

Sources of Inequality in Italy*

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May 9, 2019

Abstract

In this article, we study the evolution of income composition in terms of capital and labor income in Italy between 1989 and 2016. We rely on the novel concept of *income composition inequality*. The higher the overall degree of income composition inequality is, the stronger the link between the functional and personal distributions of income. We show that the strength of this link decreased steadily in Italy over the period considered. This result is robust to the use of different definitions of capital and labor and different estimation techniques of the degree of income composition inequality. The implications of this result are twofold. First, fluctuations in the total factor shares of income are having an increasingly weaker impact on income inequality in Italy. Second, Italy is moving towards becoming a multiple sources of income society. Finally, we conceptualize a simple rule of thumb for policy makers seeking to reduce income inequality in the long run. This rule relates fluctuations in the total factor shares and the level of income composition inequality to the specific income source to be redistributed.

JEL-Classification: D31, D33, D63, E25.

Keywords: Income composition inequality, functional and personal income distribution, Italy.

*We thank Emanuele Felice, Branko Milanovic, Salvatore Morelli, Michele Raitano, Andrea Roventini, Francesco Saraceno, Engelbert Stockhammer and two anonymous reviewers for their helpful comments and suggestions. The usual disclaimer applies.

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"In my view, Economics has become too splintered into sub-disciplines [...]. There is a great need, particularly at this juncture, to unify the different branches of Economics. The link between macro and micro is essential, and Economics has suffered from allowing these to go their separate ways. Empirically, the national accounts need to be brought closer to micro-data on households. Theoretically, the aggregate analysis of distribution needs to look at both profits and the wages of heterogeneous workers. Growth theory, Macroeconomics, and Labour Economics are all part of the mix." A.B. Atkinson (2009).

1 Introduction

To motivate our study, we introduce several stylized facts. Table 1 shows the distribution of individuals' total disposable income in Italy for 1989 and 2016 (data source: Bank of Italy, 2018). Four income groups are considered, namely, the poorest 50%, the middle 40%, and the richest 10%, which is further divided into the bottom part of the decile (90-95%) and the upper part (95-100%).

Table 1 shows that income inequality increased slightly in Italy between 1989 and 2016, as the Gini coefficient increased from 0.47 to 0.54 over the period. Specifically, the bottom 50% of the income distribution saw its share of total income fall by 6 percentage points, from 17% to 11%. In contrast, the middle class (50-90%) and the top 10% registered increases in their shares by 3 and 2 percentage points, respectively.

Table 1: Total income shares by income group

Income group	1989	2016
0-50%	17%	11%
50-90%	51%	54%
90-95%	11%	12%
95-100%	20%	21%
<i>Gini</i>	0.47	0.54

We now focus on Table 2, which shows the distribution of capital income across the *total* income ranking. We consider capital income to be the sum of property income and the capital component of self-employment income. Table 2 should be read as follows: in 1989, the bottom 90% in terms of total income earned 46% of the capital income in the economy. The richest 10% of the distribution earned 51% of the capital income in the same year.

A comparison of 1989 with 2016 shows that capital income shifted from the top to the bottom of the income distribution. In 2016, the capital income accruing to the bottom 90% had increased by 13 percentage points, dropping by the same amount for the richest 10%. Overall, the capital share of income increased by 7 percentage points.

Table 2: Capital income shares by income group

Income group	1989	2016
0-50%	14%	22%
50-90%	32%	37%
90-95%	14%	10%
95-100%	37%	28%
<i>Capital Share</i>	36%	43%

Finally, we examine Table 3, which shows the distribution of labor income along the income rank. The bottom 50% went from earning 18% of labor income in 1989 to only 3% in 2016, while the richest 50% increased its fraction of labor income from 80% to 95% over the period.

In other words, we observe the opposite pattern for labor income to that for capital income: a significant fraction of the labor income went from the bottom 50% to the top 50% of the income distribution from 1989 to 2016. Overall, the labor share of income lost 7 percentage points to the capital share.

Table 3: Labor income shares by income group

Income group	1989	2016
0-50%	18%	3%
50-90%	62%	66%
90-95%	8%	13%
95-100%	10%	16%
<i>Labor Share</i>	64%	57%

These descriptive statistics convey a lesson about the Italian economy: a structural change in the *composition* of individuals' income has taken place over the last three decades. Those at the top of the income distribution have seen their share of capital income decrease and, at the same time, their share of labor income increase. In 2016, the top 10% of the income distribution owned less than half of the capital income (38%), as opposed to 1989, when they owned 51%. The opposite dynamics have taken place at the bottom of the income distribution.

In light of the evidence shown in Tables 1-2-3, several fundamental questions arise. How can we measure the dynamics of the income composition in Italy? While the Gini coefficient is a tool capable of synthesizing the overall dynamics of income inequality in a population, is there a tool to jointly analyze the dynamics of income composition? What can we learn from such an investigation, and what policy recommendations can we formulate accordingly? This paper attempts to provide answers to all of these questions.

To this end, we adopt a methodology recently developed by Ranaldi (2019) to study the evolution of *income composition inequality* in Italy between 1989 and 2016. As proposed by Ranaldi (2019), income composition inequality can be measured through the *Income Factor Concentration* (IFC) index. Whenever two income sources are *concentrated* in the hands of the top (e.g., capital income) and bottom (e.g., labor income) of the income distribution, the IFC index indicates a high degree of income composition inequality. By contrast, the IFC index signals a low degree of income composition inequality when the two income sources are equally shared across the population, given the overall levels of income inequality and factor shares.

