

TARGETING THE POOR BEYOND GAZA OR THE WEST BANK: THE GEOGRAPHY OF POVERTY IN THE PALESTINIAN TERRITORIES

Claus ASTRUP and Sébastien DESSUS*

***Abstract** - Despite its very limited size, the West Bank and Gaza is characterized by a remarkable diverse topography, climate and vegetation. In addition, as a result of the political situation in the region, there are considerable impediment to the movements of goods and people. Consequently, significant spatial differences in living standard may be expected. In this paper, we construct a detailed poverty map of the West Bank and Gaza, by estimating the incidence of poverty in 132 distinct localities. We derive the estimates by combining econometric analysis of the Palestinian Households Budget Survey with information contained in the Palestinian Census from 1997. Our results suggest that the incidence of poverty indeed differs greatly across localities. This indicates that it may be efficient to base targeting of the poor on the geography of poverty in the West Bank and Gaza. Specifically, we show that geographic targeting compares favorably, in terms of low leakage rates, to targeting mechanisms based on observable characteristics of potential beneficiaries. We also illustrate that targeting efficiency may be further improved by combing the two types of targeting mechanisms.*

Key-Words - PALESTINIAN TERRITORIES, POVERTY, PALESTINIAN HOUSEHOLD SURVEY.

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1. INTRODUCTION

Geographical aspects of economic patterns and behaviors are receiving increasing attention from economists. Whether it directly concerns geographical issues, as in transport, natural resource or agricultural economics, or more indirectly the impact of location or climatic conditions on income, trade, or labor flows, the geographical dimension is now commonly accounted for in economic analysis¹. The field of poverty analysis is no exception. In recent years, a growing literature has emerged on the geography of poverty, for various reasons². First, because it appears more and more clearly that the geographic conditions in which households live is an important determinant of poverty. E.g. access to markets, access to services, the quality of the soil, climate, and the ethnic dimension in decision making are all factors which potentially can play an important role for the living standards of the population. Second, because the development of new tools, such as Geographic Information System, enables researchers to record and analyze rapidly statistical information obtained at the local level³. Third, because geographical indicators of poverty may improve the efficiency of targeting poverty, if large differences in living standards are observed across localities⁴.

In this paper, we develop a poverty map for the West Bank and Gaza, which goes considerably further in terms of geographical disaggregation than those previously produced. Indeed, a commonly used disaggregation is simply the two physically separated entities, Gaza or the West Bank, although the Palestinian Central Bureau of Statistics (PCBS) has estimated poverty rates for the eleven governorates, which divide the West Bank and Gaza⁵.

This exercise is motivated by several factors. First, there are reasons to expect significant differences in living standards across localities within Gaza and the West Bank. This expectation is grounded on the fact that, despite its small size, equivalent to less than 1/1000 of the United States, the West Bank and Gaza is characterized by large variations in the topography, climate, and

¹ See for instance Redding and Venables (2000), who suggest that 70 percent of the variation in per capita income across country can be explained by the geography of access to markets and the source of supply of intermediate inputs, and Sachs (2000) who suggest that tropical climates have a negative impact on growth.

² See Bigman and Fofack (2000) for a review of this literature.

³ For and introduction to GIS and related tools, see Deichmann (1999) and Henninger (1998).

⁴ Examples include Baker and Grosh (1994), focusing on Venezuela, Mexico and Jamaica, Ravallion and Wodon (1997), for the case of Bangladesh, and Schady (1999) for Peru.

⁵ The eleven governorates distinguished in the household surveys conducted in West Bank and Gaza are: Jenin, Nablus, Tulkarem and Qualqiya, Ramallah, Bethlehem and Jericho, Jerusalem, and Hebron in the West Bank and Gaza North, Gaza City, Khan Yunis, and Rafah in Gaza.

vegetation⁶. In addition, there are also large differences in the quality of habitation and accessibility to public services, depending on whether an individual or household reside in a city, refugee camp or village. Second, and this makes West Bank and Gaza different from other countries, access to markets, urban centers, and the quality of public services depends not only on natural geographic conditions, but also on the political status conferred to the different areas by the Oslo agreements. This is accentuated by significant differences in the mobility of the Palestinian population depending on their place of residence through the enforcement of Israeli security measures. E.g., living in a major urban center in the West Bank like Ramallah compared to, say, Southern Gaza, has very different implications in terms of movement restrictions for both people and goods, and consequently most probably also on poverty.

The issue of movement restrictions is in itself an important motivation for drawing a detailed poverty map of the West Bank and Gaza: Because of the severe restrictions on movements within the Palestinian territories, not only can poverty levels differ widely between two neighboring areas, but there is also an acute need to locate anti-poverty programs where the poor are in order to reach them. Studies conducted in South Asian countries suggest that the potential for reducing poverty through redistribution or developmental projects targeted at large regions is low. This consideration is probably more than anywhere else valid in the West Bank and Gaza, where transaction costs were estimated in 1998 to triple the average in the Middle East⁷. The outbreak of the second Intifada in September 2000 further reinforces the need to precisely locate poverty, as poverty levels have increased markedly⁸, and movement restrictions are even more pronounced⁹.

Households surveys usually employed for estimating poverty have too small samples to produce reliable estimates at the local level. In West Bank and Gaza, the limit for geographical disaggregation using household surveys is met at the level of the 11 governorates. In order to estimate poverty rates at a more disaggregated level, we therefore adopt a two-step procedure in which we first estimate a logit model predicting poverty using information contained in

⁶ See ARIJ (2000) for a presentation of agro-climatic conditions in West Bank and Gaza.

⁷ Data indicate that transaction costs in West Bank & Gaza are extremely high: on average 35 percent is added to the cost of producing goods in West Bank & Gaza in order to bring them from the producer to the consumer. This is more than 3 times higher than the average premium in other countries in the Middle East and North Africa region (Astrup and Dessus, 2001).

⁸ The World Bank estimated that poverty (measured by the headcount index) had increased by 50 percent during the first three months of the Intifada (World Bank, 2001).

⁹ According to ARIJ, an additional 80 roadblocks were set up during the Intifada, most of them controlling key access roads within the West Bank. Most of the approximately 40 permanent checkpoints have been located on roads crossing the Green line (the pre-1967 border between Israel and Jordan).

household surveys. In the second step we combine the estimated coefficients with information from the Census data from 1997 to estimate local poverty rates.

The estimates of local poverty rates obtained, for West Bank and Gaza divided into 132 entities, show great geographical variation in the incidence of poverty. This information is in turn used to estimate the efficiency of targeting mechanisms based on geographical considerations. Results suggest that using poverty maps to target the poor compare very well, in terms of reduced leakage and under-coverage, with other possible targeting means. This, particularly for small programs, and/or for programs combined with individual targeting mechanisms.

