Growth and inequality effects on poverty reduction in Italy

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Abstract

This paper evaluates poverty sensitivity to growth in mean incomes and distributional changes in Italy across its regions and over a period spanning from 1977 to 2004. We use the "Survey on Household Income and Wealth" (SHIW) of the Bank of Italy to estimate the growth incidence curves and the income and inequality elasticities of poverty. Growth strongly determines the patterns of poverty; however, inequality appears to have strikingly characterized it as well. A 1% increase in mean income produces a reduction in the headcount index by around 2.8%, while a 1% increase in inequality increases it by around 2.2%. The heterogeneity in poverty rates between North, Centre and South may be due to the strong heterogeneity in the poverty elasticities, which in turn depend on the initial conditions of inequality and the initial level of development.

JEL: D31, I32, O52

1 Introduction

Along with the intensification of the research to understand the microeconomic causes of poverty movements, macroeconomic aspects of poverty changes have attracted renewed interest. How are the gains of growth distributed to the poor? What are the effects of economic growth on poverty rates? Further, what are the effects of distributional changes on poverty trends?

Although most of the attention on these issues has focused on the developing world[1], several features of the recent trends in advanced countries, in terms of poor economic performance and increasing inequality, provided the stimulus for this paper to analyze the impact of growth

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[1]See among others, Adams (2004); Araar et al. (2009); Besley and Burgess (2003); Besley and Cord (2007); Bourguignon (2003); Chen and Ravallion (2003); Dollar and Kraay (2002); Eastwood and Lipton (2000); Epaulard (2003); Essama-Nssah and Lambert (2009); Kalwij and Verschoor (2007); Klasen (2008); Ravallion and Datt (2002); World Bank (2005)

and inequality on poverty trends in Italy. The huge recession of the 1990's, the recent distributional changes describing Italy as one of the most unequal of the advanced countries (Brandolini, 2005), the strong dualistic structure of its economy resulting in high differentials in standard-of-living between northern, central and southern regions, all motivate the attention of this work as to whether, and to what extent, growth and inequality have influenced the poverty changes across Italian regions.

It is widely recognized that economic growth is necessary to achieve poverty reduction; its impact on the poverty rate depends, however, on how its benefits are distributed across the population. Inequality has entered into the growth-poverty nexus because of both its direct and indirect effect - through the growth channel - on poverty rates. Given a mean income, lower inequality may reduce *static* poverty; to the extent that economic growth is affected by inequality, or vice versa, poverty responsiveness also depends on inequality due to this latter link. Further, other factors may determine the extent to which growth can affect poverty; we find that the level of development and the initial level of inequality are good candidates to explain the different outcomes of the growth process in terms of poverty reduction across the areas of the country.

To our knowledge this paper is the first to address these issues in the context of a developed country. Already before the last economic crisis, concern for poverty dynamics in Italy received renewed interest in the past years; several authors have pointed out the so-called "impoverishment" of the Italian households (Boeri and Brandolini, 2004; Massari et al., 2009). We offer a new look at poverty dynamics to ascertain how far they have been influenced by growth and inequality changes and to provide further evidence on the dualist structure of the country and on the trap mechanism behind the underdevelopment of the southern Italian regions. To this end we use the "Survey on Household Income and Wealth" (SHIW) of the Bank of Italy drawn up between 1977 and 2004 across the 20 Italian administrative regions to evaluate the extent by which economic growth has contributed to poverty reduction and the degree by which poverty rates have responded to inequality changes as well.

The paper is organized as follows. The second section introduces to the idea of pro-poor growth; it follows summarizing the statistical foundations of the income and the inequality elasticities of poverty under the assumption that incomes are lognormally distributed. Section 3 describes the data and illustrates the main trends in poverty rates, inequality index and growth indicators. Section 4 discusses the methodology used to compute the growth incidence curves and develop the parametric estimations of the income and the inequality elasticities. After the description of the results in section five, the last section concludes.

2 Pro-poor growth and poverty elasticities

As Besley and Burgess (2003) point out, the link between economic growth and poverty is ultimately a matter of quantification, which can be performed through the estimation of the elasticities of poverty with respect to growth and inequality[2]. This empirical strategy stems from, and is connected to, the diffusion of the idea of "pro-poor" growth. Growth is defined as pro-poor if it results in higher growth rates for the poor than the non-poor; broadly, growth should be biased toward the poor regardless of its impact on the reduction of poverty levels. Even though the notion of pro-poor growth is still debated (Araar et al., 2009; Chen and Ravallion, 2003; Duclos, 2009; Essama-Nssah and Lambert, 2009; Kakwani and Pernia, 2000; Klasen, 2008; Son, 2004), much effort has been put into trying to narrow it into broadly different definitions, such as absolute versus relative definitions or, further, weak versus strong ones. Growth is defined as weakly pro-poor if it reduces poverty, regardless of its extent and its degree. A growth process is hence called pro-poor, even though the poor would receive a small fraction of the total benefits; a sufficient condition for applying this definition is that the growth rate in income among the poor is greater than zero. A deeper approach defines a process as pro-poor, depending on whether it has either a relative or an absolute impact. The relative notion characterizes growth as pro-poor if the growth rate of income of the poor exceeds the average income growth rate; growth needs to be relatively biased toward the poor, with the latter having an income growth exceeding the average. This relative view stems from the fact that growth, on top of reducing poverty rates, implies a reduction in relative inequality. Growth is defined as absolute pro-poor if the absolute amount of the income gain of the poor exceeds, or is equal to, that of non-poor; under this criterion absolute inequality falls as a consequence of economic growth episodes.

Income and inequality elasticities of poverty can be properly estimated, once the empirical distribution of income can be described by some known distribution. Formally, the proportion of the population at time t with an income below the poverty line z (the headcount index) is equal to the probability that income y_t is lower than the poverty line:

$$hc_t = \Pr(y_t < z) \equiv F_t(z) \tag{1}$$

where $F_t(z)$ is the income distribution function.

Under the assumption that incomes are lognormally distributed (Aitchison and Brown, 1957; Bourguignon, 2003; Epaulard, 2003; Kalwij and Verschoor, 2007; Lopez and Servén, 2006; Quah, 2003), this poverty measure may be expressed as

$$hc_t = \Phi\left(\frac{\log\left(z/\mu_t\right)}{\sigma_t} + \frac{1}{2}\sigma_t\right) \tag{2}$$

where $\Phi\left(.\right)$ is the cumulative distribution function of the standard normal distribution and σ_t stands for the standard deviation of the logarithm of income. Under the lognormality assumption there exists a one-to-one mapping between the Gini index and the Lorenz curve, and hence the standard deviation. Let G_t be the Gini index at time t. It is verified that

[2]Early approaches based on accounting techniques (Datt and Ravallion, 1992; Kakwani, 1993) attempted to decompose the rate of change of a poverty measure between two periods in growth and inequality components. For a review see Bourguignon (2003).

$$G_t = 2\Phi\left(\frac{\sigma_t}{\sqrt{2}}\right) - 1 \tag{3}$$

Poverty reduction at a given point of time can be fully determined by the growth rate of the mean income of the population and by the change in income distribution. For sufficiently small changes, a change over time in the poverty rate can be decomposed into an income and an inequality effect; a first-order approximation of the decomposition results in

$$\frac{dhc_t}{dt} = \frac{\partial hc_t}{\partial \mu_t}\frac{d\mu_t}{dt} + \frac{\partial hc_t}{\partial G_t}\frac{dG_t}{dt} \tag{4}$$

that in terms of elasticity can be expressed by

$$\frac{dhc_t}{dt} = \eta\frac{d\mu_t}{dt}\frac{hc_t}{\mu_t} + \gamma\frac{dG_t}{dt}\frac{hc_t}{G_t} \tag{5}$$

where η and γ are respectively the income and inequality elasticities of poverty and represent the direct effects of growth and inequality changes on poverty reduction. Other indirect effects may influence poverty movements over time. The initial level of inequality and the level of development, for which the ratio of poverty line over mean income is used as a proxy[3] (Bourguignon, 2003; Epaulard, 2003; Kalwij and Verschoor, 2007), seem good candidates to indirectly explain why poverty rates respond differently to income and inequality changes. From (2) the income elasticity of poverty may be derived as follows

$$\eta = \frac{\partial hc_t}{\partial \mu_t}\frac{\mu_t}{hc_t} \equiv -\frac{1}{\sigma_t}\frac{\phi\left(\frac{\log(z/\mu_t)}{\sigma_t} + \frac{1}{2}\sigma_t\right)}{\Phi\left(\frac{\log(z/\mu_t)}{\sigma_t} + \frac{1}{2}\sigma_t\right)} \leq 0 \tag{6}$$

where ϕ and Φ are, respectively, the probability and cumulative distribution functions of the standard normal distribution. The income elasticity is negative and decreasing, in absolute terms, in the ratio of poverty line over mean income (z/μ_t) and the standard deviation of log-income (σ_t).

Similarly, using the standard deviation σ_t as a measure of inequality, the inequality elasticity of poverty is derived as

$$\gamma^\sigma = \frac{\partial hc_t}{\partial \sigma_t}\frac{\sigma_t}{hc_t} \equiv \frac{\phi\left(\frac{\log(z/\mu_t)}{\sigma_t} + \frac{1}{2}\sigma_t\right)}{\Phi\left(\frac{\log(z/\mu_t)}{\sigma_t} + \frac{1}{2}\sigma_t\right)}\left(\frac{-\log(z/\mu_t)}{\sigma_t} + \frac{1}{2}\sigma_t\right) \geq 0 \tag{7}$$

Using the Gini index as an inequality measure, the inequality elasticity of poverty rate results from (3) and (7) as

$$\gamma^G = \gamma^\sigma\frac{\partial \sigma_t}{\partial G_t}\frac{G_t}{\sigma_t} \tag{8}$$

The inequality elasticity is positive unless average income is very low, negatively correlated to the

[3] This ratio is used as an indicator for the inverse of the level of development.

ratio of poverty line over mean income (z/μ_t) and to the standard deviation of log-income (σ_t).

3 Data

The data used are mainly from the Historical Archive of the "Survey on Household Income and Wealth" (SHIW-HA) of the Bank of Italy. We employ the waves spanning the period between 1977 and 2004. The data are yearly until 1984, thereafter bi-annual (with a period of three years between 1995 and 1998). The sample was maintained as much representative as possible; starting in 1977 with 2915 households and 9598 individuals interviewed, the sample size was constantly increased over time until 2004, when 8012 households and 20581 individuals were interviewed[4]. The data are recorded by regions and areas (North, Centre and South/Islands)[5]. Regional GDP, per-capita GDP and population share are drawn from the Data-base, based on regional accounts, on the Italian Regions (March 2006 version) from the CRENoS centre (Centre for North South Economic Research).

Though we acknowledge possible differences and drawbacks when choosing the relevant welfare measure (Deaton, 2005), we employ the annually equivalent[6] net disposable income of the households as a welfare indicator. In Italy there are two main data sources for analyzing poverty and distributional changes: the Household Consumption Survey ("Indagine sui Consumi delle famiglie") of the National Institute of Statistics (ISTAT) and the above-mentioned surveys of the Bank of Italy. Since the former were placed under methodological revision during the 1990s, the use of those data to carry out a longer period analysis may undermine the consistency of the poverty measures. This ultimately induced our choice in favour of the income measure, as the Historical Archive guarantees homogeneity in the survey data in spite of the changes in the questionnaires. Two definitions of household net disposable income are employed; one present since 1977 and the other which has only been available since 1987. The former (hereafter y_{nfa}) includes incomes from job earnings (employees and self-employed), imputed rents from owner-occupied housing as well as social and pension transfers, but excludes yields on financial assets. The latter (hereafter y_{fa}) includes this last source of income net of interests on mortgages. Through most of the analysis we employ the former indicator (y_{nfa}) to exploit variation across more time periods; in the final section we provide a robustness analysis which shows that the results are not sensitive to the measure of income adopted[7].

[4] The sample size has been increased only slightly until 1984, being maintained it around 1977 levels; in 1986, the Institute strongly scaled up the sample size with 8022 households and 25068 individuals interviewed.

[5] The households are grouped across the 20 Italian administrative regions (hereafter referred to as regions), of which only 19 are taken into account in the analysis, since data for the region Val d'Aosta are not available for many of the survey years and hence are dropped from the dataset. Given the small size of the region in terms of geographical size, income measures and population density, the final analysis is not affected by this deficiency. The regions are sorted into the following areas: North: Piedmont, Lombardy, Trentino-Alto Adige, Friuli-Venezia Giulia, Liguria, Emilia Romagna; Centre: Tuscany, Umbria, Marche, Lazio; South/Islands: Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicily, Sardinia.

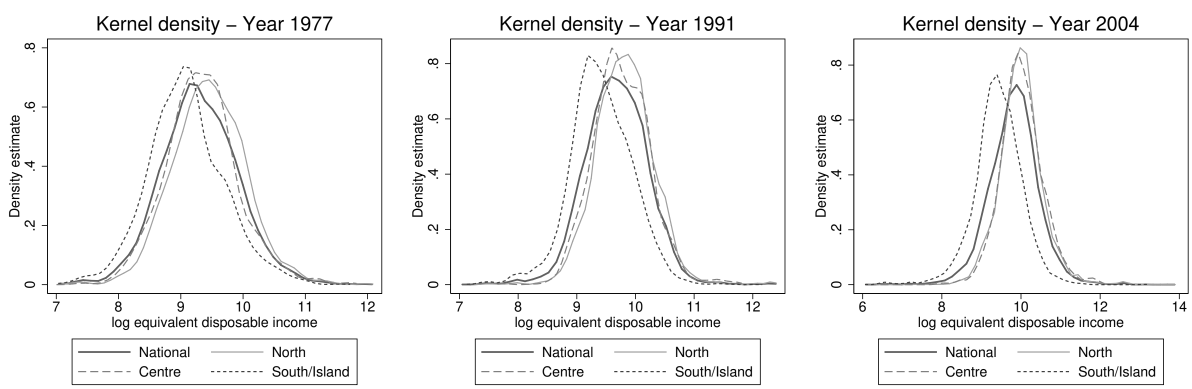
[6] As the reference unit is the household we employ an equivalence scale to allow the analysis to be implemented on homogeneous units. Following most of the studies on poverty in Italy, we apply "Carbonaro's equivalence scale".

