD), while that for a beneficiary of AMGII is estimated by 350 TND (equivalent to 243 USD).

### 3.2 Methodology

This paper aims to propose an alternative targeting method to that currently implemented in Tunisia to select the beneficiaries of anti-poverty programs. As noted above, the PNAFN program targets needy families in Tunisia. These households have been selected by the local commissions on the basis of the criteria listed in Table 1. However, the poverty status in Tunisia is determined by a comparison between the total per capita consumption of a household, and the poverty line estimated by the INS. This brings us back to asking our first question about the targeting accuracy of the anti-poverty programs in Tunisia? To answer this question, we will estimate the targeting differential (TD) indicator introduced by Galasso and Ravallion (2001), defined as the mean transfer made to the poor less that made to the non-poor. For a uniform transfer paid to all those who are deemed eligible, the targeting differential becomes the difference between the program's coverage rate for the poor and that for the non-poor, that means the difference between the proportion of the beneficiaries who are poor ( $B^P$ ) and the proportion of the beneficiaries who are non-poor ( $B^{NP}$ ). The targeting differential will be calculated as follows:

$$-1 \leq TD = B^P - B^{NP} \leq 1$$

If the program is perfectly targeted to the non-poor, then  $TD = -1$ , if the program is perfectly targeted to the poor, then  $TD = 1$ .  $TD = 0$  when the program is untargeted, and if the program is unable to cover all the poor, but there is no leakage to the non-poor, then  $TD = B/P$ , where  $P$  is the headcount index of poverty. This indicator can also be broken down to inform us about the association between poverty and program coverage within and between regions: the overall targeting differential ( $TD$ ) = an intra-region component + an inter-region component. This indicator becomes equal to:

$$TD = \sum_i \frac{TD_i P_i (1 - P_i) N_i}{NP(1 - P)} + \sum_i \frac{(B_i - B)(P_i - P) N_i}{NP(1 - P)}$$

where  $N_i$  is the number of households in region  $i$ ,  $N$  is the overall number of households;  $P_i$  is the proportion of poor in region  $i$ , and the  $B_i$  is the proportion of beneficiary in region  $i$ . The inter-region component reflects the center's efforts to reach the poor regions and partly explains the quotas allocated by the central government to each region. However, the "intra-regional" component describes the efforts of the local commissions to reach their poor people and informs us about the inclusion of households that are not officially identified as poor, and paradoxically about the exclusion of households living in deprivation. This led us to question the beneficiary selection process and to propose a new targeting methodology that resolve this issue.

Before delving deeply into the steps of the proposed methodology, it is worth recalling that the anti-poverty programs, as indicated above, offer interventions in three dimensions considered by the decision-maker as the main sources of deprivation for Tunisian households, namely food, health and education. In this research, these dimensions will be considered in our proposed targeting methodology and the eligibility criteria for these dimensional interventions will be used as deprivation thresholds presented in Table 4.

The proposed targeting methodology will be drawn from the identification step of the family of multidimensional poverty measures developed by Alkire and Foster (2007, 2011), based on the dual cut-off method.

Let  $Y = |y_{ij}|$  represents an achievement matrix of a society, where  $(y_{ij})$  is the achievement of the  $i^{th}$  household in the  $j^{th}$  dimension for all  $j = 1, \dots, d$  and all  $i = 1, \dots, n$ . The row vector  $(y_i) = (y_{i1}, y_{i2}, \dots, y_{id})$  summarizes the achievements of the household in the  $(d)$  dimensions, whereas, the column vector  $(y_j) = (y_{1j}, y_{2j}, \dots, y_{nj})$  represents the distribution of achievements in the  $j^{th}$  dimension across the  $(n)$  households. The deprivation cut-off for the  $j^{th}$  dimension is indicated by  $(z_j)$ . Corresponding to any matrix  $Y = |y_{ij}|$ , a  $(n \times d)$  dimensional deprivation matrix  $g^0 = |(g_{ij}^0)|$  is constructed. Each element of  $g^0$  is equal to one when the  $i^{th}$  household is deprived in the  $j^{th}$  dimension and is equal to zero when the household is not deprived. In other words, each entry of the matrix  $g^0$  can take only two values as follows:

$$g_{(ij)}^0 = \begin{cases} 1 & \text{if } y_{ij} < z_j \\ 0 & \text{if } y_{ij} \geq z_j \end{cases}$$

