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Italian income distribution?**

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## Does regional cost-of-living reshuffle Italian income distribution?

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### Abstract

This paper examines how spatial price differentials affect income distribution in Italy. The distribution of household income is “reshuffled” after controlling for the purchasing power of households residents in different regions, but only when housing price variations are included in the PPP index. Poor households living in Southern Italy alleviate their relative condition, but concentration of poverty still holds in the Southern part of the country.

**Keywords:** Income distribution, inequality, regional purchasing power parity, Italy.

**JEL classification:** E31, D31, D63.

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## 1 Introduction

Adjusting for differences in relative price levels is widely recognized in inter-country income comparisons. Analogously, intra-country comparisons should be adjusted for sub-national purchasing power parities (PPP). Regional cost-of-living<sup>1</sup> adjustments affect real wages and public transfers and, to a larger extent, income distribution, poverty and inequality within a country. Nevertheless, PPP estimates require detailed price data which are not usually available at sub-national level. Spatial price variability is usually investigated in developing countries, where regional price differences are expected to be wide because of high degrees of market segmentation (e.g. [Coondoo et al., 2004](#); [Jolliffe et al., 2004](#); [Gong and Meng, 2008](#)). Only few studies provide evidence for developed countries. Poverty measures adjusted for cost of living differences in US metropolitan and nonmetropolitan areas show a complete reversal of the nonmetro/metro original poverty profile ([Jolliffe, 2006](#)). [Kosfeld and Eckey \(2008\)](#) estimated consumer price index (CPI) and housing rent index (HRI) for 439 German NUTS sub-national areas in the period 1995-2004 to analyze price disparities across German regions. The authors found that disparities of regional per capita GDP adjusted for PPP reduced but not wiped off East/West real income gap. Adjustment for regional cost of living of poverty rates in the United Kingdom, induced higher value of poverty in Greater London, South East, Scotland and Northern Ireland and smaller values in the North and in Yorkshire and Humberside ([Borooah et al., 1996](#)). Using regional price indices recently provided by Italian National Institute of Statistics (ISTAT) and by Bank of Italy, this paper analyzes if the well-known income disparity between Northern and Southern Italy persists after disentangling the contribution of regional price differentials. The next section describes the spatial price indices estimated for Italian regions. Section 3 reports the main effects of cost of living adjustment on household disposable income, inequality and poverty, and concludes.

## 2 Data

ISTAT in collaboration with Institute Guglielmo Tagliacarne–Union of Italian Chambers of Commerce ([Istat, 2008](#)) estimated spatial price indices for Italian regions' capital cities<sup>2</sup> in 2006. Three expenditure items were selected: Food, Clothing & Footwear and Furniture & Furnishings. Based on these indices, Bank of Italy ([Cannari and Iuzzolino, 2009](#)) first estimated regional price indices for other consumption categories, and then aggregated all the commodity–group prices into regional cost–of–living indices. Based on alternative hypotheses, which essentially refer to the estimation procedure of additional commodity–group indices and to the weights attached to each item in the aggregation procedure, Bank of Italy finally estimated twelve purchasing power parities.

To examine the sensitivity of income distribution to the choice of geographical cost–of–living indices, we selected three out of twelve cost–of–living indices<sup>3</sup>

<sup>1</sup>Even if PPP and regional cost-of-living are not technically the same, we use these terms interchangeably in this context.

<sup>2</sup>Italian regions are administrative units that correspond to the second level of disaggregation in the Eurostat Nomenclature of the Territorial Units for Statistics, named NUTS2.