A high degree of income composition inequality entails a strong link between the functional and personal distributions of income. The underlying intuition is explained as follows: when the rich own all of the capital income in the economy, an increase in the capital income share will boost the income of the rich, therefore boosting income inequality in the population. The contrary situation of a weak link between the functional and personal distributions of income holds true under a low degree of income composition inequality. In the latter case, a change in the factor shares of income will not significantly influence the level of inequality

in the population.

By applying this method to the case of Italy, we show that income composition inequality, and therefore the link between the functional and personal distributions of income, decreased steadily between 1989 and 2016. This result, which is robust to different definitions of capital and labor and different estimation techniques of the IFC index, has two major implications. The first implication is that fluctuations in the total factor shares of income are having an increasingly weaker impact on income inequality in Italy. In other words, the fraction of the variance of the Gini coefficient explained by the change in factor shares has been decreasing. The second implication is that Italy has moved in recent decades from a *class-based* society, in which class and ownership of factor income coincide (workers owning labor income and capital owners receiving capital income), to a *multiple sources of income* society, in which class and ownership of factor income no longer overlap. Furthermore, we show that Italy has become more of a home-owning and self-employment society but not a society where income from dividends, interest and rent has become less associated with high income levels overall. Our analysis also reveals that the values of the IFC index changed from positive to negative throughout the period considered. Hence, while an increase in the capital share would have increased the level of income inequality in 1989, the same increase today would reduce income inequality in the society.

In parallel with the empirical findings, this article conceptualizes a simple rule of thumb for policy makers seeking to effectively reduce income inequality in the long run. The intuition here is that the degree of income composition inequality (measured by the IFC index) becomes a key variable for the design of effective redistribution policies. Specifically, the rule of thumb relates the fluctuations in total factor shares and the level of income composition inequality to the specific income source to be redistributed. In other words, we claim that when the policy maker's expectation regarding the sign of the variation in factor share z coincides with her expectation regarding the sign of income composition inequality, it is preferable to redistribute source z to reduce inequality in the long run.

This paper is structured as follows. Section 2 introduces the academic literature that we build upon. Section 3 presents the method we employ and the data in more detail, and Section 4 shows the main results. Section 5 traces the policy implications of our study, and Section 6

concludes the paper.

2 Background and related literature

In recent years, and with increased impetus following the pioneering works of Piketty (2014) and Piketty and Zucman (2014), the dynamics of factor income shares are again the subject of economists' attention given their potential effects on the level of personal income inequality (Atkinson, 2009; Glyn, 2011) and thereby on macroeconomic variables. As Atkinson (2009) puts it, one of the three reasons to study factor shares is "to make a link between incomes at the macroeconomic level (national accounts) and incomes at the level of the household" (Atkinson, 2009; page 5). This statement is in line with the rationale behind this work, which aims to build a bridge between Italian individual-level data on labor and capital income on the one hand and the aggregate factor shares of income in Italy in recent decades on the other.

There is not yet an established consensus in the literature on the form of the relationship between (changes in) the share of factor incomes and (the effect on) income inequality at the aggregate level. Recent empirical work by Bengtsson and Waldenstrom (2018) seeks to shed light on this relationship for 21 economies going back as far as the 1930s. Bengtsson and Waldenstrom (2018) argue that the link between factor shares and inequality does not need to be constant over time and across countries. Indeed, they claim that this link can be "contingent on the production technology, the structure of personal incomes or the institutional context, all of which may—and do indeed—change over time" (Bengtsson and Waldenstrom, 2018; page 713). Bengtsson and Waldenstrom (2018) find evidence of a strong and positive link between factor shares and inequality, although the magnitude varies from country to country. In light of the result of Bengtsson and Waldenstrom (2018) of a nonconstant relationship hinging on institutional factors, our aim is to analyze the underlying dynamics between factor shares and inequality with a focus on the case of Italy. In our view, focusing on a specific country allows us to analyze the dynamics of this relationship at a higher level of accuracy.

On a theoretical level, Milanovic (2017) identifies the two necessary analytical conditions

for the "pass-through" or transmission of a change in factor income shares to the aggregate level of inequality. Specifically, these conditions (for the example of capital income) are (i) a high level of concentration of capital income and (ii) a high and positive association between owners of capital income and the overall top income earners. If both conditions apply, then a rise in capital income as documented in Piketty (2014) leads to a greater level of personal income inequality. The case in which top income earners own capital income and labor income is owned at the bottom of the distribution is labeled by Milanovic (2017) as "classical capitalism". Further, Milanovic (2017) suggests that to reduce the overall level of income inequality, one must deal with diversification of the ownership of capital income, hence breaking down the first condition described above. The resulting ideal-typical social system for which ownership of a specific factor income no longer coincides with class is labeled by Milanovic (2017) as "new capitalism". On these lines, this paper intends to determine which ideal-typical social system the Italian economy resembles by analyzing the dynamics of income composition inequality from 1989 to 2016. Further, the adoption of the methodology in Ranaldi (2019) allows us to reduce from two to one the necessary conditions for a pass-through from factor shares to income inequality. Specifically, the sign of the IFC index will determine the effect of a change in factor shares on personal income inequality. Finally, our work relates to the policy proposal of Milanovic (2017) of reducing the concentration of the factor income whose share is increasing by proposing a rule of thumb that identifies the specific income source to be redistributed to reduce overall income inequality.

In a related study of labor shares and income inequality in Italy over the long run, Gabbuti (2018) provides novel estimates and confirms that the relationship between trends in functional and personal income distribution varies over time, adding that "the Italian case reveals that factor shares offer great, complementary insights in the historical analysis of inequality, reflecting fundamental changes in the economy and society" (Gabbuti, 2018; page 2). To complement the historical analysis by Gabbuti (2018), this paper focuses on the relationship between factor shares and income inequality over the last three decades, aiming to show why a thorough analysis of the dynamics of income composition inequality delivers lessons and stylized facts that aggregate estimates of income inequality fail to provide.

