Monitoring Poverty without Consumption Data: an Application Using the Albania Panel Survey

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ESA Working Paper No. 05-01

February 2005

ESA Working Paper No. 04-23
www.fao.org/es/esa

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Abstract

In developing countries poverty is generally measured with expenditure data. Such data are difficult and costly to obtain and it is generally recommended to collect them every 3-5 years. In between surveys, however, there is a clear need to provide policymakers with information for the monitoring of poverty trends. The paper reviews several such methods and compares the poverty estimates and trends resulting from their application to a panel dataset for Albania. The results are broadly consistent across methods and point to an overall improvement in welfare conditions over time, although the magnitude of the changes differs by locale, with urban areas showing a larger improvement than their rural counterparts. However, given the sensitivity of the predictions to model specification, it is worthwhile to construct alternative welfare indicators and triangulate results. Lacking a gold standard measure, the use of a suite of welfare indicators, if duly validated, could be a viable approach to monitor poverty trends; some caution should be exercised in drawing conclusions about the actual magnitudes of the changes.

Key Words: Poverty, Welfare, Asset index, Poverty measurement, Poverty monitoring.
JEL: O12, O18, O47, R11.

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I. INTRODUCTION

Poverty reduction is undoubtedly one of the highest ranking issues in the current international development agenda as well as in the national strategies of many less developed countries. This is reflected in the vision statements of most multi- and bi-lateral donor agencies, the Millennium Declaration adopted unanimously by all UN governments in September 2000 and the pronouncements of the vast majority of developing country governments.

This commitment to reduce poverty has generated a strong demand for better tools for policy design. An essential such tool is an efficient system for the collection of information on poverty, its monitoring, and for the evaluation of anti-poverty policies. The Poverty Reduction Strategy Papers (PRSP) processes initiated in many countries call for result-based strategies, and usually include the establishment of a monitoring and evaluation system as a key element. In many PRSPs, countries commit, for instance, to monitor routinely achievements towards the Millennium Development Goals. The PRSP process has thus generated a need for poverty data in the context of limited capacity, weak data collection systems and severe budgetary constraints that often exist in these countries.

In developing countries, particularly where the agricultural and the informal sectors of the economy are sizeable, welfare is generally measured with consumption expenditure data. Such data are difficult and costly to collect on a large scale and, even in richer countries, it is generally recommended to collect them every 3-5 years. Full consumption expenditures are usually collected by means of household-level data gathering such as Household Budget Surveys (HBS), Income and Expenditure Surveys (IES) or Living Standards Measurement Studies (LSMS). In the years in between the implementation of consumption expenditure surveys, however, there is a clear need to provide policymakers with information on the monitoring of poverty trends. One response has been the development of "light" surveys, such as the World Bank's Core Welfare Indicator Questionnaire (CWIQ). Light surveys utilize shorter questionnaires than in the full-fledged survey, but draw on a larger sample of households and collect information on poverty indicators and predictors (Grootaert and Marchant, 1991; World Bank, 1999).

Monitoring poverty reduction is of special importance in the former communist countries of Eastern Europe and the Balkans. The transition from a state socialist economic system to a free market economy has been characterized by economic dislocation, a crumbling social protection system, major reallocation of resources – including labour- across sectors, reduction of the role of the state and, not least, a need to overhaul the methods of collection of statistical information.

This is particularly true in Albania. Approximately 25 percent of Albanians, and 30 percent of rural Albanians, live in poverty (World Bank and INSTAT, 2003). The public sector has, in terms of jobs, shrunk to less then one fourth its size in 1990, while the private sector has only partially compensated for the loss in state jobs. The observed growth in employment in agriculture reflects not growing productivity but rather refuge and hides high levels of underemployment in rural areas. Unemployment rates have remained in double digits since

1992, and real wages have been dwindling due to recurrent economic crises in the late 1990s, recovering only in 2001 to their pre-crisis level of 1995 (IMF, 2002 and 2003). Less then half of rural households have access to running water inside or outside their dwelling, only 40 percent have a toilet inside their dwelling, and only 14 percent of all Albanians receive electricity continuously (World Bank and INSTAT, 2003). Persistent poverty, poor access to basic services, dismal infrastructure and high unemployment serve as constant push factors for domestic and international migration, which has become the single most important political, social and economic phenomenon in post-communist Albania (Carletto et al, 2004).

In this paper we draw on data from two waves of a panel household survey conducted in Albania by the National Institute of Statistics (INSTAT). The second wave of the panel, conducted in 2003, revisited after one year a sub-sample of individuals of the baseline survey, the 2002 Albania Living Standards Measurement Survey (LSMS02) and used a much lighter instrument which did not include the collection of consumption expenditure data.

The design of the Albania survey system is based on the assumption that poverty can be monitored, in between two full-fledged surveys, by drawing on a number of different methods without need for yearly, expensive collection of consumption expenditure data. The first year full LSMS can be used as the baseline for poverty estimates, and in subsequent years changes in poverty can be estimated with less data-demanding techniques, but maintaining a respectable level of precision. The main method employed in this paper is the prediction (and comparison) of welfare levels through the estimation of an econometric model of (log) per capita consumption expenditure.

The objectives of the paper are twofold. The first objective is to present estimates of poverty changes in Albania based on comparison of the 2002 and 2003 waves of the LSMS survey. The second objective is to assess the robustness of the prediction of household welfare levels and rankings with a range of possible alternative methods. These include a basic needs index, two asset indices, and subjective poverty indicators. A full-fledged LSMS survey with comprehensive consumption data is scheduled in 2005. At that time, it will be possible to validate the results presented here.

The remainder of the paper is organized as follows. In the next section we present a brief literature review on poverty monitoring techniques, in Section 3 we provide a description of the data. In Section 4 we describe the econometric model of consumption and the resulting poverty predictions, in Section 5 the results of the use of subjective data, and in Section 6 the construction and results obtained by the basic needs index and the asset indices. Section 7 concludes.

II. A BRIEF LITERATURE REVIEW ON POVERTY MONITORING

The collection of good quality income or expenditure data is costly and time consuming. In the developing world, nationally representative household surveys that collect such data are therefore not abundant, even though their availability in recent years has increased

substantially. Researchers and policymakers with an interest in assessing and monitoring living standards have therefore developed a variety of approaches to make inferences on living standards in the absence of the preferred consumption expenditure (or income) measure. In particular, methodologies have been proposed, developed and compared by users of different survey types, including the CWIQ surveys, Priority Surveys (PS) and the Demographic and Health Surveys (DHS). Rapid Appraisal (RA) and other qualitative methods are also used for obtaining and tracking welfare indicators.

For instance, the basic idea behind the CWIQ survey is that it should "provide policymakers with quicker feedback and at a more disaggregated level than [is] possible with the existing range of household surveys" and that it should therefore focus on "key social and economic services" but not on income and expenditure data[1]. However, as the CWIQ Handbook also recognizes, "to fully analyze the CWIQ data, it is necessary to distinguish poor from non-poor households" (World Bank, 1999). To make this distinction, a full consumption or income survey becomes a necessary prerequisite for the identification of the proper correlates and predictors of poverty.

Thus, in the presence of larger Integrated Household Surveys (Delaine et al., 1991) or of LSMS surveys a technique often used is to select a limited number of regressors for a model of log consumption in a way that minimizes the degree of misclassification occurring in the predicted (as compared to the actual) welfare ranking. This stepwise procedure, described in detail in the CWIQ Handbook (World Bank 1999; see also Fofack 2000), calibrates the consumption model by gradually removing the variables with the least explanatory power from an initial model including all the possible poverty predictors from the large survey. This leads to the identification of a core set of predictors on which data can be collected in the light monitoring survey that can be used to easily monitor poverty in years in between two extended surveys. The same handbook shows with examples from Ghana and Kenya how the degree of precision achieved can vary substantially. It is highly satisfactory in the former case (95 percent of correct prediction in the lowest quintile, 89 in the second lowest), but utterly disappointing in the latter (56 and 33 percent of correct predictions in the lowest and second lowest quintiles, respectively).