This paper is organized as follows. Section II describes the data used and the methodology retained to estimate poverty at the local level. Section III presents the maps and discusses their characteristics. Section IV measures the efficiency of targeting the poor based on the geographical dispersion of poverty rates in the West Bank and Gaza, and Section V concludes.

2. DATA AND METHODOLOGY

We base our estimation of local poverty rates on two data sources: The Palestinian Expenditure and Consumption Survey (PECS) and the Palestinian Census, both carried out by the Palestinian Central Bureau of Statistics (PCBS). The Census was carried out at the end of 1997, whereas the PECS was carried out during 3 consecutive years from 1996 to 1998.

For PECS, data were collected from 4,547 households in 1996, 3,270 in 1997 and 2,851 in 1998, in 12 rounds throughout the survey year (with the exception of the first one, conducted from October 1995 to September 1996).¹⁰ Five types of information were collected for each household: (i) statement of the household members, including social, economic and demographic particulars of the household; (ii) housing characteristics; (iii) data pertaining to the source of income and labor status; (iv) ownership of durable goods; and (v) consumption by products.

For reasons of confidentiality, household data on income were not made available to us. However, it may be argued that consumption is anyway to be preferred over income to measure household welfare since consumption is likely to be less subject to fluctuation, because of household's smoothing behavior, and since it is subject to fewer measurement errors¹¹.

¹⁰ See National Commission for Poverty Alleviation (1998), *Palestine Poverty Report 1998*, or PCBS (1998a), for a detailed presentation of sampling methods used to conduct these surveys.

¹¹ See e.g. Deaton (1997)

The Palestinian Census covers all persons present in the WBG on the 10th of December 1997, a total of 2.678 million persons¹². The Census does not contain information on household consumption or income – if it did, we could derive local poverty rates directly from the Census data. However, the Census contains considerable information on household characteristics that are likely to be correlated with poverty, and, equally important, are comparable to the ones available in PECS, notably regarding household's members' characteristics, housing characteristics, main source of income and labor status.

681 distinct localities are identified in the Census, of which 639 are in the West Bank and 42 in Gaza.¹³ For each of the localities we have obtained from PBCS the mean value¹⁴ of the variables of interest, e.g. the share of the households in which the head are illiterate, or the share of households who owns a private vehicle.

In order to estimate local poverty rates, we use a two-step methodology analogous to the one used in Minot (2000).¹⁵ In the first step, the determinants of poverty is identified using regression analysis based on the information in PECS. The regression analysis is carried out under the restriction that the set of explanatory variables used is those, which are included in both PECS and the Census. In the second step, the estimated coefficients are combined with the average values of the explanatory variables in each locality obtained from the Census to predict the poverty rate in each locality.

Specifically, in the first step we determine each household's probability of being poor by estimating the following logit model, where the dependent variable, PSTA, takes the value 1 if the household is poor and 0 if the household is non-poor. X_i are the independent variables, and ε_i an error term.

$$\text{Prob}(PSTA = 1) = \frac{\exp\left(\alpha + \sum_i \beta_i X_i\right)}{1 + \exp\left(\alpha + \sum_i \beta_i X_i\right)} + \varepsilon_i \quad (1)$$

We use the poverty line derived by the Palestinian National Committee for Poverty Alleviation (1998) to determine if a household is poor or not: the poor

¹² Excluding Palestinians living in East Jerusalem, an estimated 201,000 persons.

¹³ See PCBS (1998b) for a detailed description of the methodology pursued for carrying out the Census.

¹⁴ Confidentially considerations prevent PCBS from providing us with access to the individual records of the Census.

¹⁵ In Hentchel *et al.* (2000) a slightly different methodology is used in the context of Ecuador, the main difference being that Hentchel *et al* use OLS in their first-step estimation. Their methodology is further developed in Elbers, Lanjouw J., Lanjouw P. (2001).

are those who can not afford a basket of basic goods consisting of food, clothing and housing, and a minimum of other needs such as health care, transportation and education. For any given household, the minimum necessary consumption depends on both the composition (adult/children) of the household and size of the household¹⁶. For a benchmark household of 2 adult and 4 children the per capita poverty line was estimated at US\$2.1 per day.

On average, 25.3 percent of the population in the West Bank and Gaza lived below the poverty line in 1997. This figure, however, conceals a large difference between the incidence of poverty in the West Bank and in Gaza: in the West Bank the poverty rate was 17.1 percent whereas it was 41.3 percent in Gaza.

For the estimations we pool the three household surveys. Household consumption and the poverty line are deflated using the CPI and we introduce monthly time dummies, to account for common shocks to all households. We estimate separate models for the West Bank and for Gaza, as there are structural differences in the determinants of poverty between the two regions. (A Chow-type test indeed confirm that the coefficients are different for the West Bank than for Gaza). Within these two regions, we also introduce regional dummies, to account for structural differences which cannot be captured by the observed characteristics of the households. The estimated coefficients are reported in Annex table 1.

The results confirm the expectation that employment status is an important determinant of poverty. In particular, households in which one or several members work in Israel¹⁷ are less likely to be poor. Also, the educational level of the head of household matters for poverty: households where the head has passed to a higher level than secondary school are generally less likely to be poor. Finally, with respect to the characteristics of the household, the size of the households is important: the larger the household – measured by the number of adult equivalent members – the higher the risk of being poor. On the other hand, the marital status of the head of household does not seem to matter much.

Housing characteristics and ownership of durable goods are, as expected, good indicators for whether a household is poor or not, the former especially so in the West Bank. Possession of a television, a video, a fridge, etc. are all associated with lower probability of the household being poor. Finally, in both

¹⁶ The adult equivalent conversion factor can be expressed as $(A+0.46C)^\alpha$, where A is the number of adults, C is the number of children and $\alpha = 0.89$ represents economies of scale in household expenditures.

¹⁷ The marginal effect of work in Israel is much higher in Gaza than in the West Bank, most likely due to the fact that the wedge between wages in Israel and Gaza is significantly higher than the one between Israel and the West Bank.

the West Bank and Gaza, the urban population is less likely to be poor, whereas the risk of poverty is of the same order of magnitude independent of whether the household resides in a village or a refugee camp.

It should be noted that the estimated coefficients may not be consistent if the disturbances are heteroscedastic¹⁸. Further, the fact that some of the explanatory variables, notably ownership of durable goods, are endogenous – that is, determined by the income level of the household, and hence implicitly by the poverty status – may add to the problem of inconsistency and bias of the estimated coefficients. The latter problem is commonly incurred in studies in which regression analysis is used to combine poverty indicators. As pointed out by Minot (2000) however, in the present context the methodology may be at least partially justified by the fact that the overarching objective is to use regression analysis to develop a descriptive tool, which will enable us identify the poor, rather than study the determinants of poverty or the magnitude of the coefficients¹⁹.