[7] Pairwise correlations between the two measures of disposable income over the years are the following: 1987: 0.9886;

The central issue for the identification of the poor is the definition of the poverty line, the main distinction being made between absolute and relative. We use a pseudo-absolute poverty line, defined as follows; after defining the relative poverty line in 1995 as the per-capita mean income of a household of two components, we apply the national consumer price index (CPI, table A.1) to scale this base poverty line over time[8]. The poor are those who have an equivalent income below or equal to this standard.

Italian performance in terms of poverty reduction, inequality and growth reveals very contrasting features. Despite the impressive reduction in poverty rates, huge differentials still persist across the three main areas of the country (i.e. North, Centre and South/Islands). Southern regions are the poorest and the most unequal in the country, with still significantly high poverty and inequality rates. Despite their appreciable development over the recent decades the central regions have not yet caught up with the northern ones. The dualistic structure of the country is therefore apparent as northern regions present lower poverty and inequality rates as well as higher growth rates than the central and southern regions.

Figure 1: Estimated density functions, across time and areas



Note: log equivalent disposable incomes (y_{nfa}) at 1995 price .

The estimated density functions[9] (figure 1) provide an overview for the whole country and for its sub-areas for the years 1977, 1991 and 2004. Although the initial tendency towards the bimodal national distribution becomes less apparent by the end of the period of analysis, important differences persist across the main areas. The distributions of the southern regions are wider than those of the other regions and of the national ones as well as always behind the latter, confirming the

1989: 0.9616; 1991: 0.9789; 1993: 0.9701; 1995: 0.9840; 1998: 0.9713; 2000: 0.9744; 2002: 0.9945; 2004: 0.9973 .

[8]We use this approach since consistent and homogeneous absolute poverty lines are not available for the whole period of analysis (i.e. 1977-2004); moreover, as regional price indices are not available for the considered periods we are unable to estimate regional poverty lines. The benefit of this procedure is that the features of both the relative and the absolute poverty lines are taken into account (Brandolini, 2005)

[9]We approximate the income distributions using a non-parametric kernel density function, using the Gaussian kernel specification. The key parameter driving the fit of the kernel function is the bandwidth. Following a large literature (Cowell et al., 1998; Deaton, 1997; Pagan and Ullah, 1999; Quah, 2003; Sala-i-Martin, 2006) we use the bandwidth $h = 0.9 * \min \{sd, 0.75IQR\} n^{-1/5}$, where sd is the standard deviation, IQR the interquartile range and n the number of observations.

higher poverty as well as inequality rates of the South with respect to both the country as a whole and the other parts of it.

These trends are confirmed by the summary indices estimated from the surveys (tables 1-2 and figures A.1-A.2-A.3). The estimation procedure takes into account several issues to check the robustness of the mean income, poverty and inequality statistics to the presence of outliers as well as to the small sample size[10], when regional measures are estimated (Cannari and D'Alessio, 2003; Elbers et al., 2003; Ghosh and Rao, 1994; Tarozzi and Deaton, 2009; Wooldridge, 2002). Further, we correct the standard errors of these estimates to take into account also the complex nature of the sampling design[11] (Biewen and Jenkins, 2006; Deaton, 1997). We estimate mean incomes from the surveys for the two definitions described in the text ($\mu_{y_{nfa}}$ and $\mu_{y_{fa}}$) and for each of these definitions three measures of poverty (headcount - $hc_{y_{nfa}}$ and $hc_{y_{fa}}$, poverty gap - $pg_{y_{nfa}}$ and $pg_{y_{fa}}$, and squared poverty gap - $spg_{y_{nfa}}$ and $spg_{y_{fa}}$) and one measure of inequality (Gini index - $G_{y_{nfa}}$ and $G_{y_{fa}}$)[12].

Poverty across Italian households has strikingly declined in the long run. The trend shows a reversal at the beginning of the 1990s, when poverty rates slightly rose. Considerable differences persist, however, among regions and areas. At the beginning of the period, the number of poor households in the North was 25.4% of the total, compared to 32.4% in the Centre and 51.2% in the South/Islands area; while the gap between North and Centre had vanished by 2004, the distance between the latter two areas and the southern Italy remains marked. The higher rate at which poverty fell in recent decades allowed the Centre to catch up with the northern regions by the end of the period. In the South, instead, not only do poverty indices decrease at a much slower rate than the other two areas, but poverty rates also slightly increased between 1991 and 2004. This pattern is consistent across the three indices of poverty rates and it is respected independently of the income definition used for their estimates.

Inequality follows the patterns of poverty, showing a decreasing trend until the beginning of the 1990s and a remarkable increase in recent decades. Not only is the level of inequality strikingly higher in the South throughout all the period, but also its dynamic is characterized by different patterns; during the 1990s the Gini index shows quite a stable trend in the South, while being much more volatile in the Centre. Low levels of inequality and more stability have characterized the distribution of incomes in the northern regions; only between 2000 and 2004, did inequality

[10]Small area estimation issues as well as the presence of outliers can invalidate the inference due to unacceptably high standard errors. The variability of our estimates is not high, ensuring that all the variables are statistically significant and different from zero at 10% level of significance.

[11]The surveys are based on a two-stage sampling design, which is not a simple random one. In the first stage municipalities - for which we do not have data - are randomly selected and stratified by region and population density. In the second stage, the sample is selected from census lists of each municipality. Sampling weights provided by the Bank of Italy were used to correct for this complex survey design and to take into account possible bias due to non-response.

[12]The pairwise correlations between each of the measures estimated from the two different definitions of disposable income is very high (table A.2). The difference in the two definitions of incomes comes from the presence of the yields on the financial assets net of the interest on mortgages. In this regard, Paiella (2007) documents that Italian households own little financial wealth and that most of the financial assets are strongly concentrated at the top of the income and wealth distributions; furthermore, the capital gains enjoyed on these financial assets have been modest.

Table 1: Summary statistics: poverty rates

Headcount

Year	y_{nfa} I	y_{nfa} N	y_{nfa} C	y_{nfa} S	y_{fa} I	y_{fa} N	y_{fa} C	y_{fa} S
1977	0.355	0.254	0.325	0.513				
	(0.009)	(0.012)	(0.021)	(0.018)				
1978	0.306	0.209	0.215	0.494				
	(0.009)	(0.012)	(0.019)	(0.018)				
1979	0.295	0.194	0.225	0.479				
	(0.009)	(0.011)	(0.020)	(0.018)				
1980	0.256	0.164	0.173	0.436				
	(0.009)	(0.010)	(0.018)	(0.017)				
1981	0.250	0.171	0.172	0.420				
	(0.009)	(0.011)	(0.016)	(0.016)				
1982	0.215	0.159	0.136	0.342				
	(0.008)	(0.011)	(0.013)	(0.015)				
1983	0.215	0.146	0.188	0.334				
	(0.008)	(0.012)	(0.015)	(0.015)				
1984	0.199	0.116	0.138	0.367				
	(0.007)	(0.009)	(0.013)	(0.014)				
1986	0.217	0.134	0.152	0.380				
	(0.006)	(0.009)	(0.011)	(0.012)				
1987	0.191	0.106	0.115	0.354	0.212	0.116	0.136	0.391
	(0.008)	(0.011)	(0.011)	(0.015)	(0.008)	(0.011)	(0.012)	(0.015)
1989	0.108	0.048	0.060	0.224	0.119	0.049	0.073	0.248
	(0.005)	(0.006)	(0.007)	(0.010)	(0.005)	(0.006)	(0.008)	(0.010)
1991	0.104	0.049	0.058	0.214	0.112	0.053	0.069	0.227
	(0.005)	(0.006)	(0.010)	(0.010)	(0.005)	(0.006)	(0.011)	(0.011)
1993	0.152	0.074	0.099	0.302	0.168	0.090	0.102	0.324
	(0.006)	(0.007)	(0.010)	(0.012)	(0.006)	(0.008)	(0.010)	(0.012)
1995	0.157	0.074	0.088	0.318	0.169	0.078	0.095	0.343
	(0.006)	(0.006)	(0.010)	(0.013)	(0.006)	(0.006)	(0.010)	(0.013)
1998	0.143	0.067	0.085	0.287	0.146	0.069	0.083	0.295
	(0.006)	(0.007)	(0.009)	(0.012)	(0.006)	(0.007)	(0.009)	(0.013)
2000	0.123	0.043	0.053	0.274	0.132	0.044	0.063	0.294
	(0.005)	(0.005)	(0.008)	(0.012)	(0.005)	(0.005)	(0.009)	(0.012)
2002	0.107	0.034	0.048	0.242	0.118	0.035	0.060	0.266
	(0.005)	(0.004)	(0.008)	(0.012)	(0.005)	(0.004)	(0.010)	(0.013)
2004	0.095	0.036	0.031	0.226	0.105	0.043	0.033	0.243
	(0.005)	(0.005)	(0.005)	(0.012)	(0.005)	(0.005)	(0.006)	(0.012)

Poverty Gap

Year	y_{nfa} I	y_{nfa} N	y_{nfa} C	y_{nfa} S	y_{fa} I	y_{fa} N	y_{fa} C	y_{fa} S
1977	0.107	0.069	0.092	0.170				
	(0.004)	(0.004)	(0.008)	(0.008)				
1978	0.090	0.054	0.055	0.160				
	(0.004)	(0.004)	(0.007)	(0.008)				
1979	0.086	0.046	0.065	0.155				
	(0.004)	(0.004)	(0.007)	(0.008)				
1980	0.064	0.033	0.039	0.124				
	(0.003)	(0.003)	(0.006)	(0.006)				
1981	0.061	0.036	0.039	0.116				
	(0.003)	(0.003)	(0.005)	(0.006)				
1982	0.050	0.033	0.025	0.087				
	(0.002)	(0.003)	(0.003)	(0.005)				
1983	0.050	0.028	0.041	0.088				
	(0.002)	(0.003)	(0.004)	(0.005)				
1984	0.046	0.022	0.031	0.093				
	(0.002)	(0.002)	(0.004)	(0.005)				
1986	0.055	0.025	0.038	0.109				
	(0.002)	(0.002)	(0.004)	(0.004)				
1987	0.051	0.026	0.032	0.096	0.057	0.030	0.036	0.107
	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)	(0.005)	(0.006)
1989	0.025	0.012	0.012	0.052	0.027	0.011	0.013	0.057
	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)	(0.003)
1991	0.023	0.009	0.010	0.051	0.026	0.011	0.012	0.057
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.004)
1993	0.047	0.019	0.031	0.099	0.051	0.022	0.032	0.107
	(0.002)	(0.002)	(0.005)	(0.005)	(0.002)	(0.002)	(0.005)	(0.005)
1995	0.049	0.017	0.024	0.109	0.052	0.018	0.026	0.117
	(0.002)	(0.002)	(0.004)	(0.006)	(0.002)	(0.002)	(0.004)	(0.006)
1998	0.051	0.020	0.025	0.110	0.052	0.020	0.025	0.113
	(0.003)	(0.003)	(0.004)	(0.006)	(0.003)	(0.003)	(0.004)	(0.006)
2000	0.040	0.012	0.015	0.094	0.042	0.012	0.016	0.100
	(0.002)	(0.002)	(0.003)	(0.005)	(0.002)	(0.002)	(0.003)	(0.005)
2002	0.034	0.009	0.015	0.081	0.037	0.010	0.018	0.087
	(0.002)	(0.001)	(0.004)	(0.005)	(0.002)	(0.001)	(0.004)	(0.006)
2004	0.027	0.008	0.009	0.067	0.029	0.009	0.010	0.073
	(0.002)	(0.001)	(0.002)	(0.005)	(0.002)	(0.001)	(0.002)	(0.005)

Squared Poverty Gap

Year	y_{nfa} I	y_{nfa} N	y_{nfa} C	y_{nfa} S	y_{fa} I	y_{fa} N	y_{fa} C	y_{fa} S
1977	0.047	0.028	0.040	0.079				
	(0.002)	(0.002)	(0.005)	(0.005)				
1978	0.039	0.022	0.022	0.074				
	(0.002)	(0.003)	(0.004)	(0.005)				
1979	0.039	0.019	0.028	0.074				
	(0.002)	(0.002)	(0.004)	(0.005)				
1980	0.025	0.010	0.015	0.052				
	(0.002)	(0.001)	(0.003)	(0.004)				
1981	0.024	0.012	0.015	0.049				
	(0.001)	(0.001)	(0.003)	(0.004)				
1982	0.018	0.011	0.008	0.033				
	(0.001)	(0.002)	(0.002)	(0.003)				
1983	0.019	0.009	0.014	0.036				
	(0.001)	(0.001)	(0.002)	(0.003)				
1984	0.018	0.009	0.011	0.037				
	(0.001)	(0.002)	(0.002)	(0.003)				
1986	0.023	0.009	0.017	0.048				
	(0.001)	(0.001)	(0.003)	(0.002)				
1987	0.023	0.012	0.018	0.043	0.032	0.025	0.019	0.048
	(0.002)	(0.002)	(0.004)	(0.004)	(0.007)	(0.014)	(0.004)	(0.004)
1989	0.012	0.009	0.005	0.021	0.013	0.009	0.005	0.023
	(0.002)	(0.005)	(0.001)	(0.002)	(0.002)	(0.005)	(0.001)	(0.002)
1991	0.009	0.003	0.004	0.021	0.010	0.004	0.004	0.023
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
1993	0.024	0.010	0.017	0.051	0.026	0.011	0.017	0.055
	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)
1995	0.028	0.008	0.017	0.062	0.029	0.008	0.017	0.066
	(0.002)	(0.001)	(0.006)	(0.006)	(0.002)	(0.001)	(0.006)	(0.006)
1998	0.032	0.015	0.017	0.065	0.032	0.014	0.017	0.066
	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)
2000	0.022	0.007	0.007	0.051	0.023	0.006	0.008	0.054
	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.002)	(0.004)
2002	0.019	0.004	0.009	0.044	0.020	0.005	0.009	0.047
	(0.002)	(0.001)	(0.003)	(0.004)	(0.002)	(0.001)	(0.003)	(0.004)
2004	0.014	0.003	0.008	0.032	0.015	0.004	0.008	0.035
	(0.001)	(0.001)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)	(0.003)

Note: Robust standard errors corrected for complex sampling design in parentheses. I = Italy; N = North; C = Centre; S = South/Island.