Alternative approaches to measuring living standards in the absence of consumption data have been developed drawing on information coming from other types of surveys such as the DHS. These efforts have been promoted by two sets of researchers. One group of researchers is interested primarily in the demographic and health 'core' of these surveys, but needs of a living standard variable to include in their analysis (Montgomery et al., 1999; Filmer and Pritchett, 2001). A second group of researchers is interested primarily in poverty measuring and monitoring and prefer the DHS over Integrated Household Surveys (IHS) or LSMSs because of some specific features, such as widespread availability and standardization across countries and over time (See Sahn and Stifel, 2000; 2003).

Montgomery et al. (1999) present a review of proxy variables for living standards used by demographers and develop three simple variants of consumption proxies based on asset and

[1] This is the same idea that was behind the World Bank's Priority Survey, the predecessor of CWIQ (see Grootaert and Marchant, 1991).

basic service data. They conclude that although these indexes are weak predictors of consumption, they can still be useful for the analysis of issues related to fertility, child mortality and education in the absence of a preferred measure.

Filmer and Pritchett (2001) and Sahn and Stifel (2000; 2003) share the approach of Montgomery et al. (1999) in trying to assess welfare with an asset-based measure, but depart from them in two fundamental ways. First, they do not consider the asset index to be a proxy, but rather an alternative, to the consumption measure. Secondly, they introduce the use of principal components (Filmer and Pritchett, 2001) or factor analysis (Sahn and Stifel, 2000; 2003) in order to determine the weights to be assigned to each element of the asset index. An alternative way to estimate these weights has been put forth by Morris et al. (2000). They propose an asset index based on a sum of all possible durable goods owned by the household, where each item is weighted using the reciprocal of the proportion of sampled households owning at least one of that item.

Most of the above studies report what appear to be robust estimates of welfare rankings and call for a more extensive use of the asset index in poverty measurement and analysis. The main features of this method that make it attractive are: i) the greater availability of household surveys not collecting detailed consumption expenditure or income data; ii) the greater degree of standardization of these surveys – which may reduce the scope for systematic errors due to questionnaire design or administration, and allow greater cross-country comparability; and iii) the possibility of avoiding price indexes, which constitute an additional potential source of bias in consumption-based measures. Given the pros and cons, whether asset and other non-income indicators alone can be more valid than a full consumption base money metric of welfare remains an open empirical question[2].

Assessments of welfare and poverty based on qualitative methods such as RA are also sometimes used due to the attractiveness of their ability to generate quick results. The extent to which these results are a good approximation of what can be obtained through more time consuming and expensive methods has however been seriously questioned by Ravallion (1996). Using a Jamaica dataset, this study found that only about 20 percent of the variance in the consumption measure could be explained by subjective, RA-type questions, and that the prediction improved only partially when a core set of easily measurable objective indicators was added to the core RA ones. Even with this augmented model, only 54 percent of households in the lowest quintile were correctly predicted, and only 33 percent of those in the second poorest. Clearly, there is a considerable trade-off between rapidity and cost on the one hand, and precision on the other that should be carefully evaluated before opting for an RA-based in lieu of a money metric measure of well-being. The same is true for other types of methods which, unless properly validated, may result in flawed rankings of households by welfare level.

[2] In fact it may not even be the right question to ask, as the two indicators measure different things and, hence, are best viewed as approximations of welfare dimensions that, although correlated, are not comparable. One obvious difference is that while expenditure measures a 'flow', asset indexes measure a 'stock', i.e. wealth.

III. THE DATA

The data for this paper come from two rounds of a panel survey conducted by the Albania Institute of Statistics (INSTAT) with the technical assistance of the World Bank and the Institute for Social and Economic Research of the University of Essex. The baseline LSMS was conducted in Spring 2002 on a sample of 3600 households drawn from 450 census enumeration areas. The survey instruments included a household questionnaire with detailed expenditure information and a subjective welfare module, as well as a community questionnaire through which extensive price data were also collected.

In the spring of 2003, a lighter questionnaire was administered to a sub-sample of LSMS households by INSTAT using the same fieldworkers. A sample of over 5,200 individuals over the age of 14 from 1750 of the original households was re-interviewed as part of the second wave of the panel study. The data collection instrument excluded the information necessary to compute a new money-metric welfare measure but included a number of poverty correlates and predictors which were identified from the baseline survey. To estimate poverty measures, longitudinal weights were applied to all panel individuals, while modal household weights were applied to all household members below the age of 15.

The welfare measure used in this paper as the golden standard is total household consumption expenditure, deflated by regional price differences. No adjustment was made to account for economies of scale in consumption, as per capita figures were used[3]. The poverty measure is based on the computation of a country-specific, absolute poverty line based on the cost-of-basic-needs methodology (Ravallion and Bidani, 1997). To estimate the full poverty line, a food poverty line, i.e. the cost of obtaining a certain minimum amount of calories, was first computed and then adjusted to include essential non-food items. The food basket is anchored to a reference population in the consumption deciles around the poverty line. The non-food component was calculated as the average non-food share of those households that spend roughly the same amount for food as indicated by the food poverty line. The full poverty line, estimated making an allowance for basic non-food items, equals 4,891 Leks per capita per month[4]. The resulting poverty headcount for Albania was 25.4 percent in 2002 (World Bank and INSTAT, 2003).

IV. TRACKING CHANGES IN POVERTY USING CONSUMPTION EXPENDITURE PREDICTORS

i. Methodology

Since the second round of the Albanian panel survey does not contain information to construct a full consumption expenditure aggregate, it is not possible to compare poverty levels over time using this measure. However, in the design stage of the instrument for this second wave, preliminary analysis was conducted on the 2002 dataset to identify a set of

[3] For 2002, sensitivity analysis performed using different scale assumptions, however, did not change the rankings and profile of poverty based on the per capita figures.
[4] The average exchange rate at the time of the 2002 survey was 1 USD=145 Leks.

poverty correlates and predictors which, in absence of a better measurement, could be used to estimate poverty levels in the intervening years. We use these variables, common to both datasets, to estimate consumption in 2002. The regression coefficients estimated using the full sample of the 2002 LSMS are then used to impute consumption levels as well as poverty incidence, depth and severity on the panel sample in both 2002 and 2003.

Specifically, three models are used to estimate the per-capita total household consumption at the national level, as well as separately for urban and rural areas, on the basis of continuous, categorical and binary regressors. We use the logarithmic transformation of consumption to make the relationship linear in its parameters and to improve the precision of the estimates. The estimated model presents the following specification:

$$C_j = \alpha_{0j} + \beta_j X_j + \gamma_j I_j + \partial_j Z_j + \varepsilon_j \qquad j=0,1,2$$

where C is the log of per-capita total household consumption, X, I and Z represent sets of continuous, dummy and categorical regressors, respectively, and ε is the error term. The index j expresses the spatial dimension of the estimates, as the model is run separately for the three domains of inference allowed by the panel sample i.e. the country as a whole, as well as urban and rural areas separately. The observation subscript has been suppressed to simplify the notation.

To estimate the models, the full set of predictors common to both datasets was identified and included in a first full model. District dummies were also included (a few were dropped due to collinearity). Subsequently, through a stepwise selection procedure we eliminated those variables with no explanatory power, in terms of their statistical significance and contribution to the explained variance. Using this stepwise procedure we end up with final – relatively parsimonious – models with 27 predictors for the entire country, 24 for urban and 22 for rural (in addition to the district dummies).

ii. Results

The estimated coefficients and full results of the models are presented in Table A1 in the Appendix. Using the three models, and based on the absolute poverty line described earlier, we estimated all three poverty indicators of the Foster-Greer-Thorbecke (FGT) family (Foster, Greer and Thorbecke, 1984). The results are reported in Table 1. The estimated poverty headcounts based on the national model suggest that there has been a significant improvement in the incidence of poverty both at the country level, as well as in urban and rural areas separately. The magnitudes of the estimated changes, however, differ somewhat, with urban areas showing more of an improvement compared with their rural counterparts. The scenarios in terms of depth and severity of poverty follow similar trends. In order to understand what is driving the increase in consumption (and subsequent drop in poverty), we decompose the predicted change in consumption. Since the parameters from the 2002 regression are applied to the 2003 values of the explanatory variables, the increase in consumption is due mathematically to changes in the underlying values of the explanatory variables from 2002 to 2003.