Based on matrix  $g^0$ , we construct an  $n$ -dimensional column vector  $c = |c_i|$  where each element  $c_i$  indicates the number of deprivations suffered by the  $i^{th}$  household. This deprivation intensity column vector allows us the identification of three groups of potential beneficiaries according their poverty degree. Explicitly, these groups are written as follows:

$$N_{PE} = \{i \in \Omega_P, / c_i = k + 1\}$$

$$N_{PO} = \{i \in \Omega_P, / c_i = k\}$$

$$N_{VP} = \{i \notin \Omega_P, / c_i = k - 1\}$$

Where  $N_{PE}$ ,  $N_{PO}$  and  $N_{VP}$  represent, respectively, the total number of potential beneficiaries living in extreme poverty, in ordinary poverty and in vulnerability.  $\Omega_P$  represents the set of poor households and  $k$  denotes the number of deprivations, from which the household is considered poor. In counting identification methods, the criteria for identifying the poor can range from ‘union’ to ‘intersection’. The intersection criterion ( $k = d$ ) identifies a household as poor only if he is deprived of all considered dimensions. In contrast, the union criterion ( $k = 1$ ) identifies a household as poor if he is deprived in any dimension and indicates the swath of society that risks poverty at some point in time. In other words, if the intention is to prevent poverty in the future, vulnerability to poverty must be considered in the anti-poverty program and the union approach is helpful (Nasri and Belhadj, 2018).

With the proposed multidimensional targeting, if a household is going to have deprivation in a dimension or in an additional dimension, then he will automatically be considered a potential beneficiary included in one of the three groups highlighted above. In addition, the public decision-makers can limit or expand the scope of their interventions, depending on the country's economic and financial situation.

## 4. Empirical Results and Discussion

### 4.1. Overall Targeting Performance

As noted above, the targeting differential measures the association between poverty incidence and program coverage. The estimate of TD gives a useful summary statistic of overall performance in targeting poor. Also, the national targeting differential can be decomposed exactly into between-region and within-region components.

Table 5 calculates this indicator, which is the difference between the proportion of poor households who benefit from PNAFN  $B^P = \frac{s_{11}}{p} = 0.1310$  and the proportion of beneficiaries who are not poor  $B^{NP} = \frac{s_{12}}{1-p} = 0.0472$ , which give a positive targeting differential  $TD = 0.0838$ . This positive result rejects the nullity of independence between poverty incidence and the PNAFN coverage. Amongst all regions, 13.10% of the poor receive PNAFN benefits, as compared to 4.72% of the non-poor.

This positive performance has also been recorded for eleven provinces under Trabajar II<sup>3</sup> in Argentina Ravallion (1999), and for the BAJ1 (First Program of Social Priorities) implemented

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<sup>3</sup> Trabajar is a temporary employment program was established in Argentina in response to a sharp increase in unemployment, which was hurting the poor in particular

in Morocco (see, Van de wall 2005). By contrast, the targeting differential was significantly negative for several other social programs in Morocco, such as the NGO poverty program, the NGO literacy program, and the PAGER rural potable water investment program.

In 2011, the PNAFN benefits  $6.92\% = B$  of the population, and the poverty in Tunisia was estimated by  $15.5\% = P$ , then the differential of the maximum targeting is almost  $44.64\% (B/P)$ . The targeting differential is estimated by  $8.38\%$ , which presents  $20\%$  of the maximum, given that the scale of the program is insufficient to cover the poor even without leakage. Similarly, the targeting differential for AMGII is estimated at  $0.1671$ ; it is obtained by subtracting the proportion of beneficiaries who are not poor ( $= 0.1363$ ) from the proportion of poor beneficiaries ( $= 0.3034$ ).