Table 2: Summary statistics: inequality, mean income, per-capita GDP

Year	Gini index								Annual rate of growth mean income survey (percent)								Annual rate of GDP growth (real, per-capita; percent)			
	y_{nfa}				y_{fa}				y_{nfa}				y_{fa}							
	I	N	C	S	I	N	C	S	I	N	C	S	I	N	C	S	I	N	C	S
1977	0.345	0.326	0.332	0.345																
	(0.007)	(0.010)	(0.016)	(0.012)																
1978	0.333	0.314	0.275	0.345					3.51	3.52	6.28	1.01					3.32	3.28	3.61	3.31
	(0.009)	(0.011)	(0.010)	(0.022)																
1979	0.364	0.341	0.361	0.356					9.58	6.76	22.75	6.18					5.28	5.58	4.87	5.12
	(0.021)	(0.039)	(0.013)	(0.018)																
1980	0.340	0.334	0.338	0.281					3.29	5.89	4.82	-4.13					3.24	3.72	1.99	3.37
	(0.017)	(0.028)	(0.018)	(0.006)																
1981	0.311	0.300	0.283	0.307					-5.93	-9.18	-11.92	4.71					0.68	0.85	1.26	-0.08
	(0.010)	(0.017)	(0.010)	(0.012)																
1982	0.294	0.278	0.294	0.287					3.02	1.97	2.96	7.54					0.26	0.07	1.06	0.35
	(0.006)	(0.007)	(0.020)	(0.010)																
1983	0.297	0.272	0.312	0.295					0.53	0.91	-1.26	0.41					0.91	0.54	1.49	1.58
	(0.006)	(0.007)	(0.019)	(0.009)																
1984	0.310	0.282	0.312	0.316					6.60	5.08	12.99	2.92					2.48	3.00	1.96	2.18
	(0.006)	(0.009)	(0.014)	(0.010)																
1986	0.303	0.273	0.285	0.328					-2.84	-1.95	-5.92	-1.35					2.60	3.08	3.17	1.44
	(0.005)	(0.006)	(0.013)	(0.009)																
1987	0.314	0.293	0.282	0.311	0.321	0.298	0.288	0.316	8.73	12.64	8.83	2.51					2.79	3.24	2.60	2.26
	(0.004)	(0.007)	(0.009)	(0.008)	(0.004)	(0.006)	(0.009)	(0.008)												
1989	0.293	0.271	0.278	0.286	0.311	0.296	0.288	0.293	6.21	5.91	5.93	6.60	8.38	8.93	6.85	7.88	3.31	4.21	2.06	2.64
	(0.004)	(0.007)	(0.010)	(0.005)	(0.008)	(0.014)	(0.010)	(0.006)												
1991	0.295	0.278	0.274	0.287	0.306	0.290	0.283	0.292	1.27	1.44	1.06	0.76	0.63	0.43	1.07	0.39	2.44	1.98	2.60	2.87
	(0.009)	(0.015)	(0.012)	(0.006)	(0.008)	(0.015)	(0.012)	(0.006)												
1993	0.321	0.288	0.310	0.327	0.337	0.307	0.324	0.338	-2.54	-2.87	-0.84	-3.43	-2.22	-2.59	-0.48	-3.16	-0.39	-0.43	0.37	-0.82
	(0.006)	(0.006)	(0.010)	(0.006)	(0.005)	(0.007)	(0.010)	(0.007)												
1995	0.325	0.294	0.292	0.336	0.336	0.305	0.302	0.343	0.65	2.07	-1.38	0.00	0.10	1.43	-1.77	-0.52	2.46	3.56	2.28	0.38
	(0.005)	(0.006)	(0.010)	(0.010)	(0.005)	(0.006)	(0.010)	(0.009)												
1998	0.338	0.301	0.333	0.326	0.356	0.326	0.351	0.333	2.12	1.86	4.82	0.41	3.05	2.85	5.90	0.97	1.48	1.32	1.40	1.85
	(0.007)	(0.009)	(0.017)	(0.007)	(0.007)	(0.011)	(0.018)	(0.007)												
2000	0.326	0.292	0.275	0.342	0.339	0.309	0.287	0.348	2.08	3.88	-2.89	3.35	0.95	2.54	-3.85	2.82	2.21	1.98	2.00	2.66
	(0.005)	(0.007)	(0.011)	(0.008)	(0.006)	(0.009)	(0.011)	(0.007)												
2002	0.323	0.287	0.289	0.319	0.329	0.295	0.295	0.321	2.24	2.36	4.36	0.19	1.10	1.00	3.18	-0.45	1.48	0.70	2.01	2.49
	(0.005)	(0.008)	(0.010)	(0.007)	(0.005)	(0.008)	(0.010)	(0.007)												
2004	0.345	0.321	0.303	0.319	0.347	0.325	0.307	0.320	5.07	3.96	9.01	2.07	4.34	3.08	8.47	1.66	-0.26	-0.85	0.32	0.19
	(0.008)	(0.013)	(0.011)	(0.010)	(0.008)	(0.012)	(0.011)	(0.010)												

Note: Robust standard errors corrected for complex sampling design in parentheses. I = Italy; N = North; C = Centre; S = South/Island.

in these regions strikingly increase, while during the 1990s it displayed only a slight increasing trend.

4 Methodology

4.1 Growth incidence curve

Preliminarily, the impact of economic growth on poverty can be graphically examined through the growth incidence curve (GIC). The GIC plots the growth rate of income (or consumption) for each percentile of the distribution and allows us to look beyond averages at what happens to the poor, the middle class and the non-poor during the growth process. It allows evaluation as to whether growth is pro-poor, according to both its relative and absolute definitions. Following Ravallion and Chen (2003), the mean growth rate for the poor[13] is used as a measure of the rate of pro-poor growth. Growth is called absolutely pro-poor if the mean growth rate for the poor is greater than zero ("weak" approach) or relatively pro-poor if the mean growth rate for the poor is at least as large as the growth rate in the overall mean. While the former criterion only requires the poor to be on average better off in absolute terms, the idea of relative pro-poor growth requires the growth process not to widen the initial income differentials.

Formally, at each time t the growth incidence curve maps out the mean growth rate for the poor, used as a measure of pro-poor growth and defined by:

$$g_t(p) = \frac{L_t^{'}(p)}{L_{t-1}^{'}(p)}(\delta + 1) - 1 \tag{9}$$

where $L'(p)$ is the slope of the Lorenz curve at the pth-quantile, at time t and $t-1$, and $\delta = (\mu_t/\mu_{t-1}) - 1$ is the growth rate in mean income at time t. It is clear from (9) that if the Lorenz curve does not change, if - in other words - there are no distributional effects of the growth process, the rate of pro-poor growth corresponds to the growth rate in overall mean, in which case all incomes grow at the same rate ($g_t(p) = \delta_t$, for each quantile p). $g_t(p) > \delta_t$ if and only if $y_t(p)/\mu_t$ is increasing over time, where $y_t(p)$ is the income of the pth-quantile. Further, if $g(p)$ is decreasing (increasing) for all p, inequality falls (rises) over time. The absolute rate of pro-poor growth can finally be computed as the area under the growth incidence curve up to the headcount index.

GIC curves were constructed from the SHIW-HA surveys[14]. Interpretation of the curve is based on the definition provided above. If the GIC is above zero it indicates weak absolute pro-poor growth. If the GIC is negatively sloped it indicates relative pro-poor growth, implying that the poor benefit more than the non-poor from growth and that inequality between the two groups drops.

[13] This measure differs from the growth rate in the mean income of the poor, generally used in the poverty literature.

[14] We trimmed the distributions at the 1st and the 99th percentiles and estimated confidence intervals using the bootstrap technique to reduce the biases produced by the surveys that are known to be stronger at the extreme bounds of the distributions.

4.2 Econometric specification

In the econometric analysis we use the regional estimates of the mean incomes and of the poverty and inequality rates; when we employ the first definition of household disposable income (i.e. y_{nfa}) we have 342 usable observations, spanning 18 time periods across 19 regions[15]. The availability of panel data makes it possible to control for unobserved time-constant region-specific characteristics that may affect both poverty and income, i.e. regional fixed effects. One of the simplest specifications used to estimate the basic relationship between poverty rates, economic growth and inequality (Adams, 2004; Besley and Burgess, 2003; Ravallion and Chen, 1997) is given by:

$$\log hc_{it} = \alpha_i + \eta \log \mu_{it} + \gamma \log G_{it} + \beta t + \varepsilon_{it} \tag{10}$$

where hc_{it} is the headcount in region i at time t, μ_{it} the mean income derived from the survey, G_{it} the Gini index, α_i the regional fixed-effects, t a common time trend, and ε_{it} are the (idiosyncratic) errors. We wash out the regional fixed effects by taking first differences from the model in eq. (10) so as to estimate the following model[16]

$$\Delta \log hc_{it} = \beta + \eta \Delta \log \mu_{it} + \gamma \Delta \log G_{it} + v_{it} \tag{11}$$

where $\Delta \log hc_{it} = \log hc_{it} - \log hc_{it-1}$, $\Delta \log \mu_{it} = \log \mu_{it} - \log \mu_{it-1}$, $\Delta \log G_{it} = \log G_{it} - \log G_{it-1}$ and $t-1$ refers to the observations from the survey before time t[17]. The estimated coefficients give the (partial) elasticities of poverty with respect to income (η) and inequality (γ); controlling for the changes in income distribution this simple model (eq. 11) allows identification of the distribution-neutral income elasticity of poverty. Further we test the hypothesis that area heterogeneity exists to evaluate whether structural differences between North, Centre and South do affect poverty responses across regions and over time. Finally, following the model developed in section 2 we ask whether the regional variation in poverty responsiveness to income and inequality changes is due to the initial level of development and to the initial level of inequality. To this end we estimate a more detailed model (eq. 12), introducing the density near the poverty line at the beginning of the spell - captured by the ratio of the poverty line over the mean income $(\log (z_{t-1}/\mu_{it-1}))$ - as a proxy for the initial level of development and the level of the Gini index at the beginning of the spell $(\log G_{it-1})$. Their interactions with both the changes in mean income and the changes in inequality capture the effects that the "crowdedness" near the poverty line as well as the characteristics of the initial distribution have on the degree of reaction of the poverty

[15] Throughout the analysis we use this definition as it allows us to exploit variations across many time periods. In the final section we conduct a robustness check employing the variables derived from the second definition of household disposable income (i.e. y_{fa}). In the latter case, we have 171 usable observations, spanning 9 time periods across 19 regions.

[16] We prefer the first difference with respect to the fixed effect estimator since the latter would require stronger assumptions for consistency on the correlation between the explanatory and the time-varying omitted variables. As further discussed in the text, these assumptions may be implausible in our setting.

[17] Hereafter we define the time-distance between two surveys as a "spell". Hence, the first differences in models (11) and (12) are the (log) differences between the observations derived from two consecutive surveys.

changes with respect to both income and inequality changes (Bourguignon, 2003; Epaulard, 2003; Kalwij and Verschoor, 2007).

$$\begin{aligned}\Delta \log hc_{it} = \beta + [\eta_1 + \eta_2 \log G_{it-1} + \eta_3 \log (z_{t-1}/\mu_{it-1})]\, \Delta \log \mu_{it} + \\ + [\gamma_1 + \gamma_2 \log G_{it-1} + \gamma_3 \log (z_{t-1}/\mu_{it-1})]\, \Delta \log G_{it} + \\ + \xi \log G_{it-1} + \chi \log (z_{t-1}/\mu_{it-1}) + v_{it} \quad (12)\end{aligned}$$

The OLS estimates of the models in (11) and (12) are likely to be biased and inconsistent due to the correlation between the explanatory variables and the error term. We do not observe the true values of the mean incomes, poverty and inequality rates, but we estimated them with some error[18]; taking first differences in eq. (10) introduces more structure in the error term. Firstly, the latter is correlated within regions and over time since consecutive spells for a given region are not statistically independent as they have one survey in common; we deal with this issue, correcting the variance-covariance matrix by clustering the standard errors at regional level. Another source of correlation derives from the fact that mean incomes, poverty and inequality rates are estimated from the same surveys; the new error term (v_{it}) is hence likely to be correlated with the measurement error in mean income[19]. We employ a Generalized Method of Moments estimator to deal with these endogeneity issues to have consistent estimations of the coefficients. Following the literature (Kalwij and Verschoor, 2007; Ravallion, 2001; Ravallion and Chen, 1997), we use lagged values of the mean income and the change in the per-capita GDP ($\Delta \log GDPpc_{it}$) as instruments for the change in the mean income ($\Delta \log \mu_{it}$) as well as interaction terms between these instruments and the proxies of the initial level of the development and of the initial distribution. Other instruments include lagged values of the Gini index, the change in the size of the population ($\Delta \log pop_{it}$) as well as its value at the beginning of the spell ($\log pop_{it-1}$)[20]. As the poverty rates derive from the surveys, while regional per-capita GDP from the regional accounts, it can be safely assumed that the measurement errors in the former are not correlated with the latter. These instruments accomplish the two specification conditions required; they are both relevant and orthogonal to the error structure. The latter condition is tested through the overidentifying restrictions test, or Hansen-J test, which is the key test to assess both the validity of the model and the exogeneity of the instruments. The second requirement is that the instruments are relevant, that is correlated with the endogenous regressor and with good explanatory power. Apart from being correlated with the regressor the consequence of instruments with little explanatory power

[18] Above we reported that this error is very small as the variability of our variables is very tiny.