Table 1. Poverty changes 2002-2003

	2002 Actual	2002 Estimated (full sample)	2002 Estimated† (panel sub-sample)	2003 Estimated† (panel sub-sample)	Percentage change between 2002 and 2003
			Headcount		
Total	25.4	20.6	20.4	17.1	-16.2**
-- Urban	19.5	13.0	13.2	10.7	-18.9**
-- Rural	29.6	24.8	24.3	22.9	-5.8**
			Poverty gap		
Total	5.7	3.5	3.5	2.5	-29.6**
-- Urban	4.5	2.7	2.7	2.0	-25.4**
-- Rural	6.6	4.4	4.3	3.9	-9.2*
			Severe poverty		
Total	1.9	0.9	0.9	0.5	-38.3**
-- Urban	1.6	0.8	0.7	0.5	-30.8**
-- Rural	2.1	1.1	1.1	1.0	-9.5

†Parameters were estimated on full 2002 sample and then applied on panel households only.
*Changes significant at 95% level.
**Changes significant at 99% level.

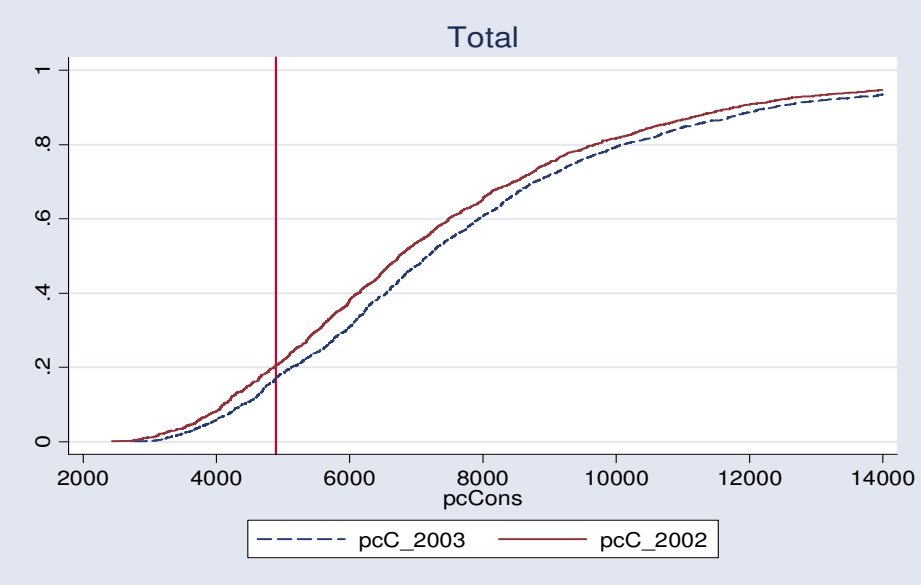
As can be seen in Table 2, the single most influential variable explaining the increase in consumption, both overall and by rural/urban, is the subjective 10-step ladder (described in detail in the next section). Other important variables include ownership of a car or truck, the subjective food question and job occupation. One must remember, however, that this is not a causal model, and causality from these explanatory variables on the dependent variable cannot be inferred. Furthermore, most of the estimated parameters have no policy implications.

Table 2. Decomposition of change in per capita consumption, 2002-2003

Main predictors of per capita consumption	Total Δ%	Urban Δ%	Rural Δ%
Household size	-3.3	-4.6	-2.6
Household size squared	2.7	2.0	6.7
Ownership of: car or truck	15.7	16.8	26.5
air conditioning	4.4	7.6	
washing machine	10.6	10.6	11.4
computer	5.0	9.1	
refrigerator			33.7
tv color			-34.0
# of cows			-33.6
Job: on-farm	-2.5		-19.2
wage-worker	-10.9	-12.0	-3.3
self-employed	17.1	22.1	14.4
diversified	-6.1	-5.6	-13.7
Occupation: professional	-7.1		-16.4
Food more than adequate	2.2	1.8	4.6
Food just adequate	16.6	10.2	24.6
Subjective 10-step ladder	48.3	34.6	93.4

Stochastic dominance analysis (Figures 1, 2 and 3) is also performed to compare the estimated cumulative distributions of consumption for the two years, nationally and for the urban and rural populations. The analysis is consistent with the message described above in showing an improvement across most of the distribution both for the country as a whole and in urban areas, these distributions being nearly first order stochastic dominant. The most substantial consumption increases, however, seem to have accrued to those in the middle parts of the distribution. The rural distribution, on the other hand, shows less marked changes between the two years, with some improvements among households right above the poverty line. A further breakdown by macro-region, shown in Figures A1 to A4 in the Appendix, suggests that most of the improvements were concentrated in Tirana. In the Coastal and Central regions improvements seem limited to the bottom and central part of the distributions, respectively. But most importantly, the more remote and traditionally poorer regions of the Mountain North-East appear to benefit less from the observed reduction in poverty[5].

Figure 1. Estimated cumulative distribution, 2002 and 2003, total.



[5] It is worth recalling here that the second round of the survey was not designed to be statistically representative for the four macro-regions, so these results are only indicative and should be treated with caution.

Figure 2. Estimated cumulative distribution, 2002 and 2003, urban.

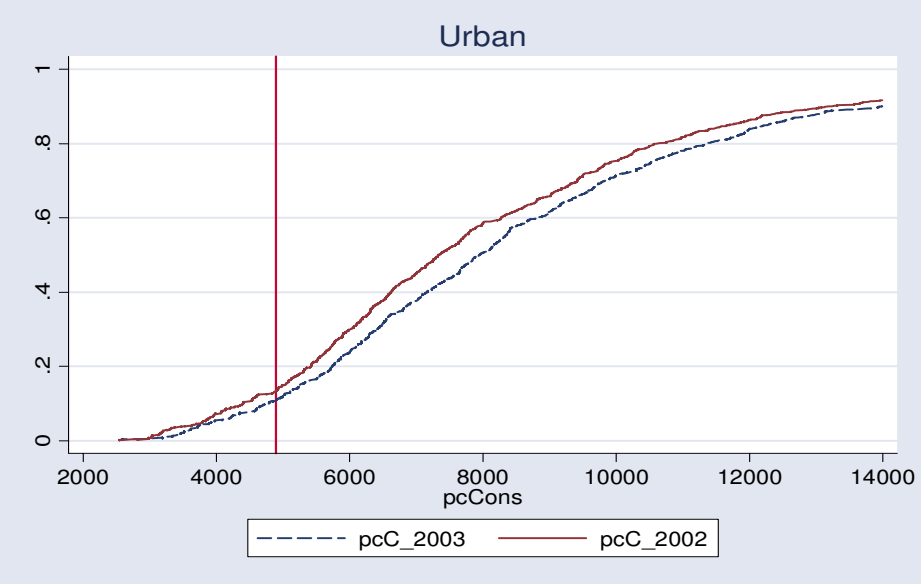


Figure 3. Estimated cumulative distribution, 2002 and 2003, rural.

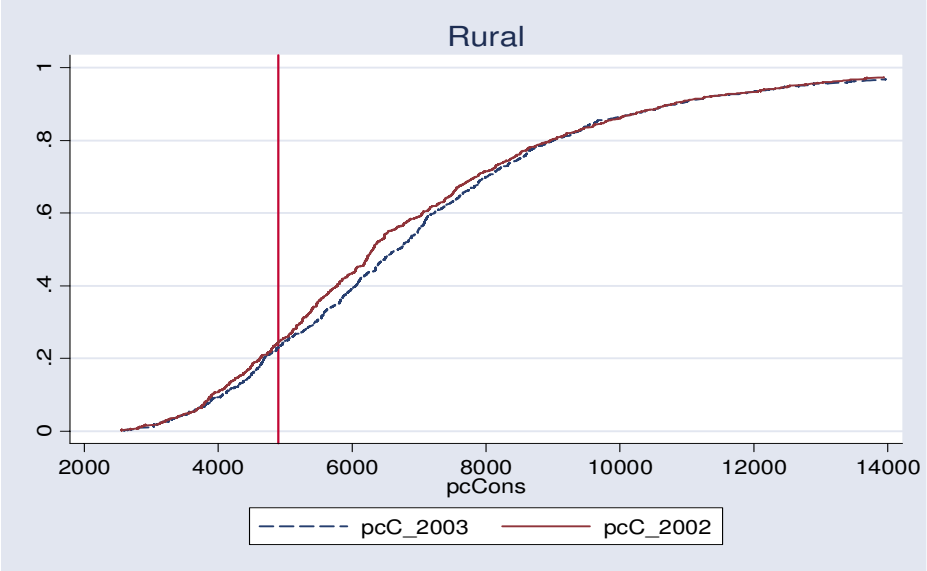


Table 3 reports the per-capita consumption variation between the two years. As we estimated three distinct equations, overall national changes should not be considered as the average of urban and rural figures. Nevertheless, the estimates show that consumption increased for urban households more than for rural. These overall changes are in the same order of magnitude of the reported 7 percent growth rate of GDP per capita in 2003 (World Bank, 2004).