On decomposing the national targeting differential for both programs, we found that all the overall targeting differential is accounted for by the intra-region component. The inter-region component marginally worsens the overall targeting differential. This result is similar to what was found by analyses of transfer programs in other countries (Alderman 2002, for Albania) and (Galasso and Ravallion 2001, for Bangladesh).

According to Table 5, it is clear that both programs include households that are not officially identified as poor and paradoxically exclude poor households at the same time. This led us to question the beneficiary selection process and to propose a new targeting methodology that resolve this issue.

#### **4.2 Beneficiaries Identification and Targeting Accuracy**

the potential beneficiaries are identified after neutralizing the impact of programs on the PNAFN and AMGII beneficiary's achievements. To this end, we have first removed from the food expenditure of households benefiting from the PNAFN the amount of the cash transfer devoted to the food dimension. This later is calculated for each beneficiary, by multiplying the share of food expenditure in the total expenditure and the total transfer  $T$  (1). Also, the average annual expenditure for a beneficiary of AMGII has been deducted from their health expenses. However, their education expenses have been reduced by an amount of 120 TND (equivalent to 83 USD) for households with only one child enrolled in school, 240 TND (equivalent to 166 USD) for households with two children in school and 360 TND (equivalent to 249 USD) for households with at less three children enrolled in school.

On the other hand, an amount of 350 TND (equivalent to 243 USD) has been deducted from health expenses for those benefiting from the AMGII program. Therefore, the total expenditures of beneficiaries of the anti-poverty programs have been recalculated with the new achievements.

the total number of potential beneficiaries is estimated by 825,122 households which represents 32.61% of the total population in 2011. This proportion includes all Tunisian households suffering from at least one deprivation. The results presented in Table 6 show that this proportion varies substantially between the Tunisian regions. It is estimated by 24.83% in Greater Tunis, and it is about 27.18% in the Northeast. However, this proportion is estimated by 43.75% in the North West, 57.20% in the West Center, and 35.58% in the South West. 39.01% is the proportion of potential beneficiaries living in the South East. The lowest proportion is estimated in the East Center (23.42%).

There is clear evidence that the proposed targeting methodology identify a higher beneficiary's number compared to selection process currently implemented in Tunisia. however, the inclusion of such number of households in a social program may be constrained by the unavailability of monetary resources and by the financial situation of the country. For this purpose, the deprivations targeting approach allows categorizing potential beneficiaries into three mutually exclusive and collectively exhaustive groups of households according to their degree of poverty.

The first group includes potential beneficiaries who are in extreme poverty. From results in Table 5 (Third column), 33716 households are identified in this first group (1.33% of the total population). The proportion of households included in this group vary considerably among the seven regions of Tunisia. The highest rates are estimated in Central West (4.79%), in the North West (2.56%) and in the South East (2.03%). The Greater Tunis region has the lowest rate (0.06%). The North East has the second lowest rate (0.57%), followed by the South West and Central East (0.69%). Therefore, there is an urgent need to target all dimensional interventions for all first group members without exception.

The second group includes potential beneficiaries suffering simultaneously and exactly from two deprivations. We have identified 7.89% of the total population that should be included in this group, this is estimated by 4.88% in Center East, and it is about 5.71% in the Northeast. However, this proportion is estimated by 11.92% in the North West, 11.38% in the South East, and 9.35% in the South West. 17.30% is the proportion of potential beneficiaries in the West Center which should be included in this second group. The lowest proportion is estimated in the Greater Tunis (4.04%). The potential beneficiaries of this second group also need social interventions in two dimensions constituting the main causes of their deprivations.