[19] The OLS bias is composed by the classical attenuation bias due to measurement error in the explanatory variable and by the common-survey bias due to lower participation rates in the surveys among the richer groups than among the poorer ones, which would lead to over-estimation of poverty rates and under-estimations of the incomes (Deaton, 2005; Ravallion and Chen, 1997).

[20] Theoretical arguments within the unified growth approach may justify the use of both the changes and the initial level of the population to map changes in mean incomes as well as the level of development, but not the changes in the poverty rates (see for instance Galor, 2010; Galor and Weil, 2000).

(weak instruments) is increased bias in the estimated coefficients, reducing the efficiency of the estimator[21].

The coefficients estimated in the last model (eq. 12) no longer map the poverty elasticities with respect to income and inequality; the latter can be predicted from the estimated parameters as

$$\hat{\eta} = \hat{\eta}_1 + \hat{\eta}_2 \log G_{it-1} + \hat{\eta}_3 \log \left(z_{t-1}/\mu_{it-1} \right) \tag{13}$$

and

$$\hat{\gamma} = \hat{\gamma}_1 + \hat{\gamma}_2 \log G_{it-1} + \hat{\gamma}_3 \log \left(z_{t-1}/\mu_{it-1} \right) \tag{14}$$

As stated in section 2, the predicted income ($\hat{\eta}$, eq. 13) and inequality ($\hat{\gamma}$, eq. 14) elasticities of poverty differ across regions and over time depending on the initial distribution of income and on the initial level of development.

5 Results

5.1 Pro-poor growth and the growth incidence curve

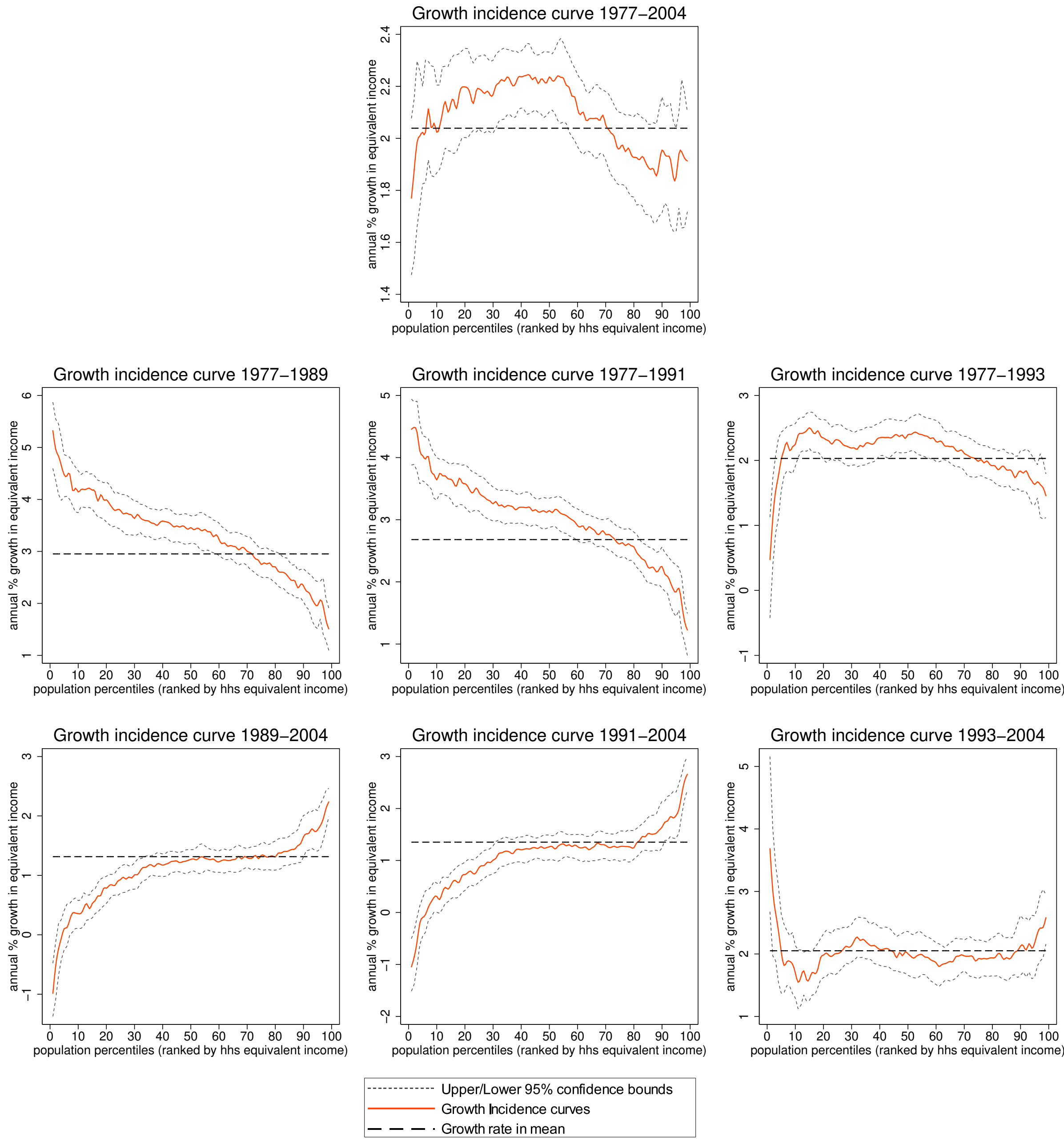
Economic growth produced heterogeneous effects across the main areas of the country and over the periods (figure 2). In the long run (1977-2004) growth was weakly pro-poor as the GIC is always above zero, such that even the poorest benefited from growth episodes. It cannot be definitively stated that growth was pro-poor in relative terms as well, since the growth incidence curve is not monotonically decreasing: it shows a reversal around the 55th percentile, but not a decreasing trend in the lowest part of the distribution[22].

Overall, the poor have benefited proportionally more than the non-poor in the long run. Nonetheless, the distribution of gains from growth seems to have been biased in favour of the middle - especially the upper-middle - class rather than the poorest parts of the distribution. As growth rates were almost constant between the 20th and the 50th percentiles, the poor and the middle class benefited equally from growth episodes; growth was not pro-poor in relative terms since it was not positively biased towards the poorest part of the distribution. The decreasing trend in the final part of the distribution clearly shows that growth favoured the upper-middle class with respect to the richest part of the population. Overall, growth positively favoured poverty reduction with two distinct distributional effects. The gap between the lowest part of the population and the middle class increased over time, whereas the distance between the upper-middle class and the richest part narrows.

[21] Unreported first stage regressions show that both the significance and magnitude of their coefficients as well as the size of the partial R-squared and the F-tests can confirm about the power of the instruments.

[22] First and second order dominance criteria may be easily applied to judge the robustness of these results (see Araar et al., 2009; Duclos, 2009; Essama-Nssah and Lambert, 2009)

Figure 2: Growth incidence curves, national analysis



The national picture is not coupled by homogeneous trends at regional level (figure A.4); in the long run (1977-2004), economic growth favoured much more the poor in the northern and central regions than those in southern regions, implying a stronger decrease in the poverty and inequality rates in the former regions than in the latter. The faster reduction in poverty and inequality rates in the North and in the Centre with respect to the South depends only in part on the differentials of growth rates between the three areas and among the regions within these areas; an important part should also be attached to the different trends in the distribution of incomes. In this regard, the Italian dualistic structure is confirmed not only in terms of macro and aggregate indicators but also with regard to the individual distribution of incomes. Over time, gains from economic growth have followed a strikingly heterogeneous pattern both at national and regional level. Until the beginning of the 1990s, economic growth drove the very strong rate of poverty reduction as both the growth incidence curve was monotonically decreasing and most of the mean growth rates for the poor were higher than the average growth rate. This trend suggests that growth was pro-poor in absolute as well as relative terms over this period, implying a reduction of inequality between the lowest and highest part of the distribution. In the following decades, instead, economic growth was strongly against the poor; the annual growth rate for the poor was lower than the average growth rate for almost all of the percentiles and the upward slope of the curve suggests that the distribution of gains from the growth process is unequal, favouring the upper income classes[23]. Briefly, while the big reduction in poverty achieved in the first years of the sample was driven by patterns of growth not biased against the poor, the renewed increase in poverty rates in the last few decades may be explained not only by slight rates of changes in mean income, but also, or at least in part, by pattern of growth biased against the poor part of the distribution and in favour of the richest one.

5.2 Income and inequality elasticities of poverty: baseline model

Table 3 presents the results of the baseline model (eq. 11), which estimates the gross and distribution-neutral income elasticities of poverty. The main assumption behind the consistency of the parameters in the GMM estimations is that the instruments are orthogonal to the error terms. The overidentifying restrictions - or Hansen-J - statistic tests the joint hypothesis of the correct model specification and the orthogonality conditions; its low significance (high p-values) ensures that the instruments are actually not correlated with the errors.

The coefficients are highly significant and with the expected signs; changes in poverty rates are negatively correlated with income changes and positively with changes in inequality. A 1% increase in the mean income reduces poverty rates by around 2% (column 4), while a 1% increase in inequality will increase them by 1.5%. We explore the possibility that inter-area differences exist in the elasticities of poverty by including a complete set of area dummies (columns 5-8). The F-test on the equality of these elasticities across the areas confirms that the three parameters are different and that there exists substantial variation across North, Centre and South. Poverty rates in the North and in the Centre are more reactive to growth than in the South; in the North and Centre a 1% increase in survey mean incomes implies a 3.4% reduction in the headcount, while in the South the decrease is 2.5%. In all three areas, poverty changes are very responsive to inequality changes as well, with a 1% increase in inequality implying a 1.9% increase in poverty rates.

[23]The slopes of the growth incidence curves change sharply around 1991 and 1993. Up to 1991 they were monotonically decreasing both at national level and across the whole country: that year there had been a marked change, more pronounced in the South than in the other areas, expressed by a monotonically increasing pattern. Unreported estimations between each pair of available years confirm that the sharp change in the distributions of the gains from economic growth starts at the onset of the economic crisis of the 1990s which the country faced.

Table 3: Income and inequality elasticities: baseline model

Dependent variable: $\Delta \log hc_{it}$								
Explanatory variables	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
(Standard errors)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \log \mu_{it}$	-2.173***	-2.196***	-2.720***	-1.994***				
	(0.432)	(0.560)	(0.499)	(0.631)				
$\Delta \log G_{it}$			1.628***	1.514***			1.747***	1.912***
			(0.346)	(0.304)			(0.313)	(0.196)
$\Delta \log \mu_{it}$*area dummy variables								
North					-2.830**	-3.285***	-3.842***	-3.359***
					(0.999)	(0.331)	(0.705)	(0.286)
Centre					-1.524***	-2.980***	-2.381***	-3.422***
					(0.444)	(0.321)	(0.299)	(0.276)
South					-1.877***	-1.843***	-2.002***	-2.511***
					(0.227)	(0.661)	(0.468)	(0.432)
# Obs.	323	323	323	323	323	323	323	323
R-squared	0.29	0.29	0.54	0.51	0.31	0.28	0.59	0.56
Hansen J-statistics		4.290[a]		1.200[a]		5.385[b]		6.752[b]
(p-value)		(0.232)		(0.753)		(0.371)		(0.240)
Equality income elasticity across areas (F-test)[c]						7.90		9.59

Note: Robust standard errors are clustered at regional level in parentheses. Significance levels: *10%, **5%, ***1%.

[a] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-1}$, $\Delta \log pop_{it}$, $\log pop_{it-1}$

[b] Instruments: $\Delta \log GDPpc_{it}$ and $\log \mu_{it-1}$ interacted with area dummy variables, $\Delta \log pop_{it}$, $\log pop_{it-1}$

[c] F-statistics critical value (5%): 3.00

The gross income elasticity (columns 1-2 and 5-6) picks up changes in inequality coinciding with growth; controlling for these changes (columns 3-4 and 7-8) the distribution-neutral income elasticities (η - section 2) are revised, taking into account the role that distributional movements have on poverty rates, both directly and indirectly through the growth channel. The coefficient is quite stable in the first specification (columns 2 and 4); otherwise, when we allow for area heterogeneity the coefficients of the distribution-neutral income elasticities (column 8) are higher than the "gross" ones (column 6). Especially in the South, where inequality rates are much higher than those in the other regions of the country, the responsiveness of poverty rates to economic growth would have been much higher after washing out the effects of the changes in the distribution. The inequality elasticity of poverty remains substantially stable across the methods of estimation, while the income elasticity of poverty is further corrected by the GMM estimation.

5.3 Level of development and initial inequality

Table 4 provides the estimates of the more detailed model (eq. 12), where we enquire whether the level of development and the initial level of inequality may be the source for the observed heterogeneity in the income elasticities of poverty across North, Centre and South. We find that this heterogeneity is not due to different degrees of responsiveness of the poverty rates to economic growth, but depends on the differences in the initial level of development and in the initial level of inequality across the regions. In the first specification we allow for area heterogeneity including a full set of dummy variables (columns 1 and 2); all the coefficients are highly significant, but we can no longer reject the hypothesis of equality of the coefficients across the areas (column 2). Hence we estimate our final model (column 3 and 4) where the income and the inequality elasticities of poverty are allowed to differ across regions only as a function of their initial conditions, as described by the interaction terms. The coefficients on the change in mean income ($\Delta \log \mu_{it}$) and on the change in the Gini index ($\Delta \log G_{it}$) are no longer interpretable as "net" elasticities; the presence of the interaction terms implies that these elasticities must now reflect also the influence of the initial level of inequality and the initial level of development. As expected (section 2), both initial lower level of development and initial higher level of inequality tend to correct downward the estimates of the income and the inequality elasticities of poverty (column 4).