<sup>3</sup>Subscripts refer to column's number in Table A2.1 in [Cannari and Iuzzolino \(2009, p. 33–34\)](#)

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(Table 1). Index  $PPP_1$  assumes spatial price variation only for prices related to Food, Clothing & Footwear and Furniture & Furnishings, holding spatial prices of all other goods and services fixed. This index refers only to survey data collected by ISTAT and to consumption categories representative of about one third of the Italian households' consumption budget. Index  $PPP_2$  shares the same hypothesis of  $PPP_1$  but incorporates also an index of house prices provided by Italian Housing Market Agency as a proxy of price variability of housing costs. Regional prices of all other items are assumed not to vary. Index  $PPP_9$ , instead, uses actual and imputed rents provided by Bank of Italy's Survey of Household Income and Wealth (SHIW) for housing costs. Moreover, index  $PPP_9$  includes regional price variation also for Health, Maintenance & Repairs and Other commodities and services, using data released by the Italian Ministry of Economic Development. In order not to overestimate the South/North-Center gap, quality differences in both housing costs and expenditure services are controlled for. The remained items, which account for 22% of the Italian average consumption's budget, are assumed fixed. The  $PPP_9$  index can be considered the most reliable source of regional price comparisons in Italy so far. Regardless of the estimation procedure, housing prices represent the major element of variation, accounting for almost 70% of cost-of-living differences between Northern and Southern Italy. It should be noted that Bank of Italy estimation of housing costs, via home property values or via actual and imputed rents, takes into account differences in internal characteristics of houses (like number of bathrooms, size, typology, etc.) but it does not control for external characteristics (like neighborhood socio-economic characteristics, safety, quality of services, infrastructures, etc.). Therefore, housing cost differentials may reflect local characteristics, and, more generally, quality of life differences across regions.

Income data are from 2006 SHIW. We use annual disposable income of all household members, which is the sum of wages and salaries, income from self-employment, pensions, public assistance, private transfers, income from real properties, imputed rental income from owner-occupied dwellings, and yields on financial assets net of interest paid on mortgages, net of tax and social security transfers. Household is defined as a group of individuals living together who, independently of their kinship, share their income wholly or in part. To take into account household composition, incomes are adjusted by an equivalence scale. We use the modified-OECD scale, which assigns a value of 1 to the household head, a value of 0.5 to each additional adult member and a value of 0.3 to each child under the age of 15.

### 3 Effects of regional cost-of-living on income distribution

Table 2 provides summary measures for household incomes in 2006, both in nominal terms (second column) and in PPP terms (third to fifth columns). Regardless PPP's definition, household income adjusted for cost-of-living differences is, on average, lower than actual income. Concentration decreases, narrowing the gap between rich and poor households, mainly due to a reduction of the ratio between median and first decile. Discrepancies are more clear-cut when housing related costs are considered. For instance, Gini coefficient is 32.27 for nominal incomes and equal to 31.92 for incomes adjusted with  $PPP_1$ . For income deflated by  $PPP_2$  and

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**Table 1:** *Estimated regional cost-of-living indices in 2006.*

<b>Regions/Areas</b>	<i>PPP</i> <sub>1</sub>	<i>PPP</i> <sub>2</sub>	<i>PPP</i> <sub>9</sub>
Piemonte	100.7	100.7	105.1
Valle d'Aosta	101.2	112.7	106.4
Lombardia	103.4	109.5	114.1
Liguria	101.9	120.8	112.9
<b>North West</b>	<b>101.8</b>	<b>110.7</b>	<b>109.6</b>
Trentino Alto Adige	103.0	119.2	112.3
Veneto	101.4	102.9	101.0
Friuli Venezia Giulia	102.1	98.5	106.9
Emilia-Romagna	101.5	109.8	108.9
<b>North East</b>	<b>102.0</b>	<b>107.3</b>	<b>107.2</b>
Toscana	99.8	112.9	111.8
Umbria	100.1	96.3	106.5
Marche	99.8	100.7	96.9
Lazio	100.0	119.1	112.4
<b>Center</b>	<b>99.9</b>	<b>106.9</b>	<b>106.7</b>
Abruzzo	99.1	92.2	92.6
Molise	96.7	82.9	85.1
Campania	96.6	100.2	91.5
Puglia	98.2	90.9	91.9
Basilicata	98.5	82.1	85.1
Calabria	99.1	81.9	85.2
Sicilia	97.9	88.4	92.8
Sardegna	99.4	92.9	90.7
<b>Southern Italy</b>	<b>98.2</b>	<b>88.7</b>	<b>89.3</b>
<b>North-Center</b>	<b>101.2</b>	<b>108.3</b>	<b>107.8</b>
<b>Italy</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>South/North-Center</b>	<b>97.0</b>	<b>82.0</b>	<b>82.8</b>

*Source:* Cannari and Iuzzolino, Bank of Italy 2009.