On the other hand, if the public decision maker in Tunisia sets the multidimensional poverty alleviation as an objective, then there is an urgent need for prioritizing households included in these first two groups who suffer from multiple deprivations, even in the case of an austerity

policy. However, to eradicate poverty in all its forms, it would be useful to strengthen the targeting of the two first groups through a forward-looking policy targeting proportion of households living in vulnerability to poverty. This proportion constitutes the potential beneficiaries of the third group. We found that this third group include 592,716 Tunisian households living with a single deprivation, it's about 23.42% of total population. This proportion represents 17.86%, 20.9%, and 25.61% of households living respectively in the Center East, North East and South West. The high proportions are observed in West Center (35.11%) and in North West (29.26%). This category of households likely to be poor in the future is a challenge for the international committee, and preventive policies must consider their situations to curb the flows of the poor and to protect households from becoming poor in the future.

There is clear evidence that targeting household deprivations is more accuracy in terms of inclusion of those are officially poor and in terms of the non-poor exclusion, compared to selection processes currently implemented in Tunisia.

According to Table 7, it is clear that targeting deprivations covers more households compared to selection process currently implemented in Tunisia.

We estimated 825,122 Tunisian households as potential beneficiaries of poverty reduction programs, of which 34.38% are officially identified as poor and 65.62% are non-poor. We found that 1.42% of households not selected as potential beneficiaries are officially identified as poor. However, 24.23% of households excluded by the current selection process are identified as officially poor.

On the other hand, our results show that 98.58% of households not selected as potential beneficiaries are also officially non-poor, while the current selection process allows to exclude only 75.77% of non-beneficiary's households that are officially not poor.

On estimating the targeting accuracy by potential beneficiaries' groups, we found that the methodology proposed in this research identify 94% of poor households in the group of potential beneficiaries living in extreme poverty (Figure 2) and only 6% are non-poor people who were included in this group. the poor and the non-poor who excluded from the first group are estimated at 11.06% and 88.94% respectively. As shown in Figure 2, the proportion of non-poor households that were excluded from the second group is estimated at 91.06%, while, the poor households excluded from this group of households living with exactly two deprivations, represent only 8.94%. However, we find that the two proportions of poor and non-poor households selected as potential beneficiaries are similar and estimated at around 50%.

Regarding the vulnerable household's group, the proportion of non-poor households is estimated at 74.27%. this category is likely to be poor in the future. The main advantage of protecting this group is to limit the flow of the poor and therefore their needs for social protection. Empirical evidence suggests that the most effective way to tackle poverty is to prevent rather than reverse poverty once it has occurred. the methodology proposed in this research allows public-decision maker to target both at the same time.

## **5. Conclusion**

Poverty is a major evaluative concern in most societies and the way in which we identify it has some practical importance in the design of the anti-poverty program. Unlike the universal policies, a number of social programs are targeted. In this research, we have proposed a new targeting methodology using a multidimensional approach that satisfies a set of axioms and can simultaneously encompass the target objectives of social programs currently implemented in Tunisia and the multiple deprivations of the poor household.

In the first part of this research, we have deciphered the relationship between official poverty measurement and anti-poverty programs currently implemented in Tunisia, with special emphasis on their targeting performance and on the divergence observed between the beneficiary selection process at the regional level and the official identification of poor households. The results obtained show that the national targeting differential is positive for both social programs, which rejects the nullity of independence between the incidence of poverty and program coverage. On decomposing the national targeting differential, we found that all the overall targeting differential is accounted for by the intra-region component.

The inter-region component actually marginally worsens the overall targeting differential. Our results suggest that both programs include households that are not officially identified as poor and paradoxically exclude poor households at the same time. This led us to question the beneficiary selection process and to propose a new targeting methodology that resolves this issue.

There is clear evidence that the proposed targeting methodology identify a higher beneficiary's number compared to selection process currently implemented in Tunisia. however, the inclusion of such number of households in a social program may be constrained by the unavailability of monetary resources and by the financial situation of the country. For this purpose, the deprivations targeting approach allows categorizing potential beneficiaries into three mutually exclusive and collectively exhaustive groups of households according to their degree of poverty. On the other hand, targeting household deprivations is more accuracy in

terms of inclusion of those are officially poor and in terms of the non-poor exclusion, compared to selection processes currently implemented in Tunisia.