In order to have an overview of the heterogeneity in the estimated elasticities across regions and over time, table 5 presents the predicted income and inequality elasticities of poverty (eq. 13 and 14). In the overall period (1977-2004), more equal and more developed regions (i.e. North) show higher income and inequality elasticities of poverty with respect to the more unequal and the less developed ones (column 1). We further analyze the change in elasticities over different sub-periods. The increasing magnitude of elasticities over the years cannot be an indicator of also an improvement in poverty reduction policies, since it is mainly due to the fact that as poverty rates decrease over time, the elasticities are automatically over-inflated.

Table 4: Income and inequality elasticities: the role of initial conditions

Dependent variable: $\Delta \log hc_{it}$				
Explanatory variables (Standard errors)	OLS (1)	GMM (2)	OLS (3)	GMM (4)
$\Delta \log \mu_{it}$			-2.471**	-4.388***
			(1.043)	(0.558)
$\Delta \log \mu_{it} * \log G_{it-1}$	-1.301*	-3.175***	-1.153	-3.282***
	(0.763)	(0.402)	(0.774)	(0.374)
$\Delta \log \mu_{it} * \log (z_{t-1}/\mu_{it-1})$	2.470***	2.514***	3.915***	4.463***
	(0.670)	(0.714)	(0.521)	(0.623)
$\Delta \log G_{it}$	2.530***	2.114***	2.744***	2.829***
	(0.655)	(0.337)	(0.664)	(0.403)
$\Delta \log G_{it} * \log G_{it-1}$	1.814***	1.495***	2.022***	2.210***
	(0.493)	(0.236)	(0.498)	(0.325)
$\Delta \log G_{it} * \log (z_{t-1}/\mu_{it-1})$	-3.332***	-3.281***	-3.348***	-3.695***
	(0.434)	(0.302)	(0.444)	(0.395)
$\log G_{it-1}$	0.281**	0.285***	0.275*	0.335***
	(0.138)	(0.033)	(0.141)	(0.056)
$\log (z_{t-1}/\mu_{it-1})$	-0.025	-0.067*	-0.038	-0.114**
	(0.073)	(0.036)	(0.075)	(0.052)
$\Delta \log \mu_{it}$*area dummy variables				
North	-4.301***	-5.679***		
	(1.154)	(0.728)		
Centre	-2.978***	-5.241***		
	(1.142)	(0.725)		
South	-2.920***	-4.617***		
	(1.031)	(0.599)		
# Obs.	323	323	323	323
R-squared	0.67	0.58	0.65	0.63
Hansen J-statistics (p-value)		13.347[a] (0.271)		10.022[b] (0.349)
Equality income elasticity across areas (F-test)[c]		2.62		

Note: Robust standard errors are clustered at regional level in parentheses. Significance levels: *10%, **5%, ***1%.

[a] Instruments: $\Delta \log GDPpc_{it}$ and $\log \mu_{it-1}$ interacted with area dummy variables, $\Delta GDPpc_{it} * \log G_{it-1}$, $\Delta GDPpc_{it} * \log (z_{t-1}/\mu_{it-1})$, $\log \mu_{it-1} * \log G_{it-1}$, $\log \mu_{it-1} * \log (z_{t-1}/\mu_{it-1})$, $\log G_{it-1} * \log G_{it-1}$, $\Delta \log pop_{it}$, $\log pop_{it-1}$, $\Delta \log pop_{it} * \log G_{it-1}$, $\Delta \log pop_{it} * \log (z_{t-1}/\mu_{it-1})$, $\log pop_{it-1} * \log G_{it-1}$, $\log pop_{it-1} * \log (z_{t-1}/\mu_{it-1})$

[b] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-1}$, $\Delta GDPpc_{it} * \log G_{it-1}$, $\Delta GDPpc_{it} * \log (z_{t-1}/\mu_{it-1})$, $\log \mu_{it-1} * \log G_{it-1}$, $\log \mu_{it-1} * \log (z_{t-1}/\mu_{it-1})$, $\log G_{it-1} * \log G_{it-1}$, $\Delta \log pop_{it}$, $\log pop_{it-1}$, $\Delta \log pop_{it} * \log G_{it-1}$, $\Delta \log pop_{it} * \log (z_{t-1}/\mu_{it-1})$, $\log pop_{it-1} * \log G_{it-1}$, $\log pop_{it-1} * \log (z_{t-1}/\mu_{it-1})$

[c] F-statistics critical value (5%): 3.00

Table 5: Predicted elasticities

	Mean over the period				Rate of change (%)		
	1977-2004	80s	90s	00s	80s-90s	80s-00s	90s-00s
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Income elasticity of poverty							
National	-2.869	-2.490	-3.336	-3.803	0.340	0.527	0.140
	(0.188)	(0.191)	(0.180)	(0.237)			
North	-3.527	-2.988	-4.053	-4.725	0.356	0.581	0.166
	(0.171)	(0.251)	(0.127)	(0.155)			
Centre	-3.222	-3.013	-3.596	-4.177	0.193	0.386	0.162
	(0.316)	(0.342)	(0.277)	(0.317)			
South	-2.116	-1.793	-2.578	-2.810	0.438	0.567	0.090
	(0.136)	(0.130)	(0.106)	(0.192)			
Inequality elasticity of poverty							
National	2.207	1.898	2.601	2.973	0.370	0.566	0.143
	(0.155)	(0.155)	(0.151)	(0.197)			
North	2.762	2.324	3.207	3.747	0.380	0.612	0.169
	(0.136)	(0.196)	(0.102)	(0.119)			
Centre	2.510	2.323	2.841	3.308	0.223	0.424	0.165
	(0.242)	(0.267)	(0.205)	(0.236)			
South	1.569	1.312	1.950	2.127	0.486	0.621	0.091
	(0.109)	(0.099)	(0.088)	(0.153)			

Note: standard errors in parentheses. 80s = 1980-1989; 90s = 1991-1998; 00s = 2000-2004

Indeed, when we pay attention to their relative importance and look at the rate of change over the decades, over the years the inequality elasticities increase much more than the income elasticities of poverty. For instance, between the 1980s and the initial part of the 2000s, at national level the inequality elasticity of poverty increased by 56.6% while the income elasticity of poverty only by 52.7%, implying an increasing weight of lower inequality than only higher income growth rates in reducing poverty rates.

5.4 Robustness analysis

5.4.1 Poverty measures

The model developed in section 2 poses a direct relation between economic growth, inequality and the number of poor, as expressed by the headcount index. Nonetheless, we provide further evidence with the adoption of alternative poverty measures; namely, the poverty gap and the squared poverty gap which are indicators of the depth and of the severity of poverty among the poor.

Table 6: Income and inequality elasticities of poverty: other poverty measures

Dependent variable: $\Delta \log(\text{poverty measure})_{it}$

	Poverty Gap				Squared Poverty Gap			
Explanatory variables	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
(Standard errors)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \log \mu_{it}$	-3.181***	-2.744***	-5.455***	-9.643***	-3.765***	-3.136***	-7.447***	-13.506***
	(0.464)	(0.506)	(1.522)	(0.888)	(0.550)	(0.688)	(2.703)	(1.677)
$\Delta \log \mu_{it} * \log G_{it-1}$			-2.976***	-7.061***			-4.186**	-9.810***
			(1.130)	(0.591)			(2.007)	(1.178)
$\Delta \log \mu_{it} * \log(z_{t-1}/\mu_{it-1})$			3.434***	3.224***			3.584***	2.929**
			(0.760)	(0.915)			(1.350)	(1.241)
$\Delta \log G_{it}$	2.094***	2.068***	3.130***	3.112***	2.393***	2.196***	3.887**	4.652***
	(0.409)	(0.320)	(0.968)	(0.665)	(0.533)	(0.418)	(1.720)	(1.419)
$\Delta \log G_{it} * \log G_{it-1}$			2.018***	2.367***			2.274*	3.306**
			(0.727)	(0.610)			(1.291)	(1.301)
$\Delta \log G_{it} * \log(z_{t-1}/\mu_{it-1})$			-3.575***	-4.024***			-3.400***	-3.561***
			(0.648)	(0.399)			(1.151)	(0.762)
$\log G_{it-1}$			0.249	0.226**			0.240	0.138
			(0.206)	(0.106)			(0.366)	(0.161)
$\log(z_{t-1}/\mu_{it-1})$			-0.046	-0.037			-0.075	-0.014
			(0.109)	(0.071)			(0.194)	(0.076)
# Obs.	323	323	323	323	323	323	323	323
R-squared	0.49	0.48	0.55	0.49	0.31	0.30	0.34	0.29
Hansen J-statistics		0.538[a]		5.533[b]		2.174[a]		6.544[b]
(p-value)		(0.910)		(0.786)		(0.537)		(0.685)

Note: Robust standard errors are clustered at regional level in parentheses. Significance levels: *10%, **5%, ***1%.

[a] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-1}$, $\Delta \log pop_{it}$, $\log pop_{it-1}$

[b] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-1}$, $\Delta GDPpc_{it} * \log G_{it-1}$, $\Delta GDPpc_{it} * \log(z_{t-1}/\mu_{it-1})$, $\log \mu_{it-1} * \log G_{it-1}$, $\log \mu_{it-1} * \log(z_{t-1}/\mu_{it-1})$, $\log G_{it-1} * \log G_{it-1}$, $\Delta \log pop_{it}$, $\log pop_{it-1}$, $\Delta \log pop_{it} * \log G_{it-1}$, $\Delta \log pop_{it} * \log(z_{t-1}/\mu_{it-1})$, $\log pop_{it-1} * \log G_{it-1}$, $\log pop_{it-1} * \log(z_{t-1}/\mu_{it-1})$

Table 6 presents the results, using as the dependent variables the changes in the other two poverty measures ($\Delta \log pg_{it} = \log pg_{it} - \log pg_{it-1}$ and $\Delta \log spg_{it} = \log spg_{it} - \log spg_{it-1}$) between two consecutive surveys. The size of the estimated coefficients is slightly higher than that in the previous models due to the higher sensitivity of the two poverty measures; differently from the headcount, the poverty and the squared poverty gap are much more elastic to transfers between the poor as they identify respectively the distance of the average income of the poor from the poverty line and the inequality amongst the poor. Nonetheless, the predicted elasticities (table A.3) are consistent and in line with those estimated in the previous model. Higher inequality and a lower of level of development lessen both the income and the inequality elasticities of poverty, inducing striking variations across regions and over time also in the sensitivity of the changes in the depth and intensity of poverty to the changes in mean incomes and inequality. Southern regions are the less sensitive to economic growth and to inequality changes in reducing not only the number of the poor, but also the intensity of poverty.

5.4.2 Longer spells

Economic growth and changes in distribution may well affect the reduction of poverty rates only in the very the long run. To verify this possibility, we check the robustness of the previous results to the adoption of longer spells. Instead of having spells defined as the (log) differences between two consecutive surveys, now the length of the spells is given by the distance $\tau = 1, 2, 3, 5, 10$ between two surveys. The changes in the variables of interest are defined as $\Delta \log x_{it} \equiv \log x_{it} - \log x_{it-\tau}$, with $x = hc, \mu, G$; similarly, the interaction terms refer to the beginning of the τ-th spell. Table 7 shows that the coefficients estimated are strikingly in line with those estimated in the previous models (see tables 3 and 4); increasing the length of the spell does not substantially alter either the size or significance of estimates, implying that the elasticities previously identified actually map the degrees of responsiveness of the poverty rates to changes in mean income and distribution.

In all the specifications, the more detailed models (columns 3-4, 7-8, 11-12 and 15-16) return highly significant coefficients which provide predicted elasticities strikingly consistent with those estimated in the shorter run version. The simpler specifications (columns 1-2, 5-6, 9-10, 13-14) return the distribution-neutral income elasticities of poverty which are very much in line with the previous ones, except in the longer spell case ($\tau = 10$, column 14). This may be due to the fact that on increasing the length of the spells the reduced number of observations influences the efficiency of the GMM estimation, while not affecting the OLS estimator. Table A.4 in the appendix presents an overview of the heterogeneity in the predicted elasticities across regions and over time. These are very close to the elasticities in the shorter spell case ($\tau = 1$). It is further confirmed that they are very sensitive to the initial conditions even in the long run; underdeveloped and unequal regions present lower income and inequality elasticities of poverty. In this regard, a poverty trap mechanism seems at work in the southern regions of Italy as their continuously lower degrees of responsiveness of the poverty rates to economic growth and to changes in distribution are caused