3 Methodology and data

This section introduces both the method and data that we employ. To assess the link between the functional and personal distributions of income, we follow the method proposed by Ranaldi (2019), who analytically defines the concept of *income composition inequality* in an effort to estimate the extent to which the *composition* of income is unequally distributed across the population. The income composition is unequal whenever two sources of income (e.g., capital and labor)¹ are separately owned by the top and bottom of the income distribution (or vice versa). On the other hand, there is equality of income composition whenever each individual owns the same population shares of the two income sources. Why and how is this measure of inequality relevant? Its role is highlighted by analyzing the interplay with changes in factor shares and aggregate income inequality. Whenever income composition inequality is high, capital income ends up in the hands of the wealthiest individuals. In this context, an increase in the capital share increases the level of overall income inequality by boosting the income of the wealthy. Therefore, under a high level of income composition inequality, the link between the functional and personal distributions of income is strong. The opposite situation holds true when income composition inequality is low.

To measure income composition inequality, Ranaldi (2019) analytically defines the IFC index. The IFC index is constructed by means of the *concentration curves for each income source*. These curves are the cumulative distributions of income sources across the population, with individuals being indexed by their income rank and not by capital or labor income rank. These curves cumulate an income source up to the level of the total factor share (which is less than 1) and not to 1, as is the case for the more standard concentration curves developed by Kakwani (1977a, 1977b). The area below the concentration curve for an income source can be considered a good proxy for the level of concentration for the specific income source at the top, or at the bottom, of the income distribution. When this area is large, the income source is concentrated primarily at the bottom of the income distribution, while when the area is small, the source is concentrated at the top.

¹In what follows, we exclusively deal with these two sources, although the method can be applied to any pair of sources whose sum equals total income or, rather, total wealth.

A graphical representation of the concentration curves for Italy in 1989 is illustrated in Figures 2 and 3. Specifically, Figure 2 shows the concentration curve for capital income and the related zero- and maximum-concentration curves, whereas Figure 3 focuses on the concentration curve for labor. Recall that the two curves are interrelated; a high concentration of capital at the top implies a high concentration of labor at the bottom, and vice versa. Furthermore, the sum of these two concentration curves results in the Lorenz curve for total income, which is the red lines in Figures 2 and 3. Although each concentration curve is associated with a specific zero- and maximum-concentration curve, the choice of focusing on one curve affects solely the narrative of the subject matter. Indeed, if we focus on the concentration curve for capital, we wonder the extent to which the capital income is concentrated at the top of the total income distribution; in contrast, if we focus on the concentration curve for labor, we wonder the extent to which the labor income is concentrated at the top. In the following analysis, we will focus on the concentration curve for capital income.

By introducing both the zero- and maximum-concentration curves, which mirror the conditions of zero and maximum inequality in income composition, respectively, Ranaldi (2019) constructs the IFC index, which is defined as the area given by the difference between the concentration curve for the income source and the zero-concentration curve, suitably normalized. Formally, if we denote the area given by the difference between the zero-concentration curve and the concentration curve for capital (labor) by \mathcal{A} and the difference between the zero-concentration curve and the maximum-concentration curve by \mathcal{B} , we can define the IFC index (labeled as \mathcal{I}_f) as follows:

$$\mathcal{I}_f = \frac{\mathcal{A}}{\mathcal{B}}. \quad (1)$$

Another way of expressing this index is as follows:²

$$\mathcal{I}_f = \frac{\pi w (\tilde{\mu}_w - \tilde{\mu}_\pi)}{\mathcal{B}}, \quad (2)$$

where π and w are the capital and labor shares of income, respectively, and $\tilde{\mu}_w$ and $\tilde{\mu}_\pi$ are the areas of the *non-scaled* labor and capital concentration curves, respectively.³

²Note that $\mathcal{A} = \pi(\tilde{\mu}_y - \tilde{\mu}_\pi)$, where $\tilde{\mu}_y$ is the area of the Lorenz curve. The area of the Lorenz curve can be broken down into the sum of the two areas below the concentration curves for capital and labor; hence, $\tilde{\mu}_y = \pi\tilde{\mu}_\pi + w\tilde{\mu}_w$, and we can easily find that $\mathcal{A} = \pi w (\tilde{\mu}_w - \tilde{\mu}_\pi)$.

³The two areas $\tilde{\mu}_w$ and $\tilde{\mu}_\pi$ should be multiplied by w and π , respectively, to obtain the areas of the concentration curves as in Ranaldi (2019).

Interestingly, simple algebra reveals that the derivative of the Gini coefficient, \mathcal{G} , with respect to changes in the capital share of income is as follows:

$$\frac{\partial \mathcal{G}}{\partial \pi} = 2(\tilde{\mu}_w - \tilde{\mu}_\pi). \quad (3)$$

Equation 3 states that the sign of the IFC index, which derives from the difference between the areas of the two concentration curves, determines whether an increase in the capital share of income positively or negatively affects the personal income distribution. Thus, the IFC index can be considered a bridge between the functional and personal distributions of income. However, note that the overall change in the total income Gini coefficient is not solely determined by the dynamics of the factor shares. Changes in the structure of the labor market and the introduction of a new redistribution policy are only two of the forces that can influence its dynamics. It is also likely that two different surveys will sample a country's population in two different ways, thereby provoking possible artificial changes in the level of income inequality.