Table 3: Changes in estimated per-capita consumption, 2002-2003

(Leks per month)

	Total	Urban	Rural
Per-capita consumption (2002)	7,679	8,311	7,072
Per-capita consumption (2003)	8,116	8,844	7,249
ΔC	437	533	177
ΔC (%)	5.7%	6.4%	2.5%

*All figures are estimated.

To get a sense of the goodness-of-fit of the models, in Table 4 (national) and Tables A2 and A3 in the Appendix (urban and rural) we present contingency tables relating the quartiles of actual versus predicted per-capita consumption. For all three samples the two measures are strongly correlated. However, while the estimated model fares well at the tails for all three samples – ranging from 68 to 74 percent of cases properly predicted – the model performs less well for the two middle quartiles, where only less than half of the observations are correctly predicted.

Table 4. Estimated vs. actual consumption quartiles, 2002.

(Percentage observations in each cell)

		Estimated 2002				
		1	*2*	*3*	*4*	*Total n*
Observed 2002	*1*	*68*	26	6	0	900
	2	25	*45*	26	4	900
	3	6	24	*44*	26	900
	4	1	5	24	*70*	899
	Total n	900	900	900	899	3,599

Spearman's rho = .755

Test of Ho: the two quartiles are independent, Prob > |t| = 0.0000

A similar exercise is repeated in Table 5 for all households, and Tables A4 and A5 in the Appendix for urban and rural households. These transition matrices place households in the longitudinal sample in predicted consumption quartiles for 2002 and 2003. The objective of the transition matrix is to analyze the dynamics and the direction of household rank changes. An upper triangular matrix would indicate a sharp and consistent reduction of poverty; that is, households located in the lowest quartile in 2002 would have moved out of this quartile in 2003. On the contrary, a lower-triangular matrix would denote an increase in the proportion of poor families. On-diagonal elements represent the immobility of household ranking.

Table 5. Transition matrix, by quartile, total.

(Percentage observations in each cell)

		2003				
		1	*2*	*3*	*4*	*Total n*
2002	*1*	***75***	*21*	*3*	*1*	437
	2	23	***53***	21	3	435
	3	2	22	***53***	23	435
	4	0	3	23	***74***	434
	Total n	436	435	435	435	1,741

Spearman's rho = .810
Test of Ho: the two quartiles are independent, Prob > |t| = 0.0000

While we find that the transition matrices for all three samples exhibit relatively lower dynamics at the tails, much movement is occurring in the middle consumption quartiles. Between 73 and 76 percent of households located in the first quartile in 2002 are still there in 2003, and similarly between 74 and 80 percent of those in the wealthiest quartile in 2002 remain so in 2003. Only 49 to 56 percent of households in the middle two quartiles remain in the same quartile over the two periods. Clearly, this higher mobility at the centre of the distribution may be at least in part imputed to the lower predicting power of our model within this range.

V. MONITORING POVERTY CHANGES USING SUBJECTIVE INDICATORS

The Albania panel LSMS includes an extensive module on subjective welfare. In this section we assess the feasibility of using selected subjective questions alone to monitor changes in welfare over time, and compare the findings to those of the model of log consumption in Section 4.

A priori one would certainly expect some degree of matching between the two methods, as subjective questions are included in the predictive model and explain a good part of the variation in consumption. Also, the subjective welfare literature consistently finds that economic dimensions of welfare do explain part of the variation in subjective assessments of welfare.[6]

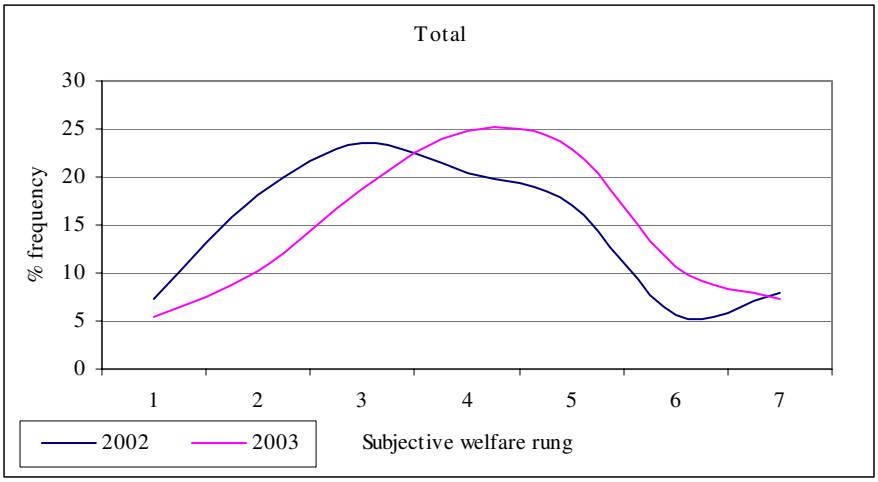
While there now exists a fairly large body of literature attempting to explain what determines subjective welfare, be it purely economic or in the more general sense of 'happiness' or 'satisfaction with life', much less research has focused on what determines changes in perceived levels of welfare. One study that sheds some light on this aspect is Ravallion and Lokshin (2001) based on panel data for Russia. For both the levels of and the changes in subjective perceptions of economic welfare, the literature suggests that there is a broad set of

[6] See for instance Carletto and Zezza (2004) for a discussion and an application to Albanian data.

factors that matter. These include consumption and income, demographic and household characteristics, employment status, relative wealth, health conditions, as well as observed and unobserved (and time-variant and invariant) personality traits.

The Albania LSMS questionnaire includes a range of questions on subjective perceptions of welfare. The first is what it is referred to in the literature as the Economic Welfare Question (EWQ) (Ravallion and Lokshin, 2002). This is a modified Cantril scale question, asking respondents (one per household, normally the head of the household) to place themselves on a ten-step welfare ladder[7]. If the 'subjective poor' are defined as those who place themselves on the bottom two rungs of the ladder, the extent of subjective poverty reduction between 2002-2003 would be a striking 10 points, from 25.5 to 15.7 percent. Rural subjective poverty reduction is even larger, decreasing by over 13 points. Clearly, these numbers are well above any plausible range of actual reduction in poverty in the 2002-2003 period, but could be taken as suggesting a trend in line with the predicted consumption models.

Figure 4 – Changes in subjective perception of welfare (EWQ), Total



[7] Specifically, the question asks: "Imagine a 10 step ladder where on the bottom, the first step, stand the poorest people, and on the highest step, the tenth, stand the rich. On which step are you today?" Rungs 7 to 10 were grouped into a single class as only a few households put themselves in those higher rungs.