Table 7: Robustness check: longer spells

Dependent variable: $\Delta \log hc_{it}$

	spell: $\tau = 2$				spell: $\tau = 3$				spell: $\tau = 5$				spell: $\tau = 10$			
Explanatory variables	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
(Standard errors)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
$\Delta \log \mu_{it}$	-2.80***	-1.80***	0.04	-5.24***	-2.92***	-1.84***	-2.85***	-3.37***	-2.76***	-3.18***	-2.84***	-3.74*	-2.59***	-0.54	-2.87**	-6.34***
	(0.372)	(0.363)	(0.929)	(1.853)	(0.441)	(0.554)	(0.928)	(1.253)	(0.451)	(0.533)	(0.882)	(2.021)	(0.278)	(0.675)	(1.116)	(1.633)
$\Delta \log \mu_{it} * \log G_{it-\tau}$			0.86	-3.60***			-1.30*	-1.70*			-1.42**	-2.40			-0.37	-3.07***
			(0.681)	(1.328)			(0.669)	(0.893)			(0.632)	(1.493)			(0.767)	(1.124)
$\Delta \log \mu_{it} * \log (z_{t-\tau}/\mu_{it-\tau})$			4.10***	3.21***			3.85***	3.71***			3.80***	4.55***			1.16*	1.68***
			(0.434)	(0.665)			(0.414)	(0.282)			(0.493)	(0.541)			(0.654)	(0.526)
$\Delta \log G_{it}$	1.57***	1.38***	2.36***	2.90***	1.79***	1.70***	3.50***	2.94***	1.80***	1.91***	3.15***	3.32***	1.59***	1.44***	4.34***	3.59***
	(0.257)	(0.172)	(0.722)	(0.918)	(0.252)	(0.134)	(0.661)	(0.395)	(0.225)	(0.194)	(0.719)	(0.649)	(0.206)	(0.196)	(0.794)	(0.795)
$\Delta \log G_{it} * \log G_{it-\tau}$			1.46***	1.93***			2.52***	2.16***			2.32***	2.78***			1.79***	1.83***
			(0.501)	(0.686)			(0.473)	(0.282)			(0.513)	(0.438)			(0.509)	(0.636)
$\Delta \log G_{it} * \log (z_{t-\tau}/\mu_{it-\tau})$			-2.73***	-3.14***			-3.53***	-3.84***			-3.98***	-4.64***			-0.28	-2.20***
			(0.417)	(0.605)			(0.491)	(0.344)			(0.539)	(0.616)			(0.703)	(0.803)
$\log G_{it-\tau}$			0.40**	0.77***			0.71***	0.80***			0.77***	0.75***			1.13***	1.86***
			(0.160)	(0.103)			(0.175)	(0.085)			(0.201)	(0.147)			(0.310)	(0.340)
$\log (z_{t-\tau}/\mu_{it-\tau})$			-0.14*	-0.15			-0.19*	-0.22***			-0.24*	-0.34**			0.37	0.29
			(0.085)	(0.093)			(0.099)	(0.059)			(0.126)	(0.138)			(0.254)	(0.250)
# Obs.	304	304	304	304	285	285	285	285	247	247	247	247	152	152	152	152
R-squared	0.60	0.53	0.73	0.66	0.64	0.57	0.77	0.77	0.61	0.60	0.75	0.74	0.67	0.34	0.78	0.76
Hansen J-statistics		4.200[a]		6.393[b]		3.992[a]		9.189[b]		7.782[a]		3.664[b]		3.430[a]		11.812[b]
(p-value)		(0.241)		(0.270)		(0.262)		(0.420)		(0.051)		(0.599)		(0.330)		(0.160)

Note: Robust standard errors are clustered at regional level in parentheses. Significance levels: *10%, **5%, ***1%.

[a] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-\tau}$, $\Delta \log pop_{it}$, $\log pop_{it-\tau}$

[b] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-\tau}$, $\Delta GDPpc_{it} * \log G_{it-\tau}$, $\Delta GDPpc_{it} * \log (z_{t-\tau}/\mu_{it-\tau})$, $\log \mu_{it-\tau} * \log G_{it-\tau}$, $\log \mu_{it-\tau} * \log (z_{t-\tau}/\mu_{it-\tau})$, $\log G_{it-\tau} * \log G_{it-\tau}$, $\Delta \log pop_{it}$, $\log pop_{it-\tau}$, $\Delta \log pop_{it} * \log G_{it-\tau}$, $\Delta \log pop_{it} * \log (z_{t-\tau}/\mu_{it-\tau})$, $\log pop_{it-\tau} * \log G_{it-\tau}$, $\log pop_{it-\tau} * \log (z_{t-\tau}/\mu_{it-\tau})$

by their initial low level of development and by their initial high level of inequality, and not only by their lower growth rates of the mean incomes[24]. This is especially evident when considering that over the years the poverty rates have become more elastic to changes in distribution than to changes in mean income. Table A.4 indeed confirms that over time the inequality elasticity of poverty proved to be relatively higher than the income elasticity as the rate of change of the former increased across the decades much more than the latter (columns 5-6-7).

5.4.3 Income definitions

Thus far the analysis has employed only one definition of household equivalent disposable income both for the semiparametric estimation of the growth incidence curves and for the parametric estimation of the poverty elasticities. It may be alleged that this measure of income (y_{nfa}), which excludes the yields on financial assets, overestimates the poverty rates since financial assets can be an important device either for coping with the risk associated to higher poverty environments or an important source of wealth accumulation. We have already verified that there are small differences between the two measures of income, given the very high pairwise correlations between them (see footnote 7) and between the variables estimated from the two different measures of income (table A.2).

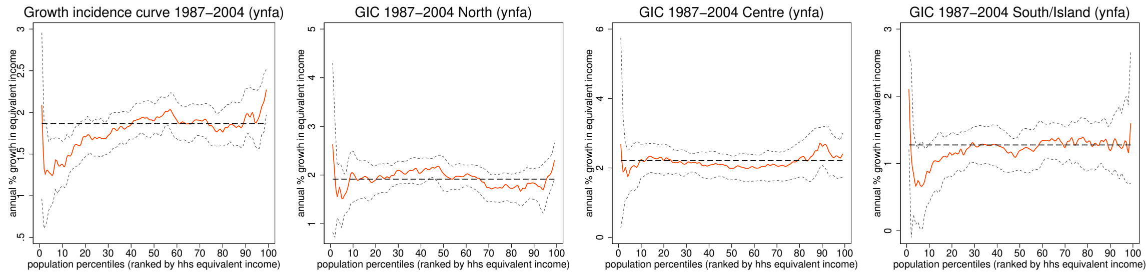
Figure 3 plots the growth incidence curve for both the definitions of income between the first year in which the financial assets source entered the survey (1987) and the last year of our sample (2004); panel 3a plots the estimated curve using the first definition of income (y_{nfa}) which does not take into account the yields on the financial assets, while panel 3b plots the curve for the other income measure (y_{fa}) which instead includes this source as well.

As expected, the inclusion of financial assets does not influence the analysis; the slopes of the curves in the two cases are almost equal and slightly increasing at national level, indicating that - as previously shown (see figures 2 and A.4) - since the early 1990s the distributional process has been against the poorest parts of the distribution as the lowest percentiles gained much less than the middle and upper ones. This features is more evident in the southern regions than in north and centre. In the latter, the fairly flat curves are evidence that households across almost all the percentiles experienced the same mean growth rate of incomes; even in these cases, however, the growth process has not been pro-poor since there has not been a process of convergence between the upper and lower tails of the distribution. Neither does the inclusion of financial assets affect the size of the mean growth rates across the percentiles which is equivalent across the income measures used.

[24]Heterogeneity in the growth rates of the mean incomes and of the per-capita GDP cannot fully explain the heterogeneity in the poverty elasticities since over the whole sample southern regions do not show persistently lower growth rates than northern ones (table 2).

Figure 3: Growth incidence curves: robustness check

(a) Excluding financial incomes (y_{nfa})



(b) Including financial incomes (y_{fa})

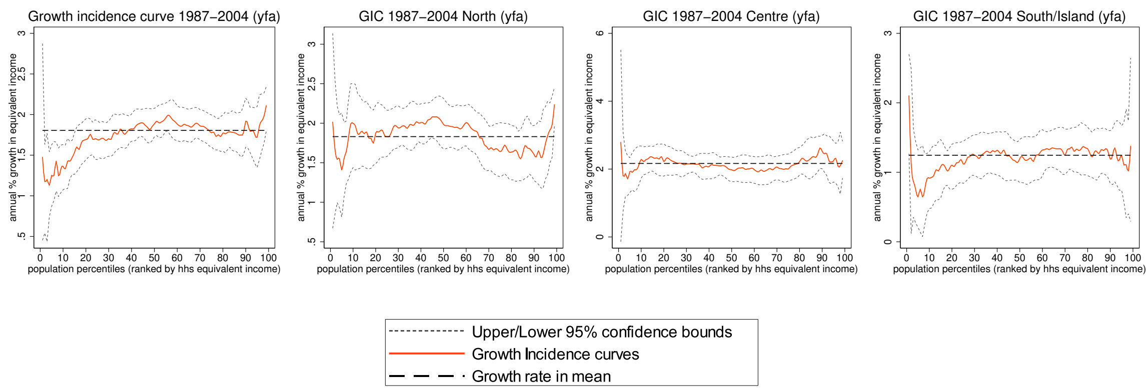


Table 8 presents estimates of the income and inequality elasticities of poverty; in panel A we report the estimates based on the first indicator of income (y_{nfa}), but over a shorter period of time with respect to the previous analysis for consistency with the available observations when a full measure of household disposable income is used (y_{fa}, panel B). In both cases, the distribution-neutral income elasticity of poverty and the inequality elasticity of poverty (columns 1-2, 5-6, 9-10) are slightly higher than those in the previous specifications (tables 3, 4 and 7) as a consequence of both the shorter period of time and of the fact that as poverty rates decrease over time small changes in mean income or in distribution inflate the elasticities. Nonetheless, in the more detailed specifications (columns 3-4, 7-8, 11-12) the estimated coefficients can predict elasticities very close to those found before, even when we control for longer spells. Table A.5 in the appendix shows that the size of the elasticities is generally consistent with those previously estimated, although the elasticities estimated in the model based on the measure of income y_{fa} are slightly higher than those from the model based on the income y_{nfa}.

Table 8: Robustness check: different income measures

Dependent variable: $\Delta \log hc_{it}$

	spell: $\tau = 1$				spell: $\tau = 2$				spell: $\tau = 3$			
Explanatory variables	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM	OLS	GMM
(Standard errors)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: y_{nfa} (exlcuding financial income)												
$\Delta \log \mu_{it}$	-4.05***	-3.20***	10.86***	12.40***	-3.88***	-3.53***	7.87**	5.90*	-3.85***	-3.89***	4.03	8.72***
	(0.558)	(0.569)	(3.263)	(2.378)	(0.461)	(0.438)	(3.253)	(3.544)	(0.564)	(0.545)	(3.703)	(2.971)
$\Delta \log \mu_{it} * \log G_{it-\tau}$			11.11***	13.19***			7.03**	6.13*			3.75	7.71***
			(2.537)	(2.219)			(3.025)	(3.247)			(3.163)	(2.580)
$\Delta \log \mu_{it} * \log(z_{t-\tau} / \mu_{it-\tau})$			1.81*	-0.35			4.13***	2.92***			4.17***	3.27***
			(1.024)	(1.352)			(1.079)	(0.932)			(0.706)	(0.624)
$\Delta \log G_{it}$	2.62***	2.36***	-3.18	-3.86***	2.16***	2.35***	-2.65	-2.68***	2.27***	2.27***	0.13	1.16**
	(0.393)	(0.268)	(2.137)	(1.259)	(0.337)	(0.236)	(1.790)	(1.040)	(0.380)	(0.332)	(1.263)	(0.549)
$\Delta \log G_{it} * \log G_{it-\tau}$			-2.70*	-3.50***			-2.34	-2.32**			0.16	1.33**
			(1.582)	(1.038)			(1.479)	(0.980)			(0.951)	(0.551)
$\Delta \log G_{it} * \log(z_{t-\tau} / \mu_{it-\tau})$			-3.47***	-2.73***			-2.98**	-3.29***			-3.63***	-4.23***
			(1.029)	(0.506)			(1.194)	(0.620)			(0.762)	(0.392)
$\log G_{it-\tau}$			-0.39	-0.43**			-0.15	0.11			-0.26	-0.58*
			(0.266)	(0.180)			(0.340)	(0.322)			(0.430)	(0.303)
$\log(z_{t-\tau} / \mu_{it-\tau})$			-0.07	-0.04			-0.32***	-0.29***			-0.39*	-0.26**
			(0.124)	(0.096)			(0.106)	(0.099)			(0.189)	(0.113)
# Obs.	152	152	152	152	133	133	133	133	114	114	114	114
R-squared	0.65	0.63	0.73	0.72	0.70	0.70	0.78	0.78	0.73	0.73	0.82	0.81
Hansen J-statistics		1.167[a]		6.217[b]		4.810[a]		8.867[b]		6.361[a]		10.438[b]
(p-value)		(0.761)		(0.718)		(0.186)		(0.450)		(0.095)		(0.316)

continue

Panel B: y_{fa} (including financial income)												
$\Delta \log \mu_{it}$	-3.99***	-3.52***	9.82***	9.98***	-3.66***	-3.73***	6.60***	4.00**	-3.62***	-4.22***	2.48	2.56*
	(0.497)	(0.444)	(2.234)	(2.671)	(0.407)	(0.435)	(1.967)	(1.648)	(0.558)	(0.738)	(2.886)	(1.377)
$\Delta \log \mu_{it} * \log G_{it-\tau}$			10.13***	10.49***			6.04***	4.67***			2.36	2.91***
			(2.245)	(2.398)			(1.817)	(1.421)			(2.339)	(1.109)
$\Delta \log \mu_{it} * \log(z_{t-\tau}/\mu_{it-\tau})$			2.15*	1.71*			4.13***	3.14***			4.41***	3.76***
			(1.210)	(1.018)			(0.791)	(0.413)			(0.575)	(0.336)
$\Delta \log G_{it}$	2.49***	2.25***	-3.44*	-2.20**	2.14***	2.28***	-2.09	-1.49***	2.04***	1.99***	-0.57	-0.72**
	(0.345)	(0.258)	(1.914)	(0.966)	(0.348)	(0.299)	(1.304)	(0.456)	(0.391)	(0.383)	(0.786)	(0.361)
$\Delta \log G_{it} * \log G_{it-\tau}$			-3.45**	-2.41***			-2.80**	-1.39***			-0.25	-0.22
			(1.472)	(0.698)			(1.111)	(0.398)			(0.517)	(0.228)
$\Delta \log G_{it} * \log(z_{t-\tau}/\mu_{it-\tau})$			-2.51**	-2.86***			-2.01**	-3.51***			-3.42***	-3.73***
			(0.905)	(0.658)			(0.835)	(0.587)			(0.789)	(0.508)
$\log G_{it-\tau}$			-0.14	-0.13			-0.07	0.11			-0.27	-0.27***
			(0.202)	(0.114)			(0.227)	(0.143)			(0.321)	(0.094)
$\log(z_{t-\tau}/\mu_{it-\tau})$			-0.13*	-0.11***			-0.32***	-0.24***			-0.31**	-0.16**
			(0.074)	(0.042)			(0.075)	(0.051)			(0.117)	(0.077)
# Obs.	152	152	152	152	133	133	133	133	114	114	114	114
R-squared	0.72	0.71	0.79	0.79	0.73	0.73	0.81	0.80	0.75	0.73	0.85	0.85
Hansen J-statistics		2.414[a]		8.447[b]		6.178[a]		10.002[b]		6.374[a]		11.766[b]
(p-value)		(0.491)		(0.490)		(0.416)		(0.350)		(0.095)		(0.227)