Apart from its technical character, the IFC index also has value from the perspective of political economy. It can be considered a stylized measure of the *degree of capitalism* of a social system or economy. Following the framework proposed by Milanovic (2017), the two extreme values that the index can take coincide with two ideal-typical social systems. Specifically, under maximum income composition inequality, a society can be defined as an example of *classical capitalism*, characterized by a class of wealthy capitalists and a class of poor workers (or, vice versa, a class of wealthy workers and a class of poor capitalists). In contrast, under minimum inequality in income composition, a society can be defined as an example of *new capitalism*, in which there is no longer any clear mapping between social class and income source. We can therefore state that a particular trend in income composition inequality provides us with novel insights into the form of capitalism towards which a society converges.

As discussed in Ranaldi (2019), the income factor concentration index fills a gap in the literature on the technical assessment of the relationship between the functional and personal distributions of income. Milanovic (2017) adopts the correlation coefficient between capital and total income to study the elasticity of the interpersonal income Gini coefficient to changes in the capital income share. This metric may act as an intuitive and simple measure of such

link, although it does not formally determine the condition of the transmission of changes in the functional distribution into income inequality, as does the sign of the IFC index.

From a different perspective, Atkinson and Bourguignon (2000) and Atkinson (2009) approach the measurement of this link by decomposing the squared coefficient of the variation in income, here adopted as a measure of income inequality, into the marginal contributions of the labor and capital income. However, they do not provide summary statistics capable of precisely capturing the strength of the link. Instead, Atkinson and Lakner (2017) study the association of capital and labor income at the top by constructing a rank-based measure of association, which is a discrete approximation of the copula density. However, this interesting statistic does not precisely address the issue of the relationship between the functional and personal distributions of income. Indeed, it is rather difficult to determine the joint distributions of capital and labor under which the strength of the link is minimal and maximal.

The IFC index is also different from the pseudo-Gini coefficient, which was first proposed by Fei et al. (1978). As discussed by Ranaldi (2019), the pseudo-Gini coefficient cannot act as a measure of the link between the functional and personal distributions of income. In fact, if we were to consider the pseudo-Gini coefficient of capital income, this metric would be zero when all of the individuals in the population earned the same amount of capital income. In such a scenario, an increase in the capital share of income would result in an equal increase of the absolute level of the capital incomes of all individuals. Such an increase would therefore make the poor people better off and the rich people worse off by reducing income inequality in the society instead of leaving it unaffected.

3.1 Data

At this point in the analysis, we introduce the data employed and the definitions of capital and labor that we adopt. To compute the IFC index, we use the Survey of Household Income and Wealth (*SHIW*) provided by the Bank of Italy.⁴ The survey covers 8274 households composed of 25150 individuals and 13864 income-earners distributed over approximately 300

⁴The *SHIW* has been the main source of information about incomes at both the household and individual levels in recent decades.

Italian municipalities. This survey has been carried out since the 1960s, although information concerning returns on financial assets has only been available since 1989 (see Brandolini et al., 2018, for further information). Therefore, our analysis ranges from 1989 to 2016. The surveys are available every two years, with a two-year gap between 1995 and 1998.

The type of income provided by the Bank of Italy is net disposable income, which includes four sources: (i) payroll income, (ii) pensions and transfers, (iii) net self-employment income and (iv) property income. All of these sources can be further decomposed.⁵ Below, we adopt a single definition of capital and labor income, whereas in Appendix A, we will run the same analysis with different definitions of the two sources, although this will not affect the main results of this article.

Capital income is defined as the sum of property income (Y_{pr}) and the capital component of net self-employment income ($Y_{s\pi}$). Formally:

$$\Pi = Y_{pr} + Y_{s\pi}.$$

The main definition of labor income we adopt includes payroll income (Y_{pa}) and the labor component of self-employment income (Y_{sw}). Formally, we can write:

$$W = Y_{pa} + Y_{sw}.$$

As the Bank of Italy does not furnish the capital and labor components of net self-employment income, we impute them. To this end, we adopt the imputation strategy proposed by Glyn (2011), which attributes the average payroll income \bar{Y}_{pa} of the entire sample (in every year) to represent the maximum value that the labor income component can take. If individual i 's net self-employment income is less than \bar{Y}_{pa} (i.e., $Y_s < \bar{Y}_{pa}$), then this quantity is considered the labor component of her net self-employment income. In contrast, if i 's net self-employment income is greater than \bar{Y}_{pa} , then we regard the amount $Y_{s\pi} - \bar{Y}_{pa}$ as the capital component of her net self-employment income. It is important to note that this assumption may present

⁵Payroll income is composed of net wages and salaries and fringe benefits, while pensions and net transfers comprise pensions, arrears, financial assistance scholarships, alimony payments and gifts. Net self-employment income is computed as the sum of self-employment income and entrepreneurial income, while property income is the sum of income from real estate and financial assets. Income from real estate includes actual rents and imputed rents, while income from financial assets includes interest on deposits, interest on government securities and income from other sources.

several issues. By considering the economy's average labor income as a threshold to determine the capital and labor components of self-employment income, we risk underestimating the capital component for those sectors in which the sectorial average payroll income is lower than the economy's average payroll income, and vice versa. The common example is that of the agricultural sector, in which the average labor income is lower than the society's average labor income. Another aspect to consider regarding this decomposition is that it is usually used to decompose macroeconomic rather than microeconomic variables. However, we believe this technique to be more sophisticated than simply attributing two thirds of the self-employment income to its labor component and one third to its capital component.

Regarding the functional distribution of income, we first derive the capital share of income series from the *SHIW* data (the green line in Figure 1). This series is based on our definition of labor (and hence total) income excluding income from pensions and transfers, as explained above. This implies that the corresponding capital/labor share of total income is higher/lower than the capital income share that accounts for pensions and transfers in the denominator. The trend for the *SHIW* capital share series increases for the periods 1989 – 2004 and 2008 – 2010 and decreases for the periods 2004 – 2008 and 2010 – 2016. The series *SHIW* therefore shows an increase of slightly less than 10 percent throughout the period, from approximately 0.36 in the early 1990s to approximately 0.44 in 2014.