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$PPP_9$  Gini coefficients are instead 30.50 and 30.42, respectively, corresponding to a reduction of almost 6%. There are negligible differences between incomes deflated by  $PPP_2$  and by  $PPP_9$ , suggesting, on one hand, that the inclusion of other goods and services price estimates does not alter the variability of regional cost-of-living and, on the other hand, that results are robust to different housing price estimation procedures.<sup>4</sup>

**Table 2:** Summary measures of household equivalent income distribution

	Equivalent income	Equivalent income deflated by		
		$PPP_1$	$PPP_2$	$PPP_9$
Mean (euro)	19,021	18,889	18,213	18,199
Median (euro)	16,244	16,137	15,700	15,610
Gini	32.27	31.92	30.50	30.42
Theil	20.10	19.78	18.93	18.86
$P9010$	4.08	4.00	3.72	3.70
$P9050$	1.95	1.94	1.89	1.90
$P5010$	2.09	2.07	1.97	1.95

Note: authors' calculation on weighted household income data from 2006 SHIW.

To detect magnitude and sign of changes along income distribution, we made use of relative density. The relative density (Handcock and Morris, 1999) basically juxtaposes decile shares of households ranked according to the PPP-adjusted income distribution (the comparison distribution), to decile shares of households sorted by nominal income (the reference distribution), holding constant income deciles of the reference distribution. A value of relative density higher (lower) than one indicates that, between  $r - th$  and  $(r + 1) - th$  income deciles, the share of households in the comparison population is higher (lower) than the corresponding share in the reference population. To put it another way, the probability of being in correspondence of a quantile of the reference distribution is higher (lower) for households belonging to the comparison population. Figure 1 reports the relative densities of the income distributions in PPP terms compared to the nominal income distribution.<sup>5</sup>

When we consider income distribution deflated by  $PPP_1$  as comparison distribution (panel (a)) there is a slight gathering of the relative density toward the median, reflecting an increase of the mass of the comparison distribution in the middle classes and a corresponding decrease at both tails, with respect to the income distribution not adjusted. However, overall differences between the two distributions are slightly noticeable.

On the contrary, when we compare income distribution adjusted for  $PPP_2$  to income distribution in nominal terms (panel (b)) we observe a huge increase of the mass of the distribution between first and fourth income decile and, to a lesser extent, between fifth and sixth, counterbalanced by a sizable reduction at the bottom decile and, especially, at the top of the distribution. Same conclusions, besides a slight raise between fourth and fifth decile, not previously recorded, are reached

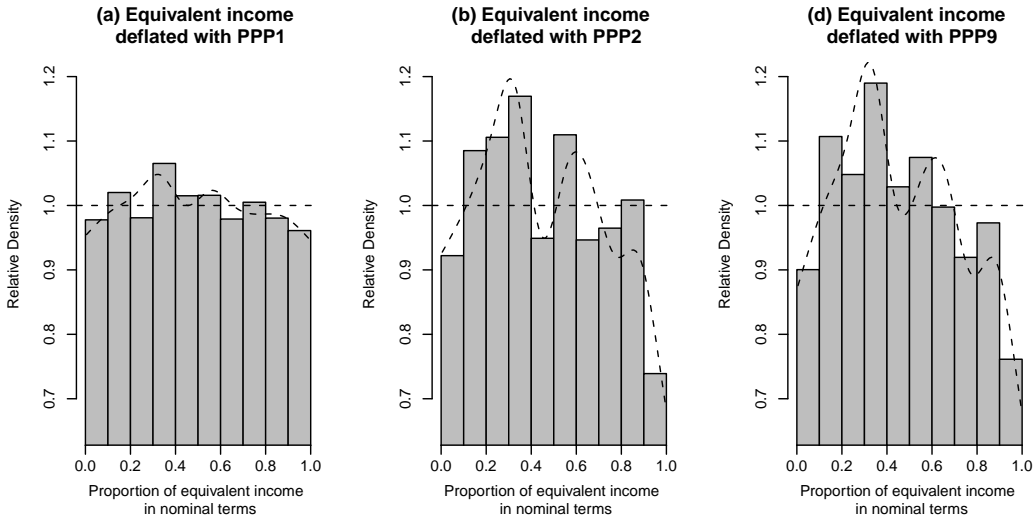
<sup>4</sup>These results are also confirmed by employing the remaining indices provided by Bank of Italy. Results are available from the authors on request.