Using the estimated coefficients from (1) above, and using the mean of the explanatory variables at the locality level we are able to calculate the expected poverty rate in each locality, P^l , as follows:

$$P^l = \frac{\exp\left(\alpha^{ADJ} + \sum_j \beta_j \overline{X_j^l}\right)}{1 + \exp\left(\alpha^{ADJ} + \sum_j \beta_j \overline{X_j^l}\right)} \quad (2)$$

where β_j is the estimated coefficients from the logit, $\overline{X_j^l}$, is the average of the explanatory variables in each locality and α^{ADJ} is an intercept term. The intercept is identical for all localities within the same governorate. It is calculated through a numerical procedure so as to ensure that the population-weighted average of local poverty rates add up to the poverty rate at the governorate level, calculated from PECS. For a number of reasons this is not automatically the case: First, the relationship (2) is non-linear. Second, the mean of the variables in the PECS is not identical to the mean of the variables observed in the Census. Third, because we use the locality-means of the explanatory variables, we implicitly assume that differences in local poverty rates reflect differences in the level of the variables between localities, rather than in the distribution of the variables within localities or a combination of the two.

¹⁸ The risk of heteroscedasticity is however reduced by the introduction of time and regional dummy variables.

¹⁹ In a separate analysis, we have tried to identify the structural determinants of poverty, see World Bank (2001).

In principle, we could use the method outlined above to calculate poverty rates at level of 681 localities. This level of disaggregation is, however, too high to be practically relevant. First, the operational relevance of using this level of disaggregation remains limited because the cost of targeting localities with perhaps as little as 10 inhabitants becomes prohibitive, especially when weighted against the number of potential beneficiaries. Moreover, existing administrative structures, infrastructure conditions etc. does not allow for differentiated treatment at this level disaggregation anyway. Indeed, in the West Bank and Gaza there are no obvious comparable administrative entities below the governorate level, which would have been otherwise a natural choice of disaggregation. Several types of administrative status characterize the 681 localities, from municipalities and village councils to refugee camps and local development committees, underscoring the difficulties in implementing poverty alleviation policies uniformly at this level.

Second, this level of disaggregation implies that the number of observation in a many localities becomes very small²⁰, which will increase the standard errors of the predicted local poverty rates, making the estimate less reliable and useful. The standard error of the predicted local poverty rates can be decomposed into 2 components: i) a model error; and ii) an idiosyncratic error²¹, see Elbers et al. (2001): The model error relates to the fact that there are standard errors associated with the estimated coefficients in the first step regression, while the idiosyncratic error is due to the fact that the first step regression contains a disturbance term.

The standard errors of the predicted local poverty rates, which are due to model error, can be calculated using the so-called Delta method. Because this component is entirely determined by the properties of the first stage estimation, it does not depend on the population size of the locality. Specifically, the Delta method consists of estimating the standard error of the predicted probability of being poor by differentiating it with respect to the vector of estimated coefficients, evaluated at the point estimate of this vector. The values of the exogenous variables, the locality means, are not stochastic since they cover the full population (by opposition to values extracted from a sub-sample). It is therefore not needed to take into account possible variation of them.

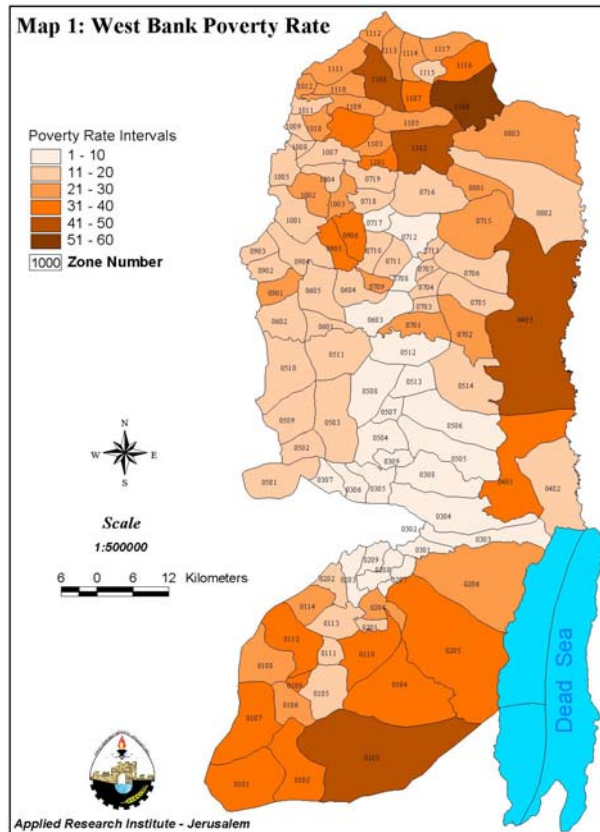
The idiosyncratic error depends on the distribution within each village, and is a declining function of the number of observations in each village. As we do not have individual specific information, we are not able to estimate the idiosyncratic error.

²⁰ Of the 681 localities, 341 have less than 1,000 inhabitants.

²¹ As noted by Elbers *et al.* (2001), there is a third source of error: computation error, which depends on the method of computation used. However, the computation error can be made as small as desired, unlike the other two sources of error.

3. A POVERTY MAP OF THE WEST BANK AND GAZA

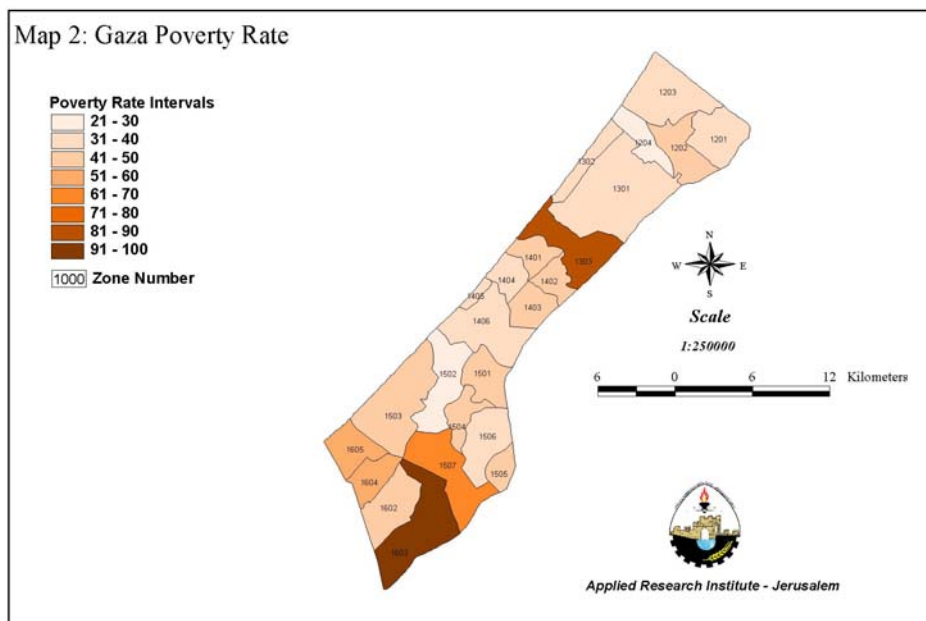
In order to accommodate both the statistical issue regarding the reliability of the predicted poverty rates and the institutional considerations we decided on a threshold population in each locality of 5,000 persons. Natural boundaries like build-up areas, and the layout of the existing road network, were taking into consideration when delineating each locality, in addition to the requirement that each locality must be continuous. In total, 132 distinct localities were identified, of which 108 are located in the West Bank and 24 in Gaza. The average population of the localities in the West Bank is approximately 15,000, whereas the much higher population density in Gaza implies an average population of 42,000 among the Gazan localities.