Figure 5 – Changes in subjective perception of welfare (EWQ), Urban

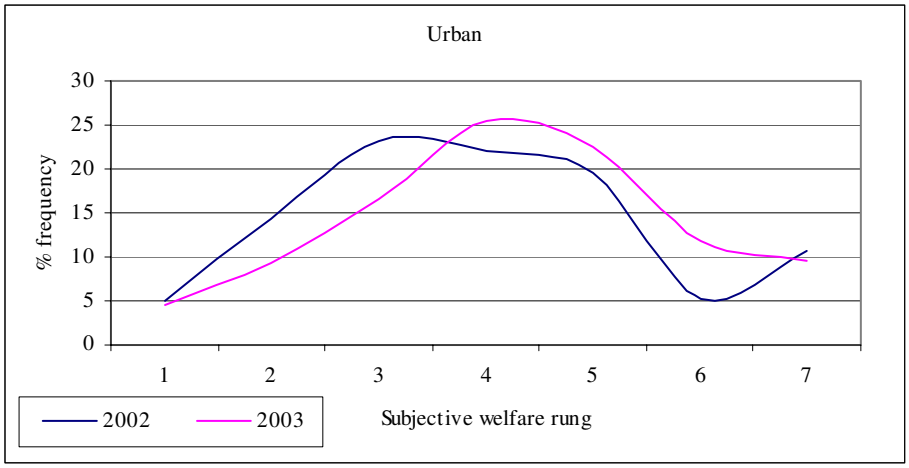
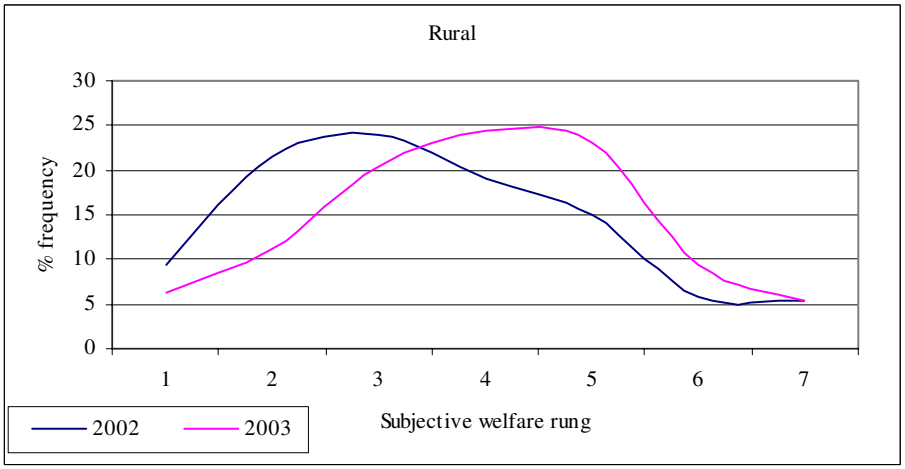


Figure 6 – Changes in subjective perception of welfare (EWQ), Rural



Another way to look at the changes in subjective welfare in the 2002-2003 period is to inspect the frequency distribution of the responses to the EWQ. These are graphed in Figures 4, 5 and 6, separately for the total panel, and for the urban and rural samples. The three distributions (that we have artificially smoothed, the actual variable being in fact discrete) do show a reported increase in subjective welfare over the entire distributions, again pointing to an overall improvement over time.

Table 6. Correlation coefficients of the differences 2002-2003 *(weighted)*

	pc-Consumption	BNI	Asset index (Morris)	Asset index (PCA)	Subjective poverty
pc-Consumption	1				
BNI	0.09	1			
Asset index (Morris)	0.20	0.08	1		
Asset index (PCA)	0.26	0.21	0.62	1	
Subjective poverty	0.57	0.10	0.17	0.19	1

*All correlations are significant at 99% level

This visual inspection of the frequency distribution might however be misleading since there is no guarantee that the households found to have improved according to the predicted consumption analysis match those that put themselves on a higher rung than they had in the previous year. To investigate the extent of the matching between the two sources we map changes in the 'objective' assessment against changes in the EWQ. First, as seen in Table 6, the correlation coefficient of changes in rankings between 2002 and 2003, between per capita consumption and EWQ is 0.57, which is quite high. Second, we look at movements in and out of poverty according to the two criteria. Table 7 shows the level of correspondence between the two sources of information, with 58 percent (64 out of 110) of those having climbed out of the 'objective' score found to have also ranked themselves higher up the ladder. The matching is however far from perfect. Only 21 percent (64 out of 307) of those that are now ranking themselves above the second rung (but that had not done so last year) have improved their poverty status according to the predicted consumption method. Also, only 33 percent (19 out of 57) of the individuals we predict to have become poor based on the consumption measure appear to have done so according to the subjective one as well. The subjective method therefore, at least in comparison with the benchmark predicted consumption measure, appears to perform better at identifying the better off than the worse off.

Table 7. Subjective vs Objective Poverty *(longitudinal sample)*

	Δ objective *(poor/non poor)*			
Δ subjective *(2-subj classes)*	worse	unchanged	better	Total
worse	19	100	1	121
unchanged	38	1231	45	1314
better	0	243	64	307
Total	57	1573	110	1741

Spearman's rho = .277

Test of Ho: Δ subj and Δ obj are independent.. Prob > |t| = 0.000

VI. MONITORING POVERTY CHANGES USING OTHER METHODS

As discussed in Section 2, a number of other methods have been used to assess poverty levels and trends which rely not on consumption or income data but rather on non-monetary dimensions of living conditions. Generally, these are used when consumption data are lacking, or simply to complement poverty analysis based on expenditure information.

i. Basic Needs Indicator

A simple tool to evaluate poverty changes that we present in this section is based on the construction of a Basic Needs Indicator (BNI) (Hentschel and Lanjouw, 1996; Hentschel et al., 2000). In the Albania case, the BNI consists of a composite sum of four indicators capturing selected non-income dimensions of poverty as basic needs to be satisfied. In our case these needs include an adequate provision of water and sanitation, adequate housing conditions, less crowded dwelling, and a minimum education level of the household head.

The value of the BNI for each household is simply the sum of the four indicator variables, each expressing the status of the need, satisfied or not.

In Table 8 we computed, for each per-capita consumption quintile, the shares of households that do not meet at least two of these basic needs. Results indicate that there is a sharp, monotone decline of the BNI as income increases. Consistent with the previous results based on alternative methods, the BNI is consistently lower for urban households and higher for rural ones for each quintile and, overall, it decreases over time. In partial divergence from the predicted consumption model, however, the overall index does not show any improvement in urban areas. Looking back at Table 6, the correlation coefficient between BNI and subjective poverty and per capita consumption is low (0.09 and 0.10).

Table 8. Basic Need Indicator (BNI) and asset indices

	2002						**2003**					
	quintile of pc-Consumption *(estimated)*						quintile of pc-Consumption *(estimated)*					
	1	2	3	4	5	Tot.	1	2	3	4	5	Tot.
Total												
BNI	58	32	19	15	7	31	54	30	16	10	5	28
Asset index (Morris)	2.4	3.0	3.3	3.6	4.2	3.1	2.9	3.7	4.0	4.3	5.2	3.8
Asset index (PCA)	-1.7	-0.5	0.5	1.1	2.6	0.1	-1.2	0.0	1.1	1.6	3.3	0.6
Urban												
BNI	45	11	8	7	3	15	40	16	9	6	3	15
Asset index (Morris)	3.4	4.3	4.5	4.9	5.4	4.4	4.2	5.1	5.3	5.7	6.6	5.2
Asset index (PCA)	-1.7	-0.2	0.3	0.8	2.1	0.0	-1.1	0.1	0.7	1.1	2.9	0.5
Rural												
BNI	64	46	28	26	13	43	61	40	22	14	10	38
Asset index (Morris)	2.0	2.2	2.6	2.8	3.0	2.4	2.5	3.0	3.4	3.6	3.9	3.1
Asset index (PCA)	-1.6	-0.7	0.1	1.1	2.1	-0.1	-1.1	0.0	1.0	1.7	2.8	0.6

ii. Asset indices

ii.1 Morris index

An alternative method is the use of an asset index. A first method (Morris, et al., 2000) synthesises information on ownership of durable goods by the household and can be considered a proxy of household wealth. The index is calculated as the weighted sum of the durable goods owned by the household, where the weights are the reciprocal of the share of households owning that item in the total sample. More formally:

$$A_j = \sum_{g=1}^{G} f_{jg} * w_g$$

where the subscript g refers to the asset item, G to the total number of items sampled and j to the household. The term w represents the weights and f_g is the number of units owned of item g.

As expected, urban households control more assets than their rural counterparts in each consumption quintile, and the value of the index increases the higher the quintile. As for year-to-year changes, results suggest more marked and widely distributed welfare gains when compared to the consumption model[8]. The gains in rural areas, in particular, are on par with those in urban and are fairly equally distributed across consumption quintiles. For all partitions of the sample, the 2003 index is higher than the 2002 across all quintiles. The Morris index is correlated to a greater extent with per capita consumption (0.20) and subjective poverty (0.17) then the BNI; in fact, as seen in Table 6, the Morris index is more correlated with these two then with the BNI itself (0.08).

ii.2 Principal components index

With the second asset index, suggested by Filmer and Pritchett (2001), principal components analysis is used to calculate the weights of the index. The first principal component, the linear combination capturing the greatest variation among the set of variables, can be converted into factor scores, which serve as weights for the creation of the marginality index. Formally:

$$A_j = \sum_{g=1}^{G} \left[F_g * \frac{(x_{jg} - \mu_g)}{\sigma_g} \right],$$

where, as above, the subscript g refers to the asset item, G to the total number of different items sampled and j to the household. The term F_g represents the variable weights, i.e. the scoring coefficients of each factor's eigenvector, x_{jg} is the value of the g-*th* variable for the *j-th* household, and μ_g and σ_g are, respectively, the mean and the standard deviation of the *g-th* variable over all households. By construction the mean value of the index is zero[9].