<sup>5</sup>The continuous dotted line is estimated with a nonparametric regression. See Massari et al. (2009) for a recent application of relative density on income distribution.

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when using  $PPP_9$  (panel (c)). As an example, the percentage of households whose  $PPP_1$ -adjusted income falls between third and fourth decile of the nominal income distribution is 7% higher than the corresponding share in the reference distribution, while it is 19% higher when we compare the  $PPP_9$ -adjusted income distribution to the nominal income distribution. On the contrary, 9.6% of households whose income is  $PPP_1$ -adjusted falls in the top income decile of the nominal income distribution, and this percentage falls to 7.6% when income distribution is deflated by  $PPP_9$ .

**Figure 1:** *Relative density. Comparison of decile shares of household ranked by equivalent income distributions adjusted for PPP and by nominal equivalent income distribution*



To observe what happens in terms of inequality and poverty between and within Italian regions before and after price-adjustment, we consider only  $PPP_1$  and  $PPP_9$ , since the results obtained with  $PPP_2$  largely overlap those achieved with  $PPP_9$ .

First, the decomposition of Theil index into between-region and within-region, reported in Table 3, reveals a significant reduction in the between-region component when PPP-adjusted income is accounted for. Thus, since the within-region component remains stable<sup>6</sup>, the percentage contribution of the between-region component drops from 14.5% for nominal income to 8.1% for income  $PPP_9$ -adjusted.

**Table 3:** *Decomposition of Theil index between and within regions. Estimated values and percentage contribution*

Equivalent income	Theil index	Between component	Within component	Between % contribution	Within % contribution
<i>Nominal</i>	20.10	2.91	17.19	14.46	85.54
<i>PPP<sub>1</sub>-deflated</i>	19.78	2.57	17.21	13.00	87.00
<i>PPP<sub>9</sub>-deflated</i>	18.86	1.53	17.33	8.09	91.91

The percentage of households at-risk-of-poverty in NUTS1 macro-areas is reported in Table 4. Households at-risk-of-poverty are those below a low-income

<sup>6</sup>Small differences in the within-regions component are due to small changes in the income shares of the regions used as weights in computing the component.

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threshold, which is defined as 60 per cent of the median equivalent income. The overall percentage of households at risk of poverty decreases from 18% to 15.7%. This reduction is due to a significant decrease of the rate of poverty in Southern Italy (South and Islands) which is not fully counterbalanced by households at-risk-of-poverty in North-West and Central Italy. After adjusting for  $PPP_9$ , however, households at-risk-of-poverty are still concentrated in Southern Italy (almost 60% with respect to 68% in the nominal scale).