Note: The Denominations used and the boundaries shown on the maps presented in this paper do not imply, on the part of the World Bank Group, any judgement on the legal status of any territory or any endorsement or acceptance of such boundaries.

The estimated incidence of local poverty reveal striking differences, see maps 1 and 2 and Annex Table 2.

In 21 localities the poverty rate exceeds 40 percent, while 23 localities have a poverty rate below 10 percent. Our estimates confirm the general held impression that the incidence of poverty is highest in the southern part of Gaza: Indeed, of the top ten poorest localities six are to be found here, including Shokat as Sufi, which is characterized by generalized poverty as more than 90 percent of the almost 6,000 inhabitants are estimated to be poor. But also the poverty rate in several localities in the West Bank is very high: The area around Raba in the northern district of Jenin has an estimated poverty rate of 53 percent; and 45 percent in both Al-Jiftlik in the Jordan Valley and in Ya'bad in the southern Hebron district are estimated to live below the poverty line. In total, the top ten poorest localities comprise almost 20 percent of the poor. The incidence of poverty is lowest around the urban centers in the West Bank: In the localities on the outskirts of Jerusalem, in the town of Ramallah and in the city of Nablus, the incidence of poverty is estimated to be below 5 percent.



Note: The Denominations used and the boundaries shown on the maps presented in this paper do not imply, on the part of the World Bank Group, any judgement on the legal status of any territory or any endorsement or acceptance of such boundaries.

On average, the estimated standard deviations of predicted local poverty rates equal 7.9 percent, see annex table 2. That is, using a 90 percent confidence level, predicted local poverty rates fall within an interval of ± 13.0 percent. As a

first illustration of the variation in local poverty rates, our results indicate that of the 132 localities, 49 have a poverty rate which is significantly different – either higher or lower – than the national average of 25.3 percent. Another indicator for the degree of geographical inequality can be constructed by counting all the pairs of localities which have significant differences in their poverty rates. This is the case for 1811 out of a total of 8,646 pairs, indicating that more than 1/5 of all pairs concern localities with significant differences in poverty rates. Put differently, if one picks two localities randomly, there is 20 percent chances to observe one of the two localities significantly poorer than the other one.

4. THE EFFICIENCY OF GEOGRAPHICAL TARGETING OF THE POOR IN THE WEST BANK AND GAZA

Using the geographic dispersion in poverty rates to target poverty alleviation programs has a number of advantages over other targeting mechanisms²². First, it provides a criteria for identifying the target population, which is easy to implement, in contrast to targeting mechanisms which require extensive information, possibly at the household level. Second, it is relatively easy monitor the disbursement of resources. Third, it has only marginal impact on the behavior of households, as it is costly to change place of residence, relative to the benefits derived from most poverty alleviation programs. Fourth, geographical targeting is useful for a range of programs not only transfer schemes but also provision of social services or infrastructure investments (naturally, with respect to the latter, a location must be decided upon). Fifth, it is fairly easy to combine geographical targeting with other targeting mechanisms.

The basic rationale for using geography as targeting mechanism is the existence of significant differences in living standards across localities: if living standards are roughly the same across localities there would not be much gained by using geography as targeting mechanism. And, the use of geographical targeting of course requires reliable estimates of living standards in sufficiently small areas, in order to determine eligibility. Potential obstacles for the use of geographic targeting are that it may foster resistance from localities determined non-eligible, and that implementation capacity may vary across localities²³.

The large disparities in the incidence of poverty between localities in WBG suggest that the geographical dimension should indeed be taken into account when designing policies aimed at alleviating poverty. The question is how much, if anything can be gained in terms of targeting efficiency by relying

²² See the discussion in Bigman and Fofack (2000).

²³ E.g. Ravallion (1998a) show in the case of Argentina that provincial ability at reaching poor areas are more important for the poverty alleviation than the central government's ability to target poor provinces, and that poor provinces were less effective at targeting their poor areas.

on the geographical distribution of poverty, rather than other targeting mechanisms?

We assess targeting efficiency by considering two commonly used measures: leakage and under-coverage rates. The leakage rate measures the probability that a non-eligible person benefits from the program, while the under-coverage rate measures the probability that a person per se eligible for the program does not benefit²⁴. For simplicity, assume that transfers to all eligible persons (or households) are identical, and equal to US\$1. Let H_j be the headcount index of locality j , H^T be the head-count index for Gaza or the West Bank, respectively, and let s_j be locality j 's share of the total population. Using this notation, the leakage rate, L , can be calculated as follows:

$$L = \frac{\sum_{j \in J} s_j (1 - H_j)}{\sum_{j \in J} s_j} \quad (3)$$

where J is the set of all localities covered by the program. The under-coverage rate, U , can be expressed as follows:

$$U = 1 - \sum_{j \in J} s_j \frac{H_j}{H^T} \quad (4)$$

The simplest benchmark for the efficiency of geographical targeting of the poor is to compare with a non-targeted program, i.e. a program which allocates the same amount of resources to each recipient irrespectively whether the recipient is poor or not. A non-targeted program has the advantage of being cheap to administer, as there is no attempt to distinguish between poor and non-poor. Moreover, distortions to the incentive structure facing individuals are low, as all individual are eligible. The main drawback of a non-targeted program is obviously that total costs²⁵ are high, because a considerable share of the resources is transferred to non-poor.

From the definitions of leakage rates and under-coverage given above, it is clear that the leakage rate of a universal, non-targeted program is simply equal to $(1 - H^T)$, and the under-coverage rate is 0. Consequently, in the case of the West Bank and Gaza, such a program would have a leakage rate²⁶ of 82.9 percent (West Bank) and 58.7 percent (Gaza).