The results from principal components analysis can be found in Table A6 in the Appendix in which the 20 highest eigenvalues of the correlation matrix are ordered from the largest to the smallest. As shown in the table, the first principal component explains only between 16- and 13 percent of the variance in the variables (43 variables for total and rural, 36 for urban). This is a relatively low percentage, less then half that found by Filmer and Pritchett in their study of India.

The eigenvector associated with the first component can be found in Table A7 in the Appendix. In principal components, the eigenvector provides the factor score for each variable, which indicates the direction and weight of the impact of each variable in the poverty index. The signs on all variables are as expected. Availability of facilities such as

[8]As in section 5 for the poverty prediction model, the estimations presented here come from separate national, urban, and rural area calculations.

[9] For this paper the weights have been estimated for the full 2002 sample and then, as in Cavatassi *et al*. (2004), applied to the panel 2002 and 2003 samples to obtain the estimates reported in Table 6. This allows obtaining values of the index for subgroups of the distribution that are comparable overtime. This also explains why the total value of the index in Table 6 is not zero.

running water and toilet inside the dwelling, and of household durables such as washing machine or water boiler, have the highest coefficients, all around .25[10].

The seemingly unexpected signs on two of the livestock variables in rural areas (cows and sheep owned) are in fact consistent with the reality depicted by the LSMS data. In Albania the non-poor are less likely to own this type of livestock, as the poor are the one depending more heavily on them for their livelihoods. The ownership of agricultural land, as expected, raises the index.

Overall, the PCA index shows a positive relationship with consumption, and this is consistent for the entire country as well as for urban and rural areas. The PCA indexes estimated for all three partitions of the sample show increases that are comparable in magnitude, thus suggesting that the welfare gains were evenly distributed across urban and rural areas. As seen in Table 6, the PCA index is more correlated with per capita consumption (0.26) and subjective poverty (0.17) then either the BNI or the Morris index. The two asset indices, however, are very highly correlated (0.62).

VII. CONCLUSIONS

In this paper we have drawn on data from two rounds of a panel household survey conducted in Albania to gauge changes in welfare levels in the country between 2002 and 2003. The rationale for using different methods is that the second wave of the panel survey used a light questionnaire which did not collect full consumption expenditure data which would have enabled us to track poverty using the monetary measure as computed in the baseline survey. However, the data collected in the surveys did allow the construction of a number of alternative comparable indicators which we use to validate and triangulate the findings. These results can be validated with a full-fledged LSMS survey with comprehensive consumption data scheduled in 2005.

The results are broadly consistent across methods. All methods point to an overall improvement in welfare between the two survey years both for the country as a whole as well as for urban and rural areas separately. Living standards in Albania improved between survey years. However, some differences are found in the magnitudes of the estimated changes over time and across regions. Further, given the sensitivity of the predicted consumption results to specification of the model, it is worth the effort to construct alternative welfare indicators and triangulate results. We can feel more confident about our results given that they correspond with the other measures.

It is worth recalling once again that a strict comparison of asset and consumption measures may be conceptually inappropriate as the two measure different things. The goal of any such comparison made in this paper is that of highlighting the implications of using one method against the other when monitoring poverty. Further, it is important to note that even when the overall trends are similar, the different methods may pick different households as poor.

[10] The interpretation of the coefficient is that, for instance, at national level the asset index for a household that does have running water inside the dwelling is 28 percent higher than that of one that does not.

This is particularly relevant if any of these methods, or a combination thereof, is to be used as a targeting tool at the household level.

Each of the measures explored in this paper present trade-offs. With the exception of the predicted consumption indicator, all are relatively easy to calculate and interpret, and the necessary data are usually readily available from standard household survey. However, the degree of subjectivity introduced by many of some of these methods makes them prone to criticisms. Consumption expenditures remains, when available, the preferred welfare measure. However, lacking this gold standard, the use of a suite of welfare indicators, if duly validated, could be recommended to monitor poverty trends.

REFERENCES

Carletto, G. & Zezza, A. 2004. Being Poor, Feeling Poorer: Combining Objective and Subjective Measures of Welfare in Albania, FAO-ESA Working Paper n. 04-12, Rome (available at http://www.fao.org/es/ESA/en/pubs_pov04.htm)

Carletto, C., Davis, B., Stampini, M., Trento, S. & Zezza, A. 2004. Internal Mobility and International Migration in Albania, FAO ESA Working Paper n. 04-13, Rome (available at http://www.fao.org/es/ESA/en/pubs_pov04.htm)

Cavatassi, R., Davis, B. & Lipper, L. 2004. Estimating Poverty Over Time and Space: Construction of a Time-Variant Poverty Index for Costa Rica, FAO-ESA Working Paper n. 04-22, Rome, (available at http://www.fao.org/es/ESA/en/pubs_pov04.htm)

Delaine, G., Demery, L., Dubois, J., Grdjic, B., Grootaert, C., Hill, C., Marchant, T., McKay, A., Round, J. & Scott, C. (eds.) 1992. The Social Dimensions of Adjustment Integrated Survey. *Social Dimensions of Adjustment in Sub-Saharan Africa Working Paper* no.14, Washington, D.C., World Bank.

Filmer, D. & Pritchett, L. 2001. Estimating Wealth Effects without Expenditure Data or Tears: An Application to Educational Enrollments in States of India, *Demography*, 38(1): 115-32.

Fofack, H. 2000. Combining Light Monitoring Surveys with Integrated Surveys to Improve Targeting for Poverty Reduction: The Case of Ghana, *The World Bank Economic Review*, 14(1): 195-219.

Foster, J., Greer, J., & Thorbecke, E. 1984, A class of decomposable poverty measures, *Econometrica*, 52: 761-766.

Grootaert, C. & Marchant, T. 1991, The Social Dimensions of Adjustment Priority Survey, *Social Dimensions of Adjustment in Sub-Saharan Africa Working Paper* no. 12, Washington, D.C., World Bank.

Hentschel, J. & Lanjouw P. 1996, Constructing an Indicator of Consumption for the analysis of Poverty. Principles and Illustrations with Reference to Ecuador, *LSMS Working Paper* no. 124, Washington, D.C., World Bank.

Hentschel, J., Lanjouw, J., Lanjouw, P., & Poggi, J. 2000, Combining Census and Survey Data to Trace Spatial Dimensions of Poverty: A Case Study of Ecuador, *The World Bank Economic Review*, 14 (1): 147-165.

IMF 2002. World Economic Outlook, Washington, D.C., IMF.

IMF 2003. Albania: Selected Issues and Statistical Appendix. *IMF Country Report* no. 03/96, Washington, D.C., IMF.

Montgomery, M.R., Gragnolati, M., Burke, K., & Paredes, E. 1999. Measuring Living Standards with Proxy Variables, *Policy Research Division Working Papers* no. 129, Population Council.

Morris, S., Carletto, C., Hoddinott, J. & Christiaensen, L. 2000. Validity of Rapid Estimates of Household Wealth and Income for Health Surveys in Rural Africa, *Journal of Epidemiology and Community Health*, 54.

Ravallion, M. 1996. How well Can Method Substitute for Data? Five Experiments in Poverty Analysis, *World Bank Research Observer*, 11(2): 199-221.

Ravallion, M. & Bidani, B. 1997. Decomposing social indicators using distributional data, *Journal of Econometrics*, 77 (1): 125-139.

Ravallion, M. & Lokshin, M. 2001. Identifying Welfare Effects from Subjective Questions, *Economica*, 68: 335-357.

Ravallion, M. & Lokshin, M. 2002. Self-rated economic welfare in Russia, *European Economic Review*, 46(8): 1453-1473.

Sahn, D.E. & Stifler, D. 2000. Poverty Comparison Over Time and Across Countries in Africa, *World Development*, 28(12): 2123-55.