**Table 4:** *Households at-risk-of-poverty in NUTS1 regions. Percentage values and percentage contribution*

Equivalent income	NUTS1 regions					Italy
	North-West	North-East	Center	South	Islands	
<i>Nominal</i>	6.73	9.47	9.75	38.67	38.50	18.00
<i>PPP<sub>1</sub>-deflated</i>	7.00	9.76	9.62	36.46	36.57	17.43
<i>PPP<sub>9</sub>-deflated</i>	8.85	8.95	11.06	28.90	29.72	15.74
	percentage contribution to aggregate poverty					
<i>Nominal</i>	10.37	10.87	10.81	46.89	21.07	100.00
<i>PPP<sub>1</sub>-deflated</i>	11.15	11.56	11.01	45.63	20.65	100.00
<i>PPP<sub>9</sub>-deflated</i>	15.60	11.73	14.02	40.06	18.59	100.00

We now turn to analyze how mean income changes in each region when income is deflated by  $PPP_1$  (Figure 2(a)) or by  $PPP_9$  (Figure 2(b)). The magnitude of percentage changes is displayed with varying degree of gray. The lighter (darker) the color, the higher is the increase (diminution) of regional mean income after controlling for regional PPP's. The evidence in Figure 2(a) is rather mixed, with positive changes mainly concentrated in the Southern Italy, but with different degrees. Only Campania and Molise experience a percentage change higher than 3%. In the North-Central Italy, Tuscany and Marche display positive changes of mean income, while for the remaining regions we observe a decrease of the mean, which ranges to very low values (Umbria and Lazio), to a diminution in excess of 3% in Lombardy.

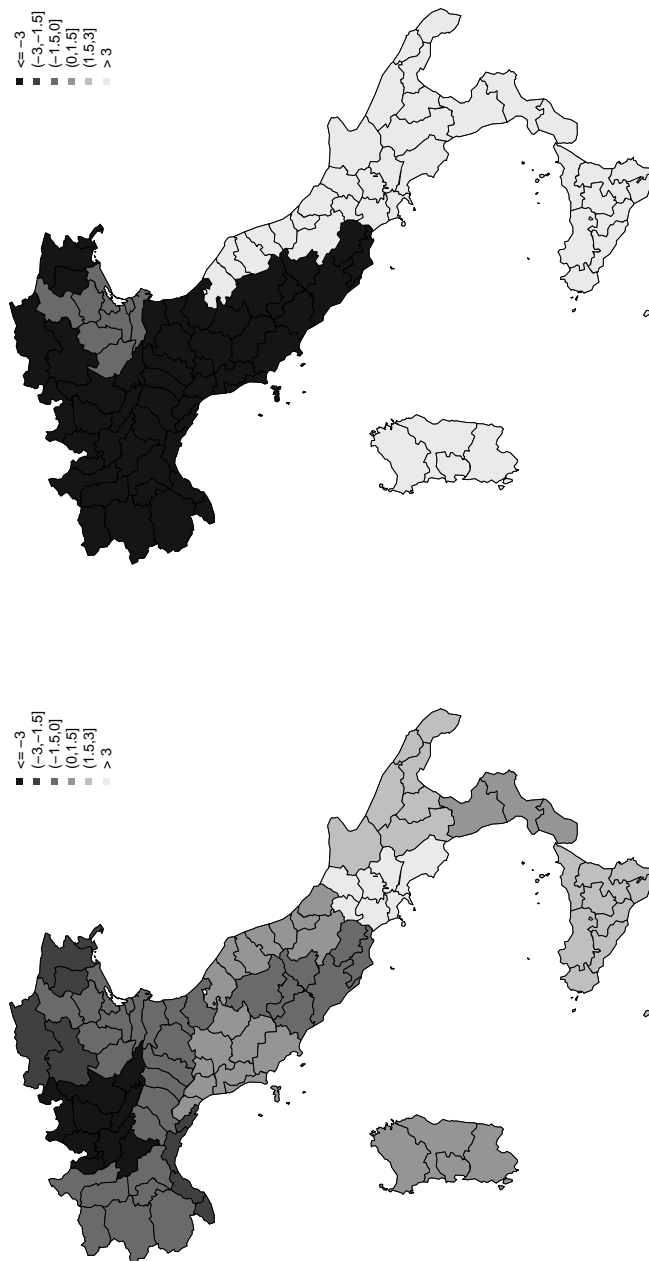
Results are more definite in Figure 2(b), with a polarization between Southern regions which display an increase higher than 3%, and North-Central regions that experience a decline in mean income of over 3%, with the exception of Veneto (-1%).