²⁴ Leakage is often referred to as the "Type I" error of targeting, and under-coverage as the "Type II" error of targeting, see e.g. Wodon (1997).

²⁵ The total cost of a program can be broken down to three components: i) the cost of obtaining information on eligible persons; ii) cost due to changed incentives due to program iii) cost of providing the benefit. The first component is of course 0 in case of a universal program.

²⁶ According to the headcount indices in 1997.

Using a non-targeted program as benchmark may not be considered ambitious enough. In particular, it may be feasible to improve targeting by basing it on observable characteristics of the recipient that are expected to be correlated with poverty. Table 1 lists leakage and non-coverage rates for a number of targeting criteria, for the West Bank and Gaza separately. It appears that using single, observable criteria do not improve targeting much. E.g. targeting the poor using female headed households as the defining criteria would in the West Bank result in a leakage of 80 percent, since only 20 percent of the female headed households are poor, representing only a modest reduction in leakage compared to a non-targeted program²⁷. Using the same criteria in Gaza would result in considerably lower leakage, 51.3 percent, because the poverty rate among female headed households in Gaza is much higher than in the West Bank. The most promising criteria in terms of leakage appear to be that the head of household is unemployed. In this case, leakage rates would be 72.7 percent in the West Bank and 37.7 percent in Gaza. However, the relative good performance in terms of leakage is counterbalanced by high a under-coverage rate because only a few households have an unemployed head: 95.8 percent of the poor in the West Bank would not be covered by such a scheme. For Gaza the figure is 87.5 percent.

Table n° 1: Scope and efficiency of selected targeting mechanisms

	Potential number of Poor Reached (1,000)		Rate Leakage (%)		Under coverage (%)	
	WB	G	WB	G	WB	G
Universal, non-targeted program	297.7	393.8	82.9	58.7	0.0	0.0
<i>Targeting by:</i>						
Residence in refugee camp	19.2	120.1	83.5	53.6	93.5	59.7
More than 5 children	125.5	169.3	79.3	53.2	57.9	43.1
Female head of household	16.0	12.7	80.0	51.3	94.6	95.7
Head of household older than 59 years	68.0	56.7	78.1	50.5	77.2	80.9
Head of household unemployed	12.6	37.2	72.7	37.7	95.8	87.5
Head of household less than secondary education	213.9	174.2	78.7	49.7	28.1	41.5
Head of household widow	12.6	11.4	80.6	53.3	95.8	96.2

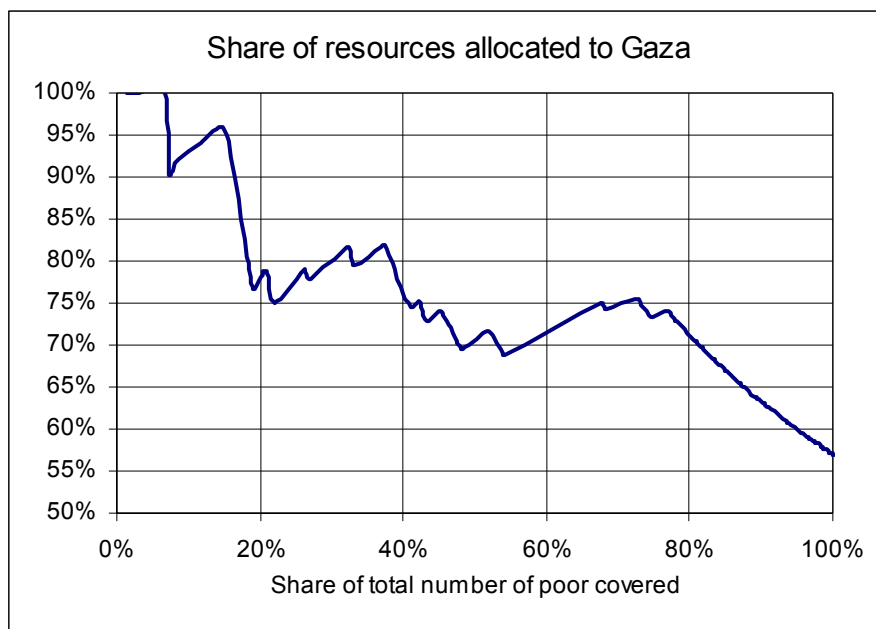
When implementing a poverty alleviation program based on geographical targeting, and given a fixed resource constraint, both the leakage rate and the under-coverage rate is minimized by allocating resources to localities with the

²⁷ The relatively low incidence of poverty among female headed households may of course reflect the impact of existing social safety nets. Formal social safety nets in the West Bank and Gaza are, however, characterized by both low coverage rates, and considerable leakage, see World Bank (2001).

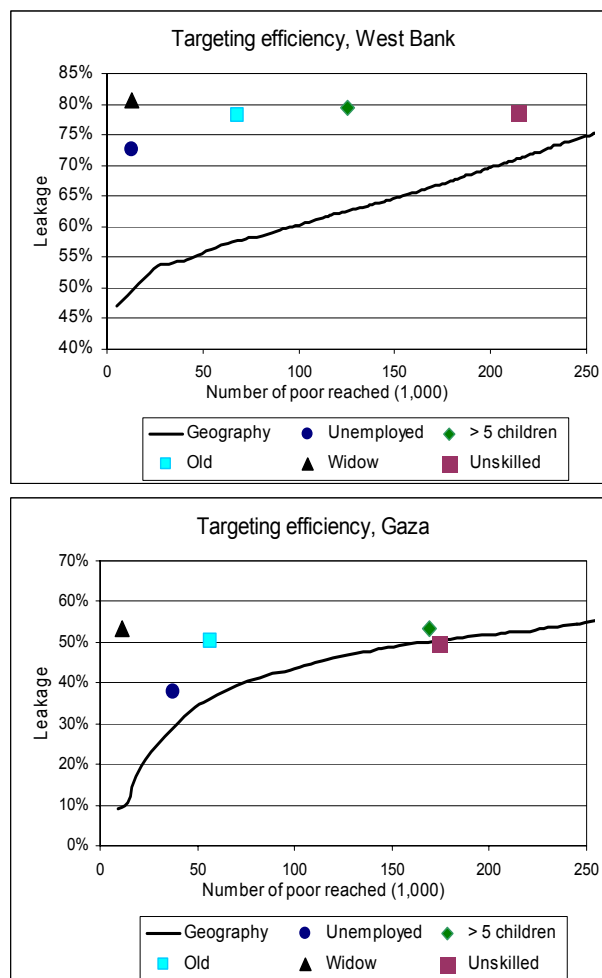
highest head-count indices first. Consequently, the lowest possible leakage rate which can be obtained through geographic targeting is equal to 1 minus the highest local headcount index. In the case of the West Bank and Gaza, the lowest possible leakage rate is equal to 9 percent, which would be obtained by allocating the resources to Shokat as Sufi, which according to our estimates is the poorest locality the West Bank and Gaza. A program confined to this locality would however be characterized by a high under-coverage rate, as an estimated 98.7 percent of all poor in the West Bank and Gaza would not benefit from the program.