Sahn, D.E. & Stifler, D. 2003. Exploring Alternative Measures of Welfare in the Absence of Expenditure Data, *Review of Income and Wealth*, 48(4): 463-89.

World Bank 1999. CWIQ (Core Welfare Indicators Survey). Handbook and CD-Rom. Washington, D.C., World Bank (available at http://www4.worldbank.org/afr/stats/cwiq.cfm)

World Bank 2004. World Development Indicators, online accessed November 2004, (available at http://publications.worldbank.org/WDI/).

World Bank & INSTAT 2003. Albania: Poverty During Growth. A Poverty Profile of Albania, background paper for the World Bank Poverty Assessment, Washington, D.C., World Bank, and Tirana, INSTAT (mimeo).

APPENDIX

Table A1. Log-consumption prediction models.

	Total		Urban		Rural	
log of pc-Consumption	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
Central	0.036	0.082	-0.059	0.110	-0.292	0.120
Mountain	0.155	0.088	0.166	0.129	-0.558	0.120
Tirana	-0.155	0.077				
District dummies (output omitted)*						
Area is rural	0.053	0.018				
Hhsize	-0.265	0.011	-0.265	0.019	-0.279	0.016
Hhsize^2	0.014	0.001	0.014	0.002	0.014	0.001
Head is widow	-0.031	0.006	-0.031			
# of children	-0.265	0.011	-0.265	0.008	-0.031	0.008
Average education	0.011	0.003	0.020	0.003	0.012	0.003
Education of head	0.004	0.002				
Plastered building			0.032	0.015		
# of rooms per person			0.049	0.020		
Wc inside the house			0.061	0.026		
Time to bus stop	-0.001	0.000				
Rooms with more than 3 people	-0.043	0.016				
Water quality			-0.048	0.022		
Having a phone line	0.081	0.014	0.063	0.015		
Possession of: car or truck	0.252	0.017	0.252	0.021	0.245	0.030
conditioner	0.107	0.040	0.113	0.040		
washing machine	0.104	0.014	0.093	0.019	0.067	0.021
computer	0.134	0.035	0.153	0.034		
TV					0.111	0.030
refrigerator					0.102	0.020
satellite dish					0.049	0.020
Time of construction: 1945-60			-0.050	0.023		
Agricultural land size	0.049	0.010			0.032	0.012
# of sheep	0.002	0.001				
# of cows (cattle)					0.026	0.007
Job: on-farm	0.070	0.025	0.030	0.044	0.131	0.041
off-farm wage	0.054	0.022	0.035	0.025	0.138	0.048
self-employed	0.131	0.031	0.117	0.034	0.145	0.070
diversified	0.097	0.025	0.071	0.030	0.170	0.044
Level of qualification: professional	0.073	0.017			0.108	0.033
Receiving: Ndhima Ekonomika			-0.093	0.023		
pension					0.057	0.023
Subjective: food more than adequate	0.139	0.035	0.145	0.043	0.122	0.060
food just adequate	0.059	0.013	0.055	0.018	0.032	0.019
Subjective 10-step ladder	0.067	0.004	0.067	0.006	0.048	0.007
# of observations	3,599		1,959		1,640	
R-squared	0.67		0.68		0.67	
Adj. R-squared	0.66		0.67		0.66	
F	119.6		74.6		59.7	

*For each model, district and area dummies collinear with other regressors were dropped.

Table A2. Estimated vs. actual consumption quartiles, 2002, urban.

(Percentage observations in each cell)

		Estimated 2002				
		1	*2*	*3*	*4*	*Total n*
Observed 2002	*1*	***69***	27	4	1	490
	2	26	***44***	24	6	490
	3	5	24	***45***	26	490
	4	1	6	26	***68***	489
	Total n	490	490	490	489	1,959

Spearman's rho = .753
Test of Ho: the two quartiles are independent, Prob > |t| = 0.000

Table A3. Estimated vs. actual consumption quartiles, 2002, rural.

(Percentage observations in each cell)

		Estimated 2002				
		1	*2*	*3*	*4*	*Total n*
Observed 2002	*1*	*71*	22	7	0	410
	2	20	*48*	30	2	410
	3	9	25	*43*	23	410
	4	0	6	20	*74*	410
	Total n	410	410	410	410	1,640

Spearman's rho = .763
Test of Ho: the two quartiles are independent, Prob > |t| = 0.000

Table A4. Transition matrix, by quartile, urban.

(Percentage observations in each cell)

		2003				
		1	*2*	*3*	*4*	*Total n*
2002	*1*	***73***	*22*	*4*	*1*	223
	2	25	***49***	23	3	223
	3	3	22	***56***	19	223
	4	0	6	18	***76***	222
	Total n	223	223	223	222	891

Spearman's rho = .795
Test of Ho: quartile_02 and quartile_03 are independent, Prob > |t| = 0.000

Table A5. Transition matrix, by quartile, rural.

(Percentage observations in each cell)

		2003				
		1	*2*	*3*	*4*	*Total n*
2002	*1*	***76***	*20*	*5*	*0*	215
	2	*21*	***54***	*24*	*1*	213
	3	*3*	*24*	***55***	*18*	214
	4	*0*	*3*	*17*	***80***	214
	Total n	214	214	214	214	856

Spearman's rho = .830
Test of Ho: quartile_02 and quartile_03 are independent, Prob > |t| = 0.000

Table A6. Principal Component Analysis. Eigenvalues *(first 20 components)*

Component	**Eigenvalue**			**Proportion of σ^2**			**Cumulative σ^2**		
	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural
1	6.89	4.75	5.41	0.16	0.13	0.13	0.16	0.13	0.13
2	2.56	2.65	2.39	0.06	0.07	0.06	0.22	0.20	0.18
3	1.84	1.85	2.09	0.04	0.05	0.05	0.26	0.25	0.23
4	1.64	1.55	1.81	0.04	0.04	0.04	0.30	0.29	0.27
5	1.55	1.51	1.46	0.04	0.04	0.04	0.34	0.33	0.31
6	1.34	1.44	1.33	0.03	0.04	0.04	0.37	0.37	0.35
7	1.29	1.32	1.27	0.03	0.04	0.03	0.40	0.41	0.38
8	1.25	1.18	1.25	0.03	0.03	0.03	0.43	0.44	0.41
9	1.20	1.18	1.22	0.03	0.03	0.03	0.45	0.47	0.44
10	1.13	1.11	1.14	0.03	0.03	0.03	0.48	0.50	0.47
11	1.07	1.05	1.06	0.03	0.03	0.03	0.51	0.53	0.49
12	1.05	1.03	1.06	0.02	0.03	0.03	0.53	0.56	0.52
13	1.03	0.97	0.98	0.02	0.03	0.03	0.55	0.58	0.55
14	1.01	0.95	0.95	0.02	0.03	0.02	0.58	0.61	0.57
15	0.99	0.93	0.93	0.02	0.03	0.02	0.60	0.63	0.59
16	0.96	0.90	0.91	0.02	0.02	0.02	0.62	0.66	0.62
17	0.94	0.88	0.89	0.02	0.02	0.02	0.65	0.68	0.64
18	0.91	0.86	0.85	0.02	0.02	0.02	0.67	0.71	0.66
19	0.90	0.85	0.83	0.02	0.02	0.02	0.69	0.73	0.68
20	0.87	0.83	0.81	0.02	0.02	0.02	0.71	0.75	0.70