We now compare the series of capital share from the *SHIW* with the series obtained from the European System of National and Regional Accounts (*ESA*) to identify possible discrepancies between the two data sources.⁶ The *ESA* series is represented by the dotted blue line in Figure 1 (labeled *ESA 2010*). In line with the results obtained by Torrini (2016), the series from *ESA* confirms that the capital share increased in the periods 1995 – 2000 and 2010 – 2016, whereas it decreased between 2000 and 2010.

The proximity between the green and blue lines in Figure 1 is explained by the fact that both series do not include pensions or transfers in their denominators, which is standard prac-

⁶We consider the 2010 *ESA* release. From a technical perspective, we consider the functional distribution of gross value added at factor costs. First, we define capital income as value added minus employee compensation. To account for self-employed workers, we assume, as in Torrini (2016), that their earnings are the same as those of waged employees in all sectors. Specifically, this definition relates to the second series of capital income built by Torrini (2016). In a second step, we split the two components of self-employment income in light of the estimates Y_{st} and Y_{sw} derived from the micro data.

tice in the computation of the official measures of the capital share, normally calculated as one minus the share of employees' compensation in total value added. However, the two series start to diverge in 2008. The 2008 financial crisis appears to have affected the two series differently.

4 Main results

This section reports the main results of the paper and lays the foundations for the policy recommendations that will be provided in Section 5.

4.1 Descriptive statistics

First, we present several descriptive statistics. For the sake of completeness, we further extend Tables 1-2-3, which were previously shown in the introduction⁷. Table 4 shows the evolution of the distribution of total income across the four income groups previously considered. The first aspect to note is that after a sudden increase in income inequality between 1989 and 1995, as mirrored by the Gini coefficient increasing from 0.47 to 0.55, income inequality remained stable for approximately the entire period. This rise is due to the foreign exchange crisis that occurred in 1992 (Fратиanni and Artis, 1996), which is remembered as the Great Crisis. This crisis was due to a loss of confidence by foreign investors that, after having acquired shares of public debts for several years, speculated against the Italian lira. As shown in Table 4, the Great Crisis mainly affected the bottom 50% of the distribution, which lost 6% of its total share of income. In contrast, the top 5% benefited from the crisis, as their income share increased from 20% to 23%. Overall, the middle class maintained almost the same share of total income over the entire period of 1989-2016, which amounts to approximately 50% of total income. As discussed in Section 1, the bottom 50% of the income distribution saw its share of total income fall by 6 percentage points throughout the period, from 17% to 11%. In contrast, the top 10% registered a total increase in their share of 2 percentage points.

⁷We consider 1989, 1995, 2000, 2004, 2012, and 2016.

Table 4: Total income shares by income group

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	17%	11%	12%	12%	13%	12%	11%
50-90%	51%	53%	52%	51%	53%	52%	54%
90-95%	11%	12%	12%	11%	12%	12%	12%
95-100%	20%	23%	22%	24%	21%	22%	21%
<i>Gini</i>	0.47	0.55	0.53	0.54	0.52	0.54	0.54

We focus on the distribution of capital income across the total income ranking, of which Table 5 presents a more detailed overview. As stated in Section 1, the capital income owned by the bottom 50% of the total income distribution has increased steadily over the last three decades, from 14% in 1989 to 22% in 2016. In addition, the middle class has seen their capital income share rise from 32% to 37%. The opposite has occurred to the top 10%, whose total share of capital income has fallen from 51% to 38%. This decrease was particularly pronounced for the top 50% of the top 10% income group. Simultaneously, the survey capital income share has risen by 7 percentage points, from 36% to 43%.

Table 5: Capital income shares by income group

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	14%	15%	18%	18%	21%	20%	22%
50-90%	32%	34%	33%	31%	33%	36%	37%
90-95%	14%	13%	13%	11%	12%	12%	10%
95-100%	37%	35%	35%	37%	31%	30%	28%
<i>Capital Share</i>	36%	39%	41%	43%	41%	43%	43%
<i>Gini</i>	0.47	0.55	0.53	0.54	0.52	0.54	0.54

The distribution of labor income across the income rank has evolved in the opposite manner as with capital, as shown in Table 6. The bottom 50% has registered a reduction in its labor share of 15 percentage points, whereas the top 10% has seen its labor share increase by 11 percentage points. Finally, the middle class has experienced a modest increase in its labor share.

Table 6: Labor income shares by income group

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	18%	7%	8%	7%	7%	5%	3%
50-90%	62%	65%	66%	66%	66%	65%	66%
90-95%	8%	11%	11%	12%	11%	12%	13%
95-100%	10%	14%	13%	14%	14%	16%	16%
<i>Labor Share</i>	64%	61%	59%	57%	59%	57%	57%
<i>Gini</i>	0.47	0.55	0.53	0.54	0.52	0.54	0.54

In summary, Tables 5 and 6 clearly indicate that the structural change in the composition of individual income in Italy over the last three decades has mainly involved the two extremes of the income distribution, namely, the bottom 50% and the top 10%. The bottom 50% has seen its total income becoming increasingly more capital intensive, whereas the top 10%'s income has become increasingly more labor intensive. The middle class has maintained almost the same income composition as its shares of labor and capital income have increased by almost the same amount. The aim of the next subsection is to synthesize these facts in a single summary statistic.