Allocating resources between Gaza and the West Bank

In general, the higher incidence of poverty in Gaza compared to the West Bank implies that the efficiency of targeting is maximized by allocating the largest share of program resources to Gaza. The final allocation depends on the scope of the program, i.e. how many poor the program intends to reach, and the ranking of local head count indices in the West Bank and Gaza as a whole. In the trivial case where a program intends to cover all poor in the West Bank and Gaza, the allocation will be determined by the share of the poor living in the West Bank, approximately 43 percent and in Gaza, approximately 57 percent. The share of resources allocated to Gaza should, however, be larger if the scope of is more narrow than all poor. The figure below illustrates the share of resources to be allocated to Gaza as a function of the scope of the program.



If the scope is approximately 10 percent of the poor, roughly 70,000 persons, targeting efficiency will be maximized by allocating approximately 90 percent of the resources to the poorest localities in Gaza; a scope of 20-40 percent of the poor implies an allocation of approximately 80 percent to Gaza. Only if the scope is more than 80 percent of the poor will the share of resources allocated to Gaza be below 70 percent.



The reason for the disproportionate share to be allocated to Gaza is not only that the incidence of poverty in general is higher in Gaza than in the West Bank, but also that the average number of poor per locality is approximately 6 times higher in Gaza than in the West Bank, 16,400 as compared to 2,700.

In practice, many factors, not least political considerations, will determine the allocation of resources between Gaza and the West Bank. In the following we therefore evaluate the efficiency of geographical targeting for a given resource allocation between the two regions. Specifically, we calculate for Gaza and the West Bank separately the trade-off between the scope of a program, measured by the number of poor reached, and the associated leakage rate. The trade-off is illustrated in the two figures below.

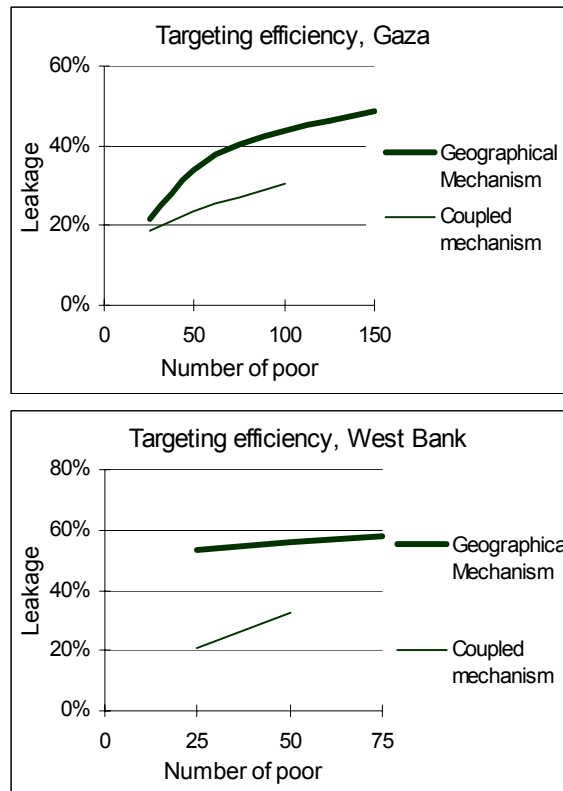
The figures reveal first of all that leakage rates are lower in Gaza than in the West Bank, for a given scope of a program; e.g. if a program aims at reaching 50,000 poor²⁸ in Gaza through geographical targeting, the leakage rate would be approximately 35 percent. The corresponding leakage rate in the West Bank would be approximately 55 percent. The lower leakage rates in Gaza reflect higher poverty rates in Gazan localities compared to localities in the West Bank. In addition, the figures illustrate that when geographical targeting is applied, leakage rates are lower than when targeting is based on any of the selected observable characteristics of the beneficiaries. Relative to other targeting mechanisms, geographical targeting is particularly efficient in the West Bank, whereas the gains from geographical targeting in Gaza are more modest. Still, as long as a program does not aim at reaching more than 175,000 poor, i.e. approximately half of the total number of poor in Gaza, geographical targeting is most efficient.

This does obviously not mean that observable characteristics of the potential beneficiaries could not be used in addition to the place of residence to better target the poor. For instance, according to the econometric analysis, the risk of being poor increases significantly when the head of household is unemployed, everything else being equal. Consequently, implementing programs able at targeting the unemployed, such as e.g. an employment generation program²⁹, could further reduce the leakage rate. Of course, the larger the proportion of poor (and of unemployed in the region), the less important the marginal impact of selecting unemployed people on the leakage rate will be. The following two graphs show the impact of coupling a geographical targeting mechanism with a single observable characteristics (head of household being unemployed). This is compared to the case where poor are targeted only depending on where they live, represented by the thick line. In order to draw

²⁸ Note that the *relative* impact on poverty would be lower in Gaza than the West Bank, because the total number of poor is higher larger in Gaza than in the West Bank.

²⁹ These programs offer indeed by nature the possibility to target unemployed workers, since people benefiting from such as program receive assistance in compensation of their work. The beneficiaries have not therefore the physical possibility to work somewhere else. In addition, these programs generally offer low wages, thereby only attracting workers with low reservation wages, that is, jobless in serious financial need. See Besley and Coate (1992) for a theoretical discussion of this kind of programs, and Ravallion (1998b) for methods to appraise such programs.

these curves, we compute the average poverty rate of unemployed people in each locality, based on the estimation of a logit model of the determinants of poverty, where all possible endogenous variables have been excluded from the right hand side³⁰. The two graphs above clearly illustrate the increase in efficiency obtained by combining the two targeting mechanisms mentioned; by the lower leakage rate than if only the geographical dimension is considered. However, the potential coverage rate is limited this coupled targeting mechanism, since the unemployed poor only represent a fraction of the total number of poor.



5. CONCLUDING REMARKS

In this paper, we have developed a detailed poverty map for the West Bank and Gaza, by estimating poverty rates for 132 distinct localities. The poverty map was constructed using a two step statistical procedure whereby

³⁰ Specifically, we only keep from the models reported in Annex the following variables to explain poverty: marital status, work status, location and educational levels.

information on the correlates of poverty extracted from households surveys was combined with information on the characteristics of households as reported in the Census survey from 1997.

Our results suggest that, despite the limited size of the West Bank and Gaza, there exist large and significant differences in the incidence of poverty across localities in West Bank and Gaza. A small number of localities in Gaza is characterized by poverty rates exceeding 60 percent. Also some localities in the West Bank have very high poverty rates. The poverty rate in 49 out of the 132 localities is significantly different – higher or lower – from the average incidence of poverty in West Bank and Gaza, which was 25.3 percent in 1997.