Finally, Figure 3 reports the changes of equivalent income distribution of households living in North-Central Italy (comparison distribution) with respect to the distribution of those living in Southern Italy (reference distribution), according to different income definitions. The gap between North-Central and Southern Italy reduces, after adjusting with  $PPP_9$ , but remains wide. For a household living in North-Central Italy the probability of falling between sixth and tenth decile of the income distribution of the South is much higher than that of the corresponding household in the reference population. The reduction of the gap between the two areas is mainly due to a decrease in the mass in the top income class. Indeed, a household in the top income decile of the nominal income distribution has a probability more than three times higher to live in North-Center than in Southern Italy. This probability is "only" two times higher, when  $PPP_9$ -adjusted income distribution is considered. In addition, there is a slight increase of the density between sixth and eighth decile. Hence, the shrinkage of the gap between South and North-Center is mainly due to a loss in terms of purchasing power incurred by richer households,



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**Figure 2:** Percentage changes of the regional mean income between income distribution deflated by  $PPP_1$  (a), and by  $PPP_9$  (b) and income distribution in nominal terms



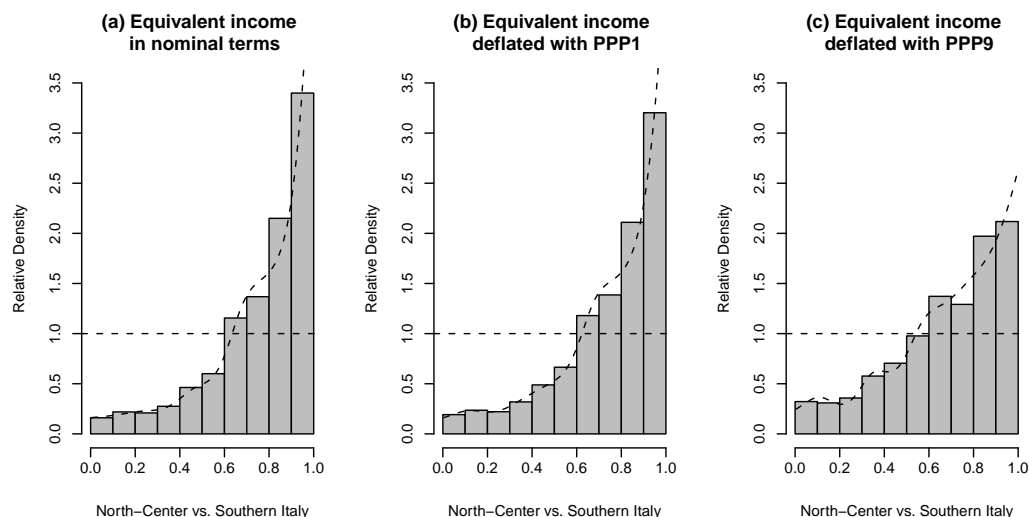
(b)

(a)

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while for households just above the median there is a modest, but significant, widening of the gap.

**Figure 3:** *Relative density. Income distribution of household living in North-Central Italy compared to the income distribution living in Southern Italy*



Overall, the distribution of household income is “reshuffled” after controlling for the purchasing power of households residents in different regions, but only when housing price variations are included in the PPP index. Higher income regions tend to be higher price level regions, reducing inequality between regions and overall inequality across households. In relative terms, rich Southern households gain the most from the “reshuffling”. Poor households living in Southern Italy alleviate their condition, but concentration of poverty still holds in the Southern part of the country. An issue left for further research regards the relationship between quality of life and cost-of-living. Had housing costs been positively correlated with quality of life, the gain in terms of purchasing power experienced by households living in poorer areas, where housing prices are typically lower, could be interpreted as a compensation of the loss in terms of quality of life.

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