4.2 Income composition inequality

We proceed to estimate the degree of income composition inequality in Italy. As illustrated in Section 3, Figure 2 plots a one-year (1989) snapshot of the decomposition of the Lorenz Curve (in red) into the concentration curves for capital (in blue) and labor (the latter does not appear in Figure 2 since it can be derived from the other concentration curve, holding the Lorenz curve constant). The concentration curve for capital lies below the zero-concentration curve, indicating that in 1989, capital income was concentrated at the top of the population (displayed in deciles and ranked with respect to income), whereas labor was concentrated in the bottom of the population (as shown in Tables 5 and 6).

For each year in the period 1989 – 2016, we then compute the level of the IFC index, as shown in equation 1 in Section 3. The IFC index is again represented by the ratio between the area given by the difference between the concentration curve for capital and the zero-concentration curve (\mathcal{A}) and the area between the zero-concentration curve and the maximum-

concentration curve (\mathcal{B}). Figure 4 conveys one of the main results of this paper by plotting the 1989 – 2016 series of the IFC index as a measure of the degree of income composition inequality in Italy. This result can be summarized as follows. Italy experienced a decreasing degree of income composition inequality throughout the period 1989 – 2016 from a level of 0.3 to below zero. As is shown in Appendix A, this result is robust to different definitions of capital and labor income. As shown in Figure 4, income composition inequality follows a substantially different trend than that of the Gini coefficient. This is because the IFC index highlights a story not considered by the Gini coefficient, namely, that Italy has gone through a structural change in the composition of individual income over the last three decades.

How can this result be interpreted? A *lower* degree of income composition inequality indicates that, on aggregate, the two sources of income are *more equally* distributed across the population, given the total level of income inequality and of the factor shares. In other words, representing Italy in 2016 as a society in which social classes and sources of income perfectly coincide (for instance, with capital owners at the top and wage earners at the bottom) is not in line with the evidence in Figure 4. Italy is becoming a society in which a larger share of individuals earns *multiple* sources of income.

We now turn to the implications for the linkage between the functional and personal income distributions in Italy⁸. Figure 4 plots the series of the Gini coefficient constructed using the *SHIW* data, showing that income inequality increased in Italy in the early 1990s and then stabilized from then onward at approximately 0.55. To what extent have changes in the factor income shares (as plotted in Figure 1) been transmitted into the level of personal income inequality? Based on the lower level of the IFC index in 2016 than in 1989, we claim that the strength of the transmission mechanism from changes in factor incomes to changes in the level of personal income inequality weakened throughout the period.

To clarify this point, recall equation 3 from Section 3. For each percentage increase in the capital share of income, the right-hand side of equation 3 indicates that the contribution to the change in personal income inequality will be given by twice the difference between the areas of the concentration curves⁹. The decreasing IFC series of Figure 4 implies that

⁸Additional analysis of this aspect is provided in Appendix B.

⁹Recall further that the actual series of the Gini coefficient is not determined solely by the dynamics of the

the elasticity of personal income inequality to changes in factor income *decreased* throughout the period. Pinning down the dynamics of the strength of the transmission mechanism from factor income distribution to personal income distribution is in our view an important aspect that previous decompositions (Shorrocks, 1982; Atkinson, 2009) of the variation in personal income inequality did not properly analyze.

The meaning of the negative value of the IFC index from 2008 onward should be clarified. A negative value of the IFC index in the last years of the analysis implies that during those years, a hypothetical sudden increase in the share of capital income would *reduce* the level of personal income inequality. However, the magnitude of the hypothetical effect on personal income inequality would be rather small, as indicated by the fact that the level of income composition inequality is low.

Finally, to observe the dynamics behind the evidence in Figure 4 from another perspective, Figures 5 and 6 separately show the series of the areas of the concentration curves for capital and labor, respectively. The series of the area of the concentration curve for labor (Figure 6) decreased throughout the period, confirming the structural change in the distribution of labor incomes across the total income rank (from poor to rich) shown in Table 6. In contrast, the series of the area of the concentration curve for capital (Figure 5) shows an increase in magnitude throughout the period, confirming the structural change in the distribution of capital incomes across the total income rank (this time from rich to poor) shown in Table 5.

4.3 Factor income components

Additional insights can be gained by examining the (area of the concentration curves for each of the) factor income components. We take a closer look at the way each capital and labor income component evolved between 1989 and 2016.

factor shares; hence, the evidence in Figure 4 (a stable level of income inequality from the early 1990s onward) might be a net effect of a set of different forces. Regardless of this limitation, we can safely argue that the degree to which changes in the capital income shares yield an increase in the level of income inequality has been steadily *decreasing* for the Italian economy.

4.3.1 Capital income components

To start with several descriptive statistics, Table 7 refers to the evolution of the distribution of the capital component of self-employment income. Clearly, this component has moved from the bottom 95% to the top 5% of the income distribution.

Table 7: Capital component of self-employment income shares

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	4%	1%	1%	0%	1%	0%	0%
50-90%	34%	35%	31%	22%	29%	30%	29%
90-95%	18%	14%	15%	11%	16%	15%	11%
95-100%	43%	48%	51%	64%	52%	53%	58%

Table 8 shows the distribution of capital income from real estate. Different from the capital component of self-employment income, this source has moved from the top 10% to the bottom 90% of the distribution. We note that between 2008 and 2012, this share decreased only for those individuals in the bottom 50% of the distribution. This is due to the effect of the 2008 financial crisis.

Table 8: Capital shares from real estate

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	22%	22%	27%	28%	30%	27%	29%
50-90%	33%	37%	36%	36%	36%	39%	40%
90-95%	12%	12%	12%	12%	11%	11%	10%
95-100%	30%	27%	23%	22%	21%	21%	19%

Table 9 plots the share of income from financial assets. This share clearly increased from 45% to 71% for the top 5% over the three decades, whereas it decreased for all other groups. Interestingly, while the financial crisis hit the bottom 50% via the housing market, it hit both the middle class and the bottom 50% of the top 10% via the financial market. Moreover, it appears that the middle class was affected by the financial crisis before the top 90-95%. However, given the low weight financial capital has in the total capital income captured by

the survey, its overall effect on the dynamics of the income composition has been relatively marginal.