Given this high level of regional inequality, there is considerably scope for geographical targeting of poverty alleviation programs. These programs may take many forms, e.g. reducing the economic distance between the remote areas of the South of Gaza, South of Hebron, Jordan Valley, East of Jenin, and urban centers, synonymous for larger markets and better access to public services, but also assistance, e.g. infrastructure or workfare programs, located in the poorest localities.

Our results indicate that the efficiency of geographical targeting, in terms of leakage rates, compare favorably to other targeting mechanisms, even for programs aimed at covering a substantial proportion of the poor. And, if geographical targeting is combined with other mechanisms, the efficiency may be further improved. This calls for a poverty alleviation strategy based on both spatial considerations and considerations of the characteristics of beneficiaries, in order to efficiently target the poor. In this paper we have abstracted from the administrative costs incurred by different targeting mechanisms. These should obviously been taken into consideration in the design of anti-poverty policies.

ANNEX

Table n° 1: The first stage model: Estimated correlates of poverty in the West Bank and Gaza

Explanatory variables:	<i>West Bank</i>				<i>Gaza</i>			
	Estimated coefficient	Marginal effect	Standard error	t-statistic	Estimated coefficient	Marginal effect	Standard error	t-statistic
Marital status:								
- Married	-0.055	-0.006	0.207	-0.264	-0.061	-0.010	0.367	-0.167
- Divorced	-0.339	-0.034	0.504	-0.674	-1.067	-0.168	0.761	-1.403
- Widowed	0.056	0.006	0.243	0.229	-0.171	-0.027	0.407	-0.421
Housing type:								
- House	-0.664	-0.067	0.473	-1.404	0.103	0.016	1.217	0.084
- Villa	-0.949	-0.096	1.150	-0.825	-1.555	-0.245	1.634	-0.951
- Apartment	-1.137	-0.115	0.486	* -2.341	-0.446	-0.070	1.220	-0.365
Tenure type:								
- Rented	0.403	0.041	0.166	* 2.428	0.374	0.059	0.288	1.298
- Owned	-0.309	-0.031	0.125	* -2.466	-0.160	-0.025	0.198	-0.809
Heating type:								
- Electric	-0.978	-0.099	0.200	* -4.898	-0.882	-0.139	0.156	* -5.658
- Gas	-1.161	-0.118	0.182	* -6.392	-1.112	-0.175	0.373	* -2.978
- Kerosene	-0.786	-0.080	0.163	* -4.817	-0.211	-0.033	0.295	-0.715
- Oil	-1.147	-0.116	0.467	* -2.457	-0.001	0.000	0.105	-0.006
- Coal	-0.382	-0.039	0.148	* -2.589	n.a.			
Cooker type:								
- Electric	-1.093	-0.111	1.433	-0.763	n.a.			
- Gas	-0.710	-0.072	0.788	-0.901	n.a.			
- Kerosene	0.338	0.034	0.847	0.399	n.a.			
- Coal	-0.362	-0.037	0.829	-0.437	n.a.			
Share of household members who are:								
- Employer	-1.605	-0.163	0.978	-1.641	-2.253	-0.355	0.989	* -2.277
- Self-employed	0.418	0.042	0.313	1.334	0.056	0.009	0.384	0.145
- Family worker	-0.820	-0.083	0.620	-1.321	-0.559	-0.088	0.692	-0.807
- Govt. employee	-0.852	-0.086	0.461	-1.847	-1.599	-0.252	0.409	* -3.911
- Private employee	0.559	0.057	0.303	1.846	-0.057	-0.009	0.356	-0.160
- Unemployed	1.565	0.159	0.522	* 3.000	1.003	0.158	0.437	* 2.297
- Student	1.078	0.109	0.274	* 3.934	1.363	0.215	0.304	* 4.480
- Housekeeper	2.319	0.235	0.305	* 7.614	0.796	0.125	0.380	* 2.093
- Work in Israel	-0.757	-0.077	0.324	* -2.334	-2.014	-0.317	0.449	* -4.484
- Work abroad	1.292	0.131	1.242	1.040	-0.702	-0.111	1.391	-0.505
Log of adult equivalent household members	1.226	0.124	0.106	* 11.596	1.693	0.267	0.127	* 13.301

Household lives in:									
- City	-0.340	-0.034	0.168	* -2.032	-0.442	-0.070	0.154	* -2.862	
- Village	-0.206	-0.021	0.153	-1.345	-0.096	-0.015	0.143	-0.667	
Education level of head of Household:									
- can read/write	-0.153	-0.015	0.116	-1.313	-0.079	-0.012	0.163	0.487	
- Elementary school	-0.150	-0.015	0.119	-1.260	-0.130	-0.020	0.163	-0.797	
- Preparatory school	-0.209	-0.021	0.129	-1.617	-0.281	-0.044	0.164	-1.710	
- Secondary school	-0.607	-0.062	0.161	* -3.783	-0.192	-0.030	0.171	-1.124	
- College	-0.678	-0.069	0.214	* -3.164	-0.508	-0.080	0.235	* -2.162	
- University	-1.171	-0.119	0.287	* -4.078	-0.975	-0.153	0.247	* -3.946	
- Post Graduate	-0.187	-0.019	0.580	-0.321	-0.991	-0.156	0.734	-1.350	
Household owns:									
- TV	-0.407	-0.041	0.118	* -3.453	-0.485	-0.076	0.165	* -2.939	
- Video	-0.334	-0.034	0.140	* -2.379	-0.674	-0.106	0.152	* -4.419	
- Telephone	-0.484	-0.049	0.121	* -4.018	-0.939	-0.148	0.134	* -7.019	
- Fridge	-0.443	-0.045	0.104	* -4.265	-0.686	-0.108	0.166	* -4.142	
- Cooker	-0.157	-0.016	0.084	-1.861	-0.315	-0.050	0.111	* -2.840	
- Washing machine	-0.343	-0.035	0.091	* -3.789	-0.455	-0.072	0.137	* -3.328	
- Solar boiler	-0.615	-0.062	0.082	* -7.463	-0.374	-0.059	0.113	* -3.321	

Note: *: significantly different from zero at the 5 percent confidence level. Monthly and regional dummies are not reported in the table.