Table A7. First Eigenvector

Variable	Eigenvector		
	Total	Urban	Rural
Ownership of: TV colour	0.18	0.21	0.21
video player	0.18	0.22	0.19
tape/CD player	0.13	0.21	0.14
camera/video	0.07	0.11	0.05
refrigerator	0.20	0.23	0.23
freezer	0.04	0.07	0.05
washing machine	0.28	0.31	0.28
dishwasher	0.04	0.08	0.01
electric/gas stove	0.23	0.21	0.26
radiator electric	0.19	0.20	0.15
generator	0.06	0.10	0.09
sewing/kitting machine	0.13	0.14	0.15
conditioner	0.09	0.12	0.04
water boiler	0.26	0.25	0.27
computer	0.09	0.13	0.03
satellite dish	0.09	0.15	0.15
bicycle	0.08	0.08	0.11
motorcycle/scooter	0.04	0.04	0.11
car	0.13	0.16	0.18
truck	0.05	0.06	0.09
dumdum tractor			0.09
Single family house	-0.19	-0.15	-0.07
Building with up to 15 apartments	0.11	0.06	0.07
Building with more than 15 apartments	0.15	0.12	0.04
Brick/stone walls	0.08		0.09
Plastered building	0.09		0.16
Time to nearest: school	-0.16		-0.12
ambulatory/doctor	-0.17		-0.15
bus/minibus stop	-0.18		-0.16
Time of construction: before 1945	-0.03	-0.01	
1945-60	-0.05	-0.04	
1981-90	0.03	0.08	
1991-	0.02	-0.04	
Having any toilet	0.26		0.26
Having running water (inside or outside)	0.20	0.21	0.12
Having water inside the dwelling	0.29	0.29	0.24
WC inside the dwelling	0.28	0.26	0.28
Separate kitchen	0.11	0.18	0.11
Having lift	0.05	0.06	
# of rooms	0.09	0.18	0.19
# of rooms per person	0.12	0.15	0.16
# of rooms used for business	0.02		
Having a phone line	0.22	0.22	0.10
Having a mobile phone	0.16	0.17	0.23
# of: cows			-0.02
sheep			-0.05
small animals			0.03
pigs			0.02
Agricultural land used			0.08

Figure A1. Estimated cumulative distribution, 2002 and 2003, Coastal region.

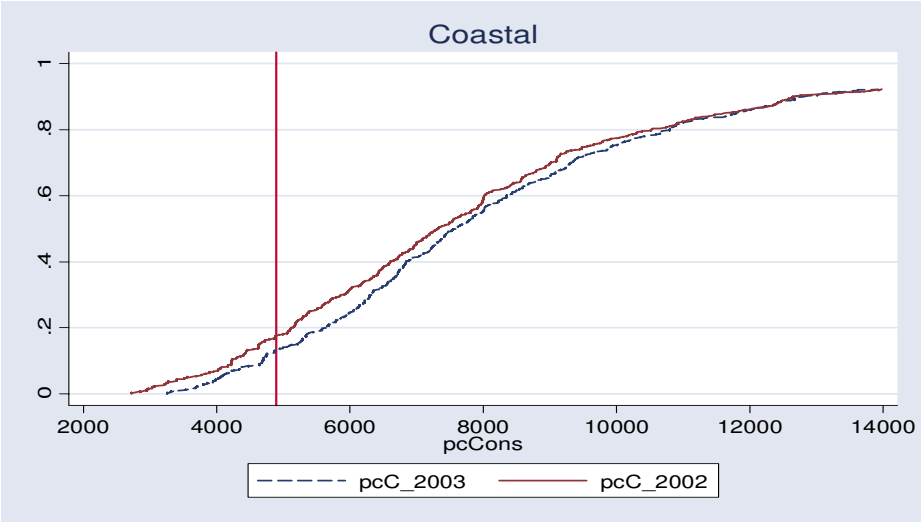


Figure A2. Estimated cumulative distribution, 2002 and 2003, Central region.

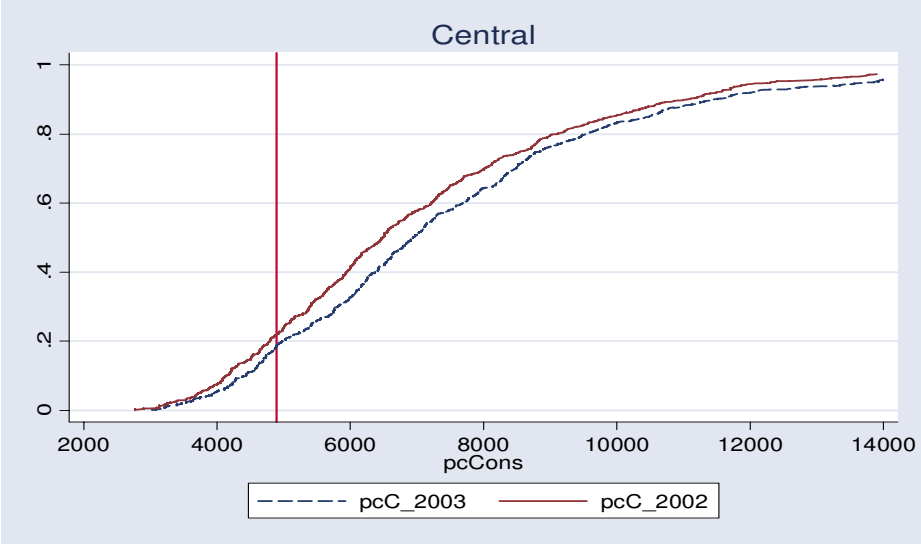


Figure A3. Estimated cumulative distribution, 2002 and 2003, Mountain region.

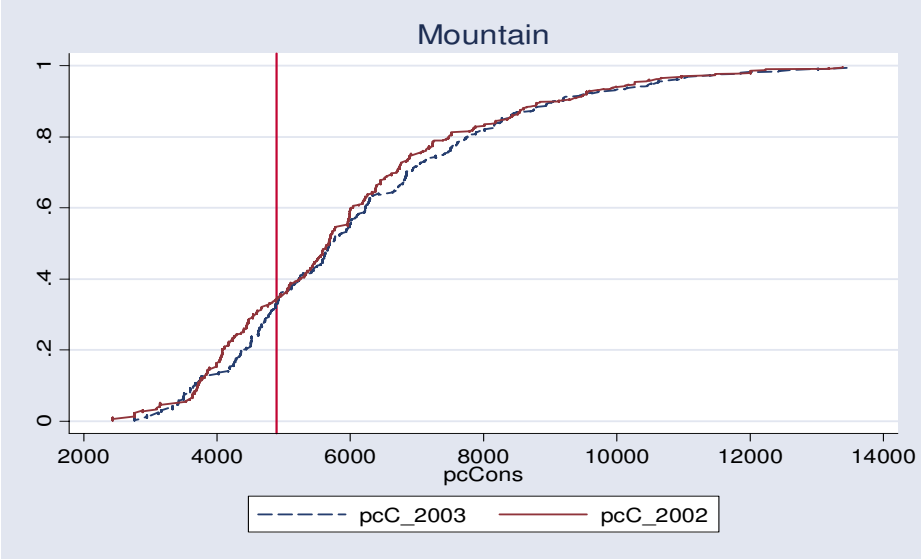
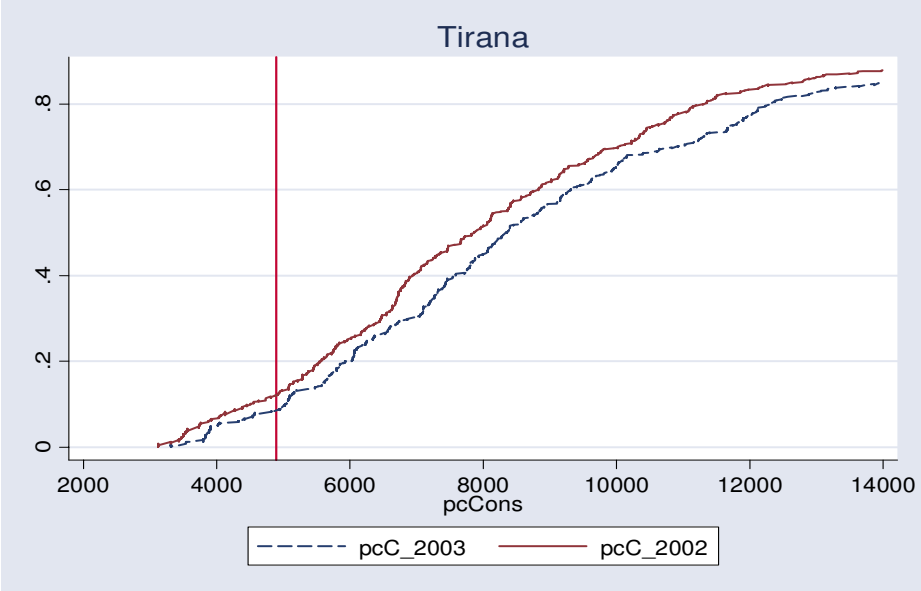


Figure A4. Estimated cumulative distribution, 2002 and 2003, Tirana.



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