Note: Robust standard errors are clustered at regional level in parentheses. Significance levels: *10%, **5%, ***1%.
[a] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-\tau}$, $\Delta \log pop_{it}$, $\log pop_{it-\tau}$
[b] Instruments: $\Delta \log GDPpc_{it}$, $\log \mu_{it-\tau}$, $\Delta GDPpc_{it} * \log G_{it-\tau}$, $\Delta GDPpc_{it} * \log(z_{t-\tau}/\mu_{it-\tau})$, $\log \mu_{it-\tau} * \log G_{it-\tau}$, $\log \mu_{it-\tau} * \log(z_{t-\tau}/\mu_{it-\tau})$, $\log G_{it-\tau} * \log G_{it-\tau}$, $\Delta \log pop_{it}$, $\log pop_{it-\tau}$, $\Delta \log pop_{it} * \log G_{it-\tau}$, $\Delta \log pop_{it} * \log(z_{t-\tau}/\mu_{it-\tau})$, $\log pop_{it-\tau} * \log G_{it-\tau}$, $\log pop_{it-\tau} * \log(z_{t-\tau}/\mu_{it-\tau})$

6 Conclusion

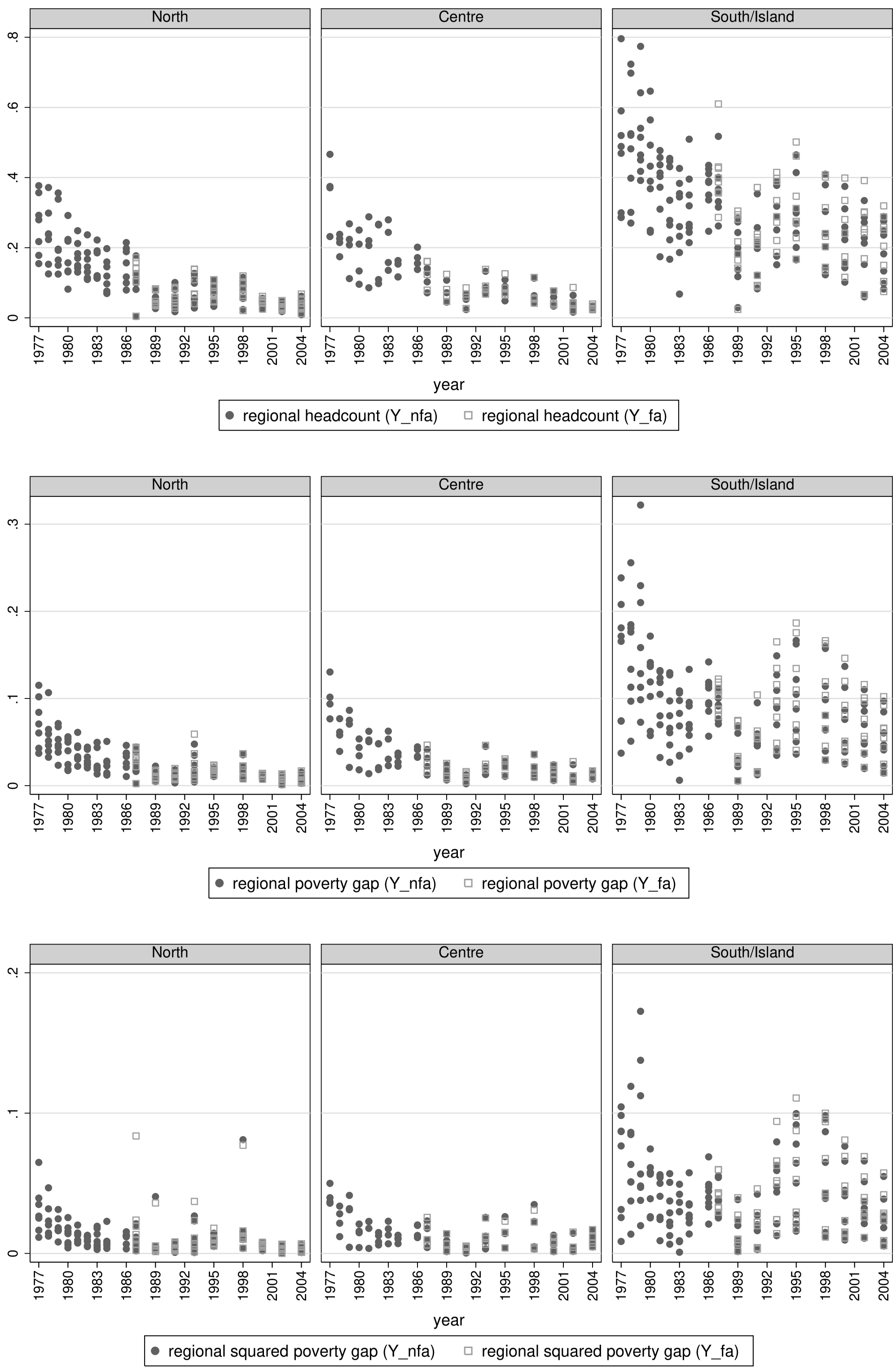
This paper assessed poverty sensitivity to growth and distributional changes in Italy, across its regions and over the period between 1977 and 2004. The growth incidence curves highlight interesting features of the Italian growth process. In the long run, between 1977 and 2004, growth was pro-poor under the weak absolute definition, positively favouring poverty reduction. Nonetheless, distribution of the gains of economic growth seems to have been biased in favour of the upper-middle class, suggesting that economic growth was not pro-poor in relative terms. While the gap between the lowest part of the population and the middle class has increased over time, the distance between the upper-middle class and the richest part narrows. Until the early 1990s, growth strikingly drove the reduction in poverty rates as the growth incidence curve was monotonically decreasing and most of the mean growth rates for the poor were higher than the average growth rate. In the last fifteen years this pattern has dramatically changed: not only is the annual growth rate for the poor lower than the growth rate in mean across almost all of the percentiles, but also the upward slope of the curve suggests that the distribution of gains has been unequal, favouring the upper income classes. The renewed increase in poverty may be explained not only by slight rates of changes in mean income, but also, or at least in part, by growth patterns biased against the poor part of the distribution and in favour of the wealthiest. At regional level, while in the north and centre economic growth has largely favoured the poorest part of the distribution, in the South it has been more biased in favour of the richest and of the upper-middle parts of the distribution.

Income and inequality elasticities of poverty have been estimated to analyze the rate at which poverty rates respond to growth episodes and distributional changes. Overall, poverty across Italian regions is highly sensitive to both growth and distributional changes: a 1% increase in survey mean incomes reduces the headcount index by about 2.8%, while a 1% reduction in inequality implies a reduction by about 2.2%. The differentials in the poverty elasticities between areas can be due not to the heterogeneity in the degrees of sensitivity, but to the initial conditions of inequality and level of development; a higher initial level of inequality and lower initial level of development lead to lower income and inequality elasticities of poverty such that the northern and central regions respond more elastically to a change in survey mean incomes (respectively -3.527% and -3.222%) than the southern part of the country (-2.116%) as well as to a change in distribution (2.762% and 2.510% in the former against 1.569% in the latter regions).

Growth-oriented policies have undoubtedly favoured the strong reduction in poverty rates across the Italian regions. However, the strong weight that distributional changes have in shaping these trends can strikingly explain the differentials between and within the three areas as well as the persistent and considerable lag in large parts of the country.

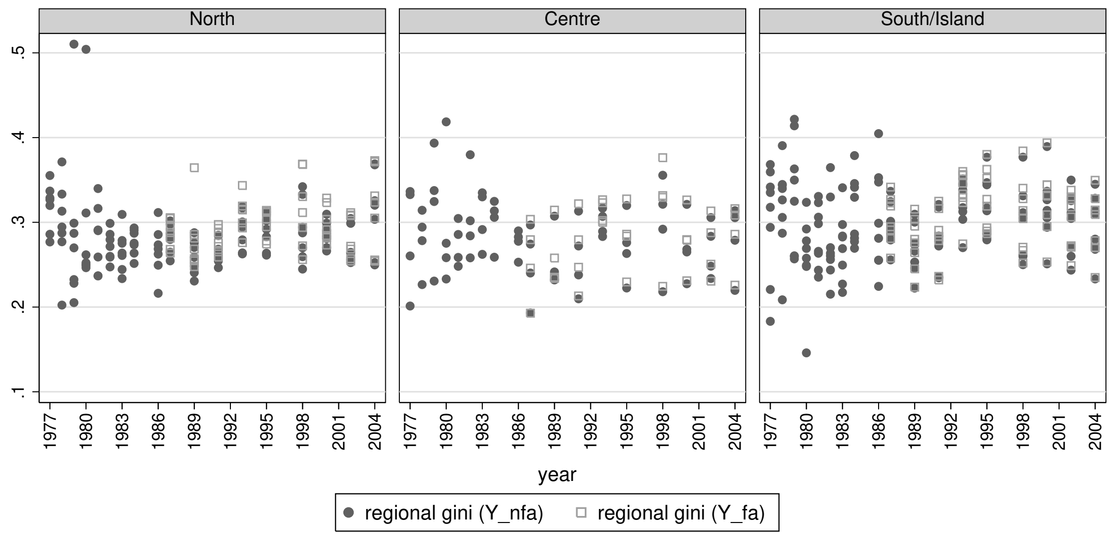
Appendix

Figure A.1: Regional poverty rates



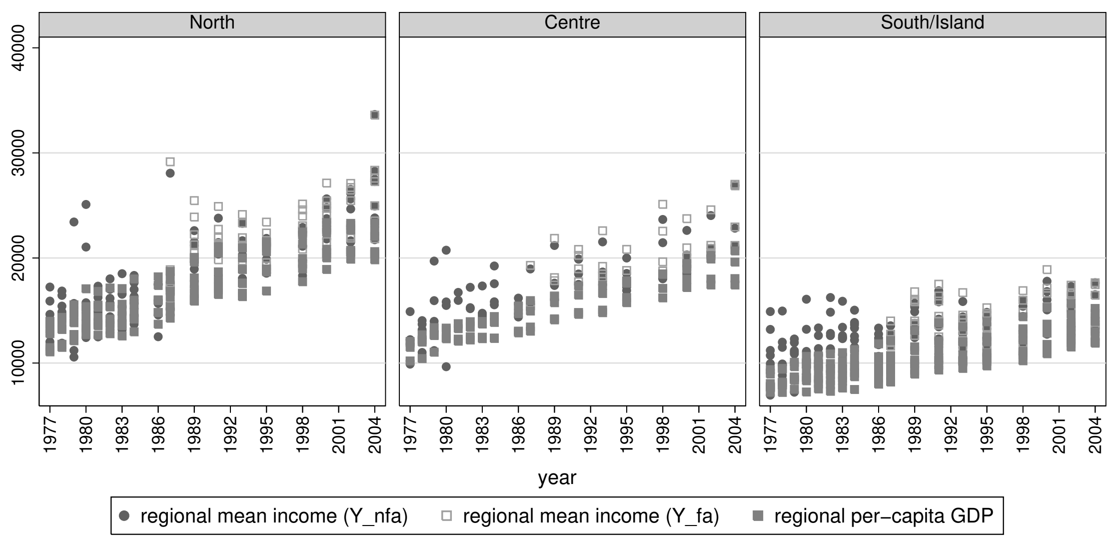
Note: estimations based on the two definitions of household disposable income, Y_{nfa} and Y_{fa}.

Figure A.2: Regional inequality



Note: estimations based on the two definitions of household disposable income, Y_{nfa} and Y_{fa}.

Figure A.3: Regional mean income and per-capita GDP



Note: annual mean household equivalent disposable incomes, Y_{nfa} and Y_{fa}, estimated from SHIW-HA; per-capita GDP from CRENoS. Both are in euros (€) at 1995 prices.