Table n° 2: Estimated local poverty rates

Locality Code	Number of poor	Poverty rate (%)	Standard deviations (%)
WEST BANK			
101	9,365	37.80	8.04
102	6,967	38.00	7.94
103	21,800	45.40	8.03
104	5,154	33.90	8.11
105	15,663	12.60	7.93
106	6,076	20.60	7.91
107	8,985	38.30	7.79
108	7,374	29.30	8.06
109	2,712	37.10	7.99
110	6,754	30.60	7.90
111	2,883	17.80	8.00
112	6,747	30.60	7.94
113	3,601	20.30	7.87
114	3,242	30.40	7.78
201	1,243	14.90	7.27
202	658	11.00	6.95
203	869	9.80	6.80
204	3,672	28.90	6.81
205	4,134	33.40	6.60
206	2,269	21.60	7.00
207	654	4.70	6.74
208	3,025	8.50	6.63
209	1,668	6.10	6.80
301	217	3.70	6.91
303	559	2.40	6.94
304	252	2.50	7.16
305	327	2.70	6.95
306	332	3.50	6.91
307	416	3.80	6.90
308	482	1.70	7.07
309	331	1.90	7.22
401	2,764	32.50	6.65
402	2,069	13.60	6.83
403	3,976	45.10	7.75
501	1,128	18.40	7.34
502	2,246	18.50	7.80
503	2,646	15.50	7.54
504	1,768	2.80	7.56
505	825	9.20	7.30
506	892	8.70	7.05
507	853	8.20	7.20
508	1,491	8.80	7.05
509	1,210	12.20	7.30
510	2,708	17.50	7.83
511	2,020	13.70	7.09
512	1,024	9.40	7.08
513	973	9.30	7.09
514	1,240	17.50	7.19
601	1,526	19.60	6.64
602	1,610	16.80	6.65
603	843	8.90	6.69
604	1,385	13.70	6.70
605	1,398	12.60	6.77
701	1,925	23.20	6.61

702	1,735	21.90	6.79
703	1,470	18.60	6.77
704	957	14.00	6.91
705	1,360	18.40	6.85
706	1,469	17.90	6.81
707	1,066	20.00	6.88
708	650	10.50	6.71
709	1,353	22.60	6.81
710	849	14.40	6.77
711	1,335	17.00	6.68
712	4,553	4.40	6.95
713	3,505	12.30	6.82
714	3,272	22.90	6.61
716	2,495	14.30	6.61
717	632	9.70	6.71
718	680	11.20	6.60
719	1,196	16.10	6.57
801	3,441	26.70	6.52
802	1,658	13.30	6.66
803	2,547	27.20	6.84
901	2,004	23.80	7.34
902	1,240	15.50	7.46
903	3,959	12.00	7.37
904	1,839	17.80	7.30
905	1,624	30.60	7.28
906	2,157	32.90	7.23
1001	1,566	18.50	7.23
1002	1,491	25.50	7.20
1003	1,487	24.00	7.44
1004	794	12.50	7.13
1005	7,562	12.40	7.18
1007	1,172	18.10	7.34
1008	1,002	13.70	7.39
1009	1,506	14.40	7.29
1010	1,129	21.20	7.47
1011	1,406	18.70	7.12
1012	1,499	21.60	7.68
1101	5,760	39.70	10.52
1102	7,525	44.20	10.36
1103	1,420	25.70	10.26
1104	3,686	33.50	10.30
1105	2,095	30.30	10.39
1106	4,787	53.40	10.20
1107	6,122	37.00	10.33
1108	3,128	42.20	10.58
1109	1,948	25.30	10.46
1110	2,853	24.90	10.47
1111	2,649	28.40	10.39
1112	1,822	25.90	10.30
1113	5,042	24.70	10.45
1114	2,360	27.80	10.42
1115	5,872	15.80	10.32
1116	2,828	34.40	10.16
1117	1,209	20.60	10.30
GAZA			
1201	9,700	37.20	8.7
1202	27,051	43.20	8.9
1203	12,971	32.40	8.8

1204	15,161	27.70	8.9
1301	93,745	31.50	9.6
1302	25,055	39.60	9.5
1303	5,233	87.10	8.1
1401	18,839	41.30	8.9
1402	10,639	41.40	8.9
1403	8,308	44.90	8.9
1404	3,956	36.10	8.8
1405	3,322	39.10	8.9
1406	12,496	32.40	8.7
1501	5,792	45.40	8.8
1502	27,236	30.10	8.8
1503	20,085	50.00	8.7
1504	9,841	41.90	8.9
1505	2,965	42.80	8.8
1506	6,678	37.70	8.8
1507	6,688	65.80	8.7
1602	24,223	47.60	8.8
1603	8,974	91.10	8.1
1604	25,205	58.60	9.0
1605	9,605	53.10	9.0

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LA GÉOGRAPHIE DE LA PAUVRETÉ DANS LES TERRITOIRES PALESTINIENS

Résumé - En dépit de sa petite surface, le territoire de la Cisjordanie et Gaza est caractérisé par la diversité de sa topographie, de son climat et de sa végétation. En outre, en raison de la situation politique dans la région, il existe une entrave considérable aux mouvements des marchandises et des personnes. Aussi, des différences spatiales significatives de niveaux de vie existent. Dans cet article, nous construisons une carte détaillée de la pauvreté en Cisjordanie et à Gaza, divisée en 132 régions distinctes. Les estimations combinent l'analyse économétrique de la consommation des ménages palestiniens avec l'information contenue dans le Recensement Palestinien de 1997. Nos résultats suggèrent que l'incidence de la pauvreté diffère très fortement d'une zone à l'autre. Aussi une politique efficace de lutte contre la pauvreté doit cibler ses zones d'interventions. En particulier, nous montrons que le ciblage géographique permet d'obtenir de meilleurs résultats qu'un ciblage basé sur les caractéristiques observables des bénéficiaires potentiels. Nous montrons également qu'une combinaison des deux types d'interventions permet d'obtenir un meilleur ciblage de la pauvreté.

GEOGRAFÍA DE LA POBREZA EN LOS TERRITORIOS PALESTINOS

Resumen - A pesar de una pequeña superficie, el territorio de Cisjordania y Gaza se caracteriza por la diversidad de su topografía, de su clima y de su vegetación. Mientras tanto, por la situación política de la región, existe un bloqueo importante para los movimientos de mercancías y de personas. También existen diferencias espaciales significativas de nivel de vida. En este artículo, construimos un mapa detallado de la pobreza en Cisjordania y Gaza, dividido en 132 regiones distintas. Las estimaciones combinan el análisis econométrico del consumo de las familias palestinas con la información contenida en el censo palestino de 1997. Los resultados sugieren que el impacto de la pobreza difiere de una zona a la otra. También una política eficaz de lucha contra la pobreza tiene que concentrarse en estas zonas de intervenciones. En particular, mostramos que la selección geográfica permite la obtención de mejores resultados que una selección basada en las características que se pueden observar de los beneficiarios potenciales. Mostramos también que una mezcla de los dos tipos de intervenciones permite obtener una mejor selección de la pobreza.