Table 9: Capital shares from financial assets

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	15%	11%	14%	21%	10%	9%	n.a.
50-90%	26%	20%	20%	10%	0%	11%	n.a.
90-95%	13%	12%	11%	6%	15%	6%	n.a.
95-100%	45%	55%	53%	62%	73%	71%	n.a.

To synthesize the facts from Tables 7 - 8 - 9, Figure 7 plots the area of the concentration curve for capital from Figure 5 with its three components. It is straightforward to infer that the overall increasing area below the concentration curve for capital has been driven primarily by real estate (housing rents). This component led to a steady redistribution of capital income from rich to poor in Italy throughout the period. The financial assets component of the concentration curve for capital has not decisively contributed to the overall dynamics, mainly due to its limited fraction of the total capital share of income. This evidence indicates that if one intends to further redistribute aggregate capital income in Italy, targeting financial assets might not necessarily have a large overall effect.

4.3.2 Labor income components

We now analyze how the distribution of the two labor income components has evolved over the period considered. Table 10 describes the evolution of payroll income. While the share of payroll income of the middle class remained stable, the top 10% saw its share increase considerably at the expense of the bottom 50%, whose share decreased by 15 percentage points.

Table 10: Labor shares from payroll income

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	17%	6%	7%	6%	6%	5%	2%
50-90%	64%	67%	67%	68%	68%	66%	67%
90-95%	8%	11%	11%	11%	11%	12%	13%
95-100%	9%	14%	13%	13%	13%	16%	16%

Finally, the labor component of self-employment income has progressively shifted from the bottom 50% to the top 10% of the distribution, as shown in Table 11.

Table 11: Labor component of self-employment income shares

Income group	1989	1995	2000	2004	2008	2012	2016
0-50%	22%	21%	18%	12%	15%	13%	10%
50-90%	47%	52%	51%	51%	49%	55%	56%
90-95%	13%	10%	12%	12%	13%	13%	11%
95-100%	16%	15%	18%	23%	21%	19%	21%

To synthesize the facts from Tables 10 - 11, Figure 8 plots the area of the concentration curve for labor from Figure 6 with its two components. We observe similar decreasing trends for the three curves, indicating that labor incomes have shifted from poor to rich and are now more equally distributed along the income rank. In particular, it appears that payroll income has been the major driver of the decrease in the area of the concentration curve for labor, in line with the evidence from Table 10 of a significant shift in payroll income from the poor 50% to the top 10%.

In the next section, we provide further details on how the concept of income composition inequality can be crucial to the effectiveness of redistribution policies.

5 Getting the redistribution right

This section introduces the final contribution of this work. It aims to clarify how a better understanding of the linkage between the functional and personal distributions of income can enhance the effectiveness of classic redistribution policies in terms of inequality reduction.

Imagine an economic policy maker seeking to reduce income inequality to maximize social welfare. To that end, she designs a classic redistribution (income taxation and transfer) policy. We argue that while a classical redistribution policy does not necessarily require the policy maker to know the current (and expected future) level of income composition inequality, the same is not necessarily true if the policy is intended to be effective in the longer run. To grasp

the concept behind this statement, we introduce the following stylized example (a simple model related to this section is developed in Appendix D).

Consider two countries, labeled Italy 1 and Italy 2 for simplicity. Italy 1's population is composed of workers earning payroll income, the self-employed earning self-employment income, capital owners earning property income, and a group of pensioners and unemployed individuals earning pensions and transfers. In contrast, Italy 2's population comprises only workers, the self-employed and capital owners, making the absence of pensioners and unemployed individuals in Italy 2 the only difference between the two countries. For simplicity, assume that the pension and transfer system is financed solely by income tax revenues and hence that the government maintains a balanced budget in each period. Specifically, one can assume, for instance, that the government progressively taxes the average total income at the top of the distribution and transfers the tax revenues to the poor and elderly in the form of income transfers and pensions. For the sake of simplicity, time index $t = 1$ symbolizes the current period or the short run, whereas $t = 2$ represents the longer run.

First, we report comparative statistics of the two countries. Clearly, at $t = 1$, the level of income inequality would be lower in Italy 1 than in Italy 2 due to the equalizing effect produced by the Italian pension and transfer system. However, at $t = 1$, the level of income *composition* inequality in Italy 1 would be higher than that in Italy 2, as the introduction of pensioners and unemployed individuals boosts the concentration of capital at the top (since pensioners and the unemployed receive a limited amount of capital income) and that of labor at the bottom of the income distribution (pensions and net transfers count as labor income that is targeted mainly to the poor).

Now, let us turn to the core of our example. The policy maker of Italy 1 expects the effect of her redistribution policy (which implied lower inequality than Italy 2 at $t = 1$) to also be in place in the longer run, namely, at $t = 2$. However, she is unaware of the role played by income *composition* inequality in the case of a shift in the factor shares of total income (our exogenous shock in this stylized example). Assume that, *ceteris paribus*,¹⁰ the capital income share in the economy increases by $x\%$ points from $t = 1$ until $t = 2$. Because the

¹⁰The drawbacks of this assumption should be further analyzed as an increase in the capital share of income has an impact on the level of income composition inequality.

term $2(\tilde{\mu}_w - \tilde{\mu}_\pi)$, which is the exact elasticity of changes in the capital share of income to changes in personal income inequality, is lower for Italy 2 (due to its lower degree of income composition inequality), such an increase in the capital share will not have a significant impact on the level of income inequality for Italy 2. In contrast, the same increase in the capital share will substantially increase the Gini coefficient in Italy 1 at $t = 2$ due to a higher level of the elasticity of changes in the factor income distribution to the personal income distribution. As a consequence, the difference in the level of inequality between the two countries at $t = 1$ will be reduced or eventually inverted.