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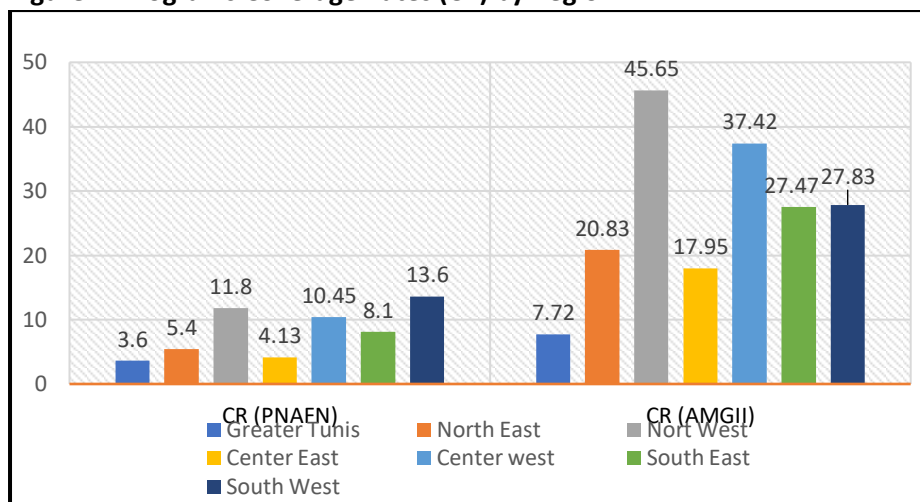
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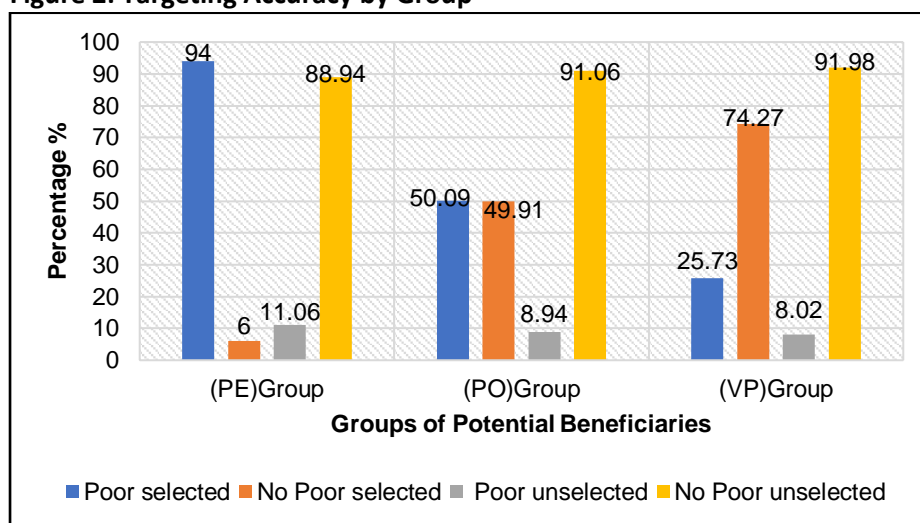
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## Figures

**Figure 1: Programs Coverage Rates (CR) by Region**



**Figure 2: Targeting Accuracy by Group**



## Tables

**Table 1: Eligibility Criteria for social safety nets in Tunisia**

Programs	Eligibility Criteria
<b>PNAFN</b>	1- Individual annual income 2- work ability of the household head 3- Loss of the head of the family, with the deterioration of the economic capacity of the family 4- lack of bond from among children who are able to spend or the inability of the bond to provide the basic needs of the family 5- The presence of people with disabilities or people with chronic or serious diseases within the family 6- Low living conditions in terms of housing and health facilities
<b>AMGII</b>	1- Annual income 2- Household size

Source: circulars and decrees ministerial, (MSA)

**Table 2: Distribution of beneficiaries between the two programs (PNAFN and AMGII)**

	% sample size	% population size (administrative data)
<b>PNAFN</b>	6.91	6.94 (169624)
<b>AMGII</b>	17.81	19.8 (484000)

**Table3. Decomposition of social programs by type of transfer**

Type of Transfer	T (1)	T (2)			T (3)	
		1	2	3+		
Annual Amount	840	120	240	360	— AMG1	— AMG2
<b>Total number of beneficiaries</b>	169624	12205	10004	9384	169624	576700
<b>Total Budget (MD)</b>	142484,2	1464,6	2400,96	3378,24	—	—

Source: Ministry of Social Affairs, 2011.