Figure A.4: Growth incidence curves, across regions and periods

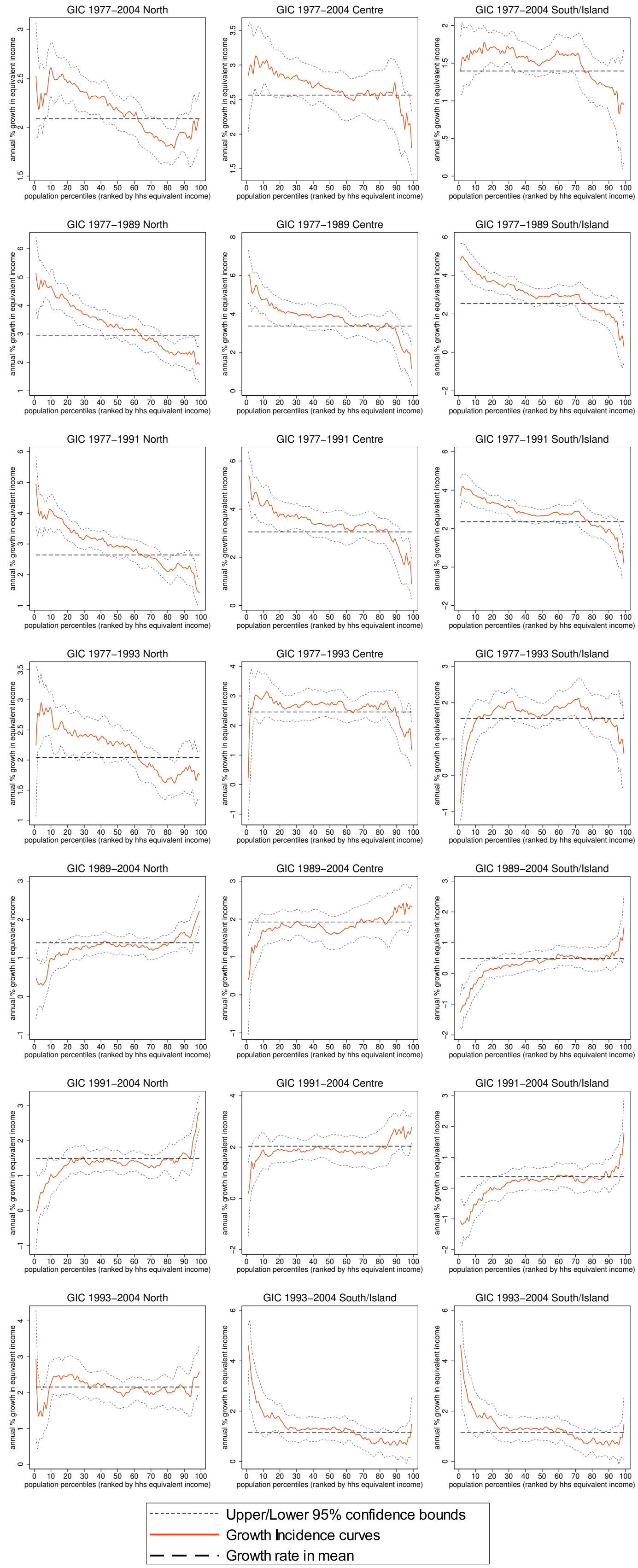


Table A.1: Poverty lines

Year	CPI	Poverty line (y_{nfa})	Poverty line (y_{fa})
1977	19.99	1665.735	
1978	22.42	1874.999	
1979	25.74	2151.226	
1980	31.19	2611.605	
1981	36.74	3071.985	
1982	42.79	3582.587	
1983	49.06	4109.93	
1984	54.36	4545.198	
1986	62.86	5265.063	
1987	65.83	5507.809	5711.38
1989	73.48	6143.969	6379.73
1991	83.24	6964.281	7221.68
1993	91.38	7642.294	7933.44
1995	**100**	**8370.753**	**8679.91**
1998	108.1	9048.543	9382.98
2000	112.7	9433.587	9782.26
2002	118.8	9944.189	10311.73
2004	124.5	10505.02	10806.48

Note: poverty lines from author's calculation on SHIW-HA, in euros (€); CPI from the National Institute of Statistics (ISTAT).

Table A.2: Bivariate correlations

	$\mu_{y_{nfa}}$	$\mu_{y_{fa}}$	$hc_{y_{nfa}}$	$hc_{y_{fa}}$	$pg_{y_{nfa}}$	$pg_{y_{fa}}$	$spg_{y_{nfa}}$	$spg_{y_{fa}}$	$G_{y_{nfa}}$	$G_{y_{fa}}$
$\mu_{y_{nfa}}$	1									
$\mu_{y_{fa}}$	0.994	1								
$hc_{y_{nfa}}$	-0.823	-0.834	1							
$hc_{y_{fa}}$	-0.821	-0.834	0.995	1						
$pg_{y_{nfa}}$	-0.750	-0.760	0.937	0.925	1					
$pg_{y_{fa}}$	-0.760	-0.771	0.946	0.938	0.998	1				
$spg_{y_{nfa}}$	-0.637	-0.640	0.794	0.779	0.931	0.920	1			
$spg_{y_{fa}}$	-0.648	-0.653	0.796	0.785	0.921	0.918	0.968	1		
$G_{y_{nfa}}$	-0.097	-0.108	0.493	0.484	0.566	0.561	0.505	0.495	1	
$G_{y_{fa}}$	-0.041	-0.030	0.413	0.404	0.494	0.488	0.459	0.445	0.967	1

Table A.3: Predicted elasticities: other poverty measures

	Mean over the period				Rate of change (%)		
	1977-2004	80s	90s	00s	80s-90s	80s-00s	90s-00s
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Poverty Gap							
Income elasticity of poverty							
National	-2.667	-2.350	-2.935	-3.413	0.249	0.452	0.163
	(0.158)	(0.191)	(0.146)	(0.203)			
North	-3.048	-2.581	-3.341	-3.969	0.295	0.538	0.188
	(0.174)	(0.303)	(0.144)	(0.214)			
Centre	-2.819	-2.804	-2.891	-3.441	0.031	0.227	0.190
	(0.412)	(0.418)	(0.435)	(0.492)			
South	-2.258	-1.922	-2.601	-2.913	0.353	0.515	0.120
	(0.189)	(0.219)	(0.155)	(0.262)			
Inequality elasticity of poverty							
National	2.484	2.148	2.913	3.317	0.356	0.544	0.139
	(0.169)	(0.168)	(0.164)	(0.215)			
North	3.089	2.613	3.574	4.162	0.368	0.593	0.164
	(0.148)	(0.212)	(0.111)	(0.129)			
Centre	2.815	2.610	3.177	3.685	0.217	0.412	0.160
	(0.262)	(0.290)	(0.221)	(0.256)			
South	1.788	1.510	2.203	2.394	0.460	0.586	0.087
	(0.118)	(0.107)	(0.096)	(0.167)			
Panel B: Squared Poverty Gap							
Income elasticity of poverty							
National	-2.914	-2.594	-3.107	-3.642	0.197	0.404	0.172
	(0.179)	(0.228)	(0.175)	(0.240)			
North	-3.191	-2.710	-3.395	-4.068	0.253	0.501	0.198
	(0.197)	(0.368)	(0.181)	(0.277)			
Centre	-2.977	-3.062	-2.899	-3.493	-0.053	0.141	0.205
	(0.509)	(0.514)	(0.568)	(0.645)			
South	-2.640	-2.260	-2.958	-3.345	0.309	0.480	0.131
	(0.259)	(0.304)	(0.227)	(0.357)			
Inequality elasticity of poverty							
National	2.578	2.269	2.940	3.334	0.296	0.469	0.134
	(0.151)	(0.157)	(0.142)	(0.190)			
North	3.089	2.648	3.496	4.053	0.320	0.531	0.159
	(0.143)	(0.217)	(0.107)	(0.136)			
Centre	2.844	2.698	3.114	3.597	0.154	0.333	0.155
	(0.278)	(0.296)	(0.254)	(0.289)			
South	1.997	1.724	2.367	2.573	0.373	0.493	0.087
	(0.116)	(0.118)	(0.088)	(0.164)			

Note: standard errors in parenthesis. 80s = 1980-1989; 90s = 1991-1998; 00s = 2000-2004

Table A.4: Predicted elasticities: longer spells

	Mean over the period				Rate of change (%)		
	1977-2004	80s	90s	00s	80s-90s	80s-00s	90s-00s
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: spell $\tau = 2$							
Income elasticity of poverty							
National	-2.544	-2.251	-2.791	-3.168	0.240	0.408	0.135
	(0.137)	(0.154)	(0.132)	(0.163)			
North	-2.979	-2.549	-3.286	-3.779	0.289	0.483	0.150
	(0.138)	(0.243)	(0.104)	(0.116)			
Centre	-2.774	-2.660	-2.874	-3.315	0.081	0.246	0.153
	(0.278)	(0.262)	(0.275)	(0.307)			
South	-2.048	-1.785	-2.316	-2.561	0.297	0.435	0.106
	(0.122)	(0.149)	(0.112)	(0.153)			
Inequality elasticity of poverty							
National	2.254	1.971	2.540	2.820	0.288	0.430	0.110
	(0.131)	(0.135)	(0.129)	(0.160)			
North	2.712	2.310	3.052	3.456	0.321	0.496	0.132
	(0.118)	(0.187)	(0.100)	(0.087)			
Centre	2.511	2.336	2.712	3.064	0.161	0.312	0.130
	(0.211)	(0.214)	(0.190)	(0.207)			
South	1.726	1.493	2.005	2.141	0.343	0.434	0.068
	(0.098)	(0.108)	(0.088)	(0.125)			
Panel B: spell $\tau = 3$							
Income elasticity of poverty							
National	-3.281	-2.959	-3.482	-3.873	0.177	0.309	0.112
	(0.155)	(0.162)	(0.153)	(0.182)			
North	-3.818	-3.421	-4.051	-4.566	0.184	0.335	0.127
	(0.140)	(0.199)	(0.153)	(0.095)			
Centre	-3.607	-3.305	-3.698	-4.292	0.119	0.299	0.161
	(0.244)	(0.283)	(0.216)	(0.230)			
South	-2.649	-2.384	-2.877	-3.056	0.207	0.282	0.062
	(0.111)	(0.144)	(0.116)	(0.109)			
Inequality elasticity of poverty							
National	2.351	2.021	2.540	2.979	0.257	0.474	0.173
	(0.160)	(0.171)	(0.159)	(0.186)			
North	2.898	2.492	3.121	3.684	0.252	0.478	0.181
	(0.149)	(0.217)	(0.160)	(0.102)			
Centre	2.682	2.384	2.741	3.398	0.150	0.425	0.240
	(0.268)	(0.305)	(0.243)	(0.258)			
South	1.707	1.428	1.932	2.153	0.353	0.508	0.115
	(0.117)	(0.155)	(0.131)	(0.108)			

continue

			Panel C: spell $\tau = 5$				
Income elasticity of poverty							
National	-3.126	-2.718	-3.179	-3.872	0.169	0.425	0.218
	(0.186)	(0.226)	(0.160)	(0.182)			
North	-3.736	-3.364	-3.669	-4.571	0.091	0.359	0.246
	(0.194)	(0.305)	(0.181)	(0.131)			
Centre	-3.506	-3.086	-3.611	-4.208	0.170	0.364	0.165
	(0.309)	(0.414)	(0.238)	(0.229)			
South	-2.402	-1.969	-2.534	-3.092	0.287	0.570	0.220
	(0.144)	(0.210)	(0.105)	(0.131)			
Inequality elasticity of poverty							
National	2.276	1.865	2.328	3.028	0.248	0.623	0.300
	(0.190)	(0.235)	(0.163)	(0.185)			
North	2.891	2.522	2.814	3.732	0.116	0.480	0.326
	(0.202)	(0.323)	(0.186)	(0.135)			
Centre	2.660	2.240	2.766	3.359	0.235	0.499	0.214
	(0.327)	(0.435)	(0.255)	(0.247)			
South	1.545	1.103	1.684	2.245	0.527	1.036	0.333
	(0.151)	(0.222)	(0.111)	(0.134)			
			Panel D: spell $\tau = 10$				
Income elasticity of poverty							
National	-3.290	-3.234	-3.243	-3.371	0.003	0.042	0.039
	(0.105)	(0.195)	(0.143)	(0.071)			
North	-3.464	-3.703	-3.450	-3.404	-0.069	-0.081	-0.013
	(0.159)	(0.135)	(0.277)	(0.081)			
Centre	-3.481	-2.955	-3.420	-3.738	0.157	0.265	0.093
	(0.207)	(0.452)	(0.291)	(0.046)			
South	-3.042	-2.963	-2.974	-3.158	0.004	0.066	0.062
	(0.133)	(0.331)	(0.137)	(0.091)			
Inequality elasticity of poverty							
National	2.326	2.167	2.259	2.469	0.043	0.139	0.093
	(0.104)	(0.169)	(0.132)	(0.079)			
North	2.587	2.648	2.559	2.603	-0.034	-0.017	0.017
	(0.141)	(0.126)	(0.234)	(0.084)			
Centre	2.543	1.972	2.490	2.803	0.263	0.422	0.126
	(0.194)	(0.362)	(0.250)	(0.070)			
South	1.990	1.843	1.882	2.184	0.021	0.185	0.161
	(0.101)	(0.270)	(0.093)	(0.092)			

Note: standard errors in parenthesis. 80s = 1980-1989; 90s = 1991-1998; 00s = 2000-2004

Table A.5: Predicted elasticities: different income measures

	Income elasticity of poverty			Inequality elasticity of poverty		
	spell $\tau = 1$	spell $\tau = 2$	spell $\tau = 3$	spell $\tau = 1$	spell $\tau = 2$	spell $\tau = 3$
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: y_{nfa} (excluding financial incomes)						
National	-3.930	-3.833	-3.230	2.486	2.531	2.366
	(0.255)	(0.222)	(0.255)	(0.176)	(0.183)	(0.191)
North	-4.136	-4.522	-3.987	3.099	3.214	3.130
	(0.176)	(0.120)	(0.147)	(0.089)	(0.093)	(0.118)
Centre	-4.681	-4.495	-3.990	2.977	3.004	2.733
	(0.694)	(0.256)	(0.349)	(0.131)	(0.076)	(0.214)
South	-3.374	-2.900	-2.188	1.703	1.698	1.513
	(0.372)	(0.226)	(0.268)	(0.158)	(0.142)	(0.110)
Panel B: y_{fa} (including financial incomes)						
National	-4.069	-3.871	-3.556	2.775	2.646	2.076
	(0.241)	(0.204)	(0.209)	(0.168)	(0.188)	(0.188)
North	-4.497	-4.549	-4.331	3.397	3.386	2.838
	(0.152)	(0.112)	(0.114)	(0.087)	(0.096)	(0.103)
Centre	-4.876	-4.463	-4.098	3.211	3.079	2.467
	(0.532)	(0.188)	(0.087)	(0.090)	(0.074)	(0.117)
South	-3.291	-2.982	-2.607	2.011	1.782	1.214
	(0.309)	(0.189)	(0.162)	(0.135)	(0.132)	(0.116)

Note: standard errors in parenthesis.

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