T (1) = 70 TND \* 12 months; T (2) = 10TND\* number of children in school \* 12months.

**Table 4: Dimensions and Deprivation Thresholds**

Dimensions	Deprivation thresholds description ( $Z_j$ )
<b>Food</b>	Household is deprived if his achievement in this dimension is below the food threshold estimated at 465000 TND by INS. The INS calculates this threshold by multiplying the median cost k cal reference group by the recommended energy needs.
<b>Education</b>	Household is deprived in this dimension if his achievement is below the education threshold estimated at 22027 TND defined as the mean of expenditure on education of households benefiting from the PNAFN or officially identified as poor
<b>Health</b>	Household is deprived in health if its income approximated by the total expenditure is lower than: * SMIG if household size $\leq 2$ persons * 1.5 SMIG if 3persons $\leq$ household size $\leq 5$ persons * 2 SMIG if household size $\geq 5$ persons

\* SMIG: the Interprofessional Guaranteed Minimum Wage estimated by 280 TND in 2011

**Table 5. Estimation of Overall Targeting Performance of Tunisian anti-poverty program**

		Poor		Total
		Yes	NO	
<b>PNAFN</b>	Yes	40355 = $s_{11}$	104922 = $s_{12}$	145277 = $B_{PNAFN}$
	NO	267545 = $s_{21}$	2117458 = $s_{22}$	2385003 = $1 - B_{PNAFN}$
	Total	307900 = P	2222380 = $1 - P$	1
	TD	0.0838		
	intra-region	0.0663		
	inter-region	0.0175		
<b>AMGII</b>	Yes	93443 = $s_{11}$	302922 = $s_{12}$	396365 = $B_{AMGII}$
	NO	214457 = $s_{21}$	1919458 = $s_{22}$	2133915 = $1 - B_{AMGII}$
	Total	307900 = P	2222380 = $1 - P$	1
	TD	0.1671		
	intra-region	0.1182		
	inter-region	0.0489		

**Table 6. Identifying of Potential beneficiaries in each Tunisian region**

<b>Regions</b>	<b>Total Head count</b>	<b>N(PE)</b>	<b>N(PO)</b>	<b>N(VP)</b>
<b>Tunisia</b>	825122	33716	198690	592716
	32.61%	1.33%	7.89%	23.42%
<b>Great Tunis</b>	156345	407	25414	130524
	24.83%	0.06%	4.04%	20.73%
<b>North East</b>	99921	2087	20983	76851
	27.18%	0.57%	5.71%	20.90%
<b>North West</b>	128936	7558	35133	86245
	43.75%	2.56%	11.92%	29.26%
<b>Central East</b>	140044	4121	29159	106764
	23.42%	0.69%	4.88%	17.86%
<b>Central West</b>	171449	14355	51852	105242
	57.20%	4.79%	17.30%	35.11%
<b>South East</b>	83028	4310	24213	54505
	39.01%	2.03%	11.38%	25.61%
<b>South West</b>	45399	878	11936	32585
	35.58%	0.69%	9.35%	25.53%

**Table 7. Targeting Methodology and Poverty Status**

		<b>Total</b>	<b>Poor</b>	
			<b>Yes</b>	<b>NO</b>
<b>Targeting Household Deprivations</b>	Yes	825122	34.38 %	65.62 %
	NO	1,705,158	1.42 %	98.58%
<b>Current Selection Process (both programs)</b>	Yes	541642	24.70 %	75.30%
	NO	1,988,638	24.23 %	75.77 %