As an illustration, assume that elasticity $2(\tilde{\mu}_w - \tilde{\mu}_\pi)$ equals 0.3 in Italy 1 and 0.1 in Italy 2 at time $t = 1$, with Gini coefficients of 0.35 for Italy 1 and 0.55 for Italy 2. Imagine then that the capital income shares in both economies grow by 10 percentage points from $t = 1$ until $t = 2$. How will this affect the level of income inequality in the next period? Knowledge of the elasticity $2(\tilde{\mu}_w - \tilde{\mu}_\pi)$ allows us to claim that the same increase in the capital share of income in the two countries will hamper income inequality at time $t = 2$ *three* times more in Italy 1 than in Italy 2. In other words, the positive variations in the Gini coefficient will be 3% for Italy 1 and 1% for Italy 2, reducing the effect of the redistribution policy designed in the previous period.

Although this example obviously oversimplifies reality, it helps to clarify the roles that both income composition inequality and the fluctuations in the factor shares have in affecting income inequality in the long run. In practice, to avoid the emergence of a scenario like that depicted in the example, the policy maker should identify at $t = 1$ the *correct* type of income source to redistribute. The following proposition provides a simple *rule of thumb* that the policy maker should adopt to do so:

Proposition 5.1. *If the expected sign of the factor share z 's variation at $t+k$ coincides with the expected sign of $\mathcal{I}_f(\mathbf{z})$ over the interval $[t, t+k]$ (i.e., $\mathbb{E}(\text{sign}(z_{t+k} - z_t)) = \mathbb{E}(\text{sign}(\mathcal{I}_{f,[t,t+k]}(\mathbf{z})))$, with $z = \pi, w$), then it is preferable to redistribute source z to reduce inequality in the long run.*

The intuition behind this proposition is as follows. As long as the level of income com-

position inequality is positive at $t = 1$ (e.g., capital income is mainly concentrated at the top of the distribution, and labor income is concentrated mainly at the bottom) and the *capital* income share is expected to rise in the coming years up to $t = 2$, it is preferable to redistribute income in the form of *capital* (such as housing or financial assets, depending on their share of capital income) so that the expected increase in the capital income share will not have a strong impact on income inequality. The same will be true in the opposite case: for a negative level of income composition inequality (e.g., capital incomes mostly accruing at the bottom of the distribution, and labor income accruing at the top), an expected increase in the *labor* share in the coming years will signal that *labor* income must be redistributed to reduce inequality in the longer run. For the sake of completeness, consider two additional scenarios that might arise. Specifically, when the two signs in this proposition differ, the expected change in income source z is already acting in favor of the redistribution of income in the long run. In the latter case, then, knowledge of the degree of income composition inequality does not generate further insights for the policy maker. The four scenarios are summarized in Figure 9.

In summary, we argue that in the event of an expected variation in a given factor share of income, a policy maker should consider the sign of the degree of income composition inequality to design effective redistribution policies. Choosing to redistribute the *correct* factor share will efficiently and more permanently reduce the burden of income inequality in the economy.

In Appendix E, we develop a simple model that shows that under incomplete information regarding changes in the functional income distribution and the level of income composition inequality, an inequality-averse social planner can choose a suboptimal vector of taxes to reduce income inequality in the society.

6 Concluding remarks

This paper analyzes the relationship between the functional and personal distributions of income. To study this relationship, this paper builds on the novel concept of income *composition* inequality that was more formally developed in Ranaldi (2019). The lower/higher the

degree of income composition inequality is, the weaker/stronger the link between movements in factor income shares and personal income inequality. This nexus provides an important background for economic policies intended to redistribute income to effectively reduce the level of inequality. Hence, the focus of the paper is to highlight the relevance of the inequality of income composition to obtain a more advanced understanding of income and economic inequality.

Our main contribution to the economic literature is twofold. First, we conduct an empirical analysis of the dynamics of income composition inequality in Italy between 1989 and 2016. By doing so, this study provides the first estimates of the level of income composition inequality in the country. The take-home message is that Italy is steadily moving towards becoming a multiple sources of income society. The results of the empirical analysis of this paper are consistent with different definitions of capital and labor and different estimation techniques of income composition inequality.

Second, we conceptualize a simple rule of thumb that relates fluctuations in the total factor shares and the level of income composition inequality to the specific income source to be redistributed. We argue that in the event of an expected variation in a given factor share of income, a policy maker should consider the sign of the degree of income composition inequality to design redistribution policies with long-term efficacy.

We consider this article to be part of a broader research agenda on the issue of income *composition* inequality and specifically on the link between factor shares and income inequality. We believe the technical assessment of this link introduces a novel dimension to the study of income distribution. Understanding the relationship between the macrolevel dynamics of economic aggregates such as the capital and labor shares of income and the microlevel changes in the dispersion of income across the population can further emphasize the political economy character of the issue of income distribution. As stated in Section 5, understanding this link is fundamental to designing effective redistribution policies that pursue a lower level of income inequality in society. As such policies are the responsibility of the incumbent policy maker, the role politics plays in this setting should be considered with greater care in future research than was done in this study.

In conclusion, given the relevance of a correct assessment of the marginal distributions of

capital and labor across the population, the estimates of which are at the core of the study of the link between functional and personal distributions of income, we call for the development and design of better techniques that can improve the quality of these data, which remain relatively inaccurate and imprecise.

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Appendices

A Robustness

In this section, we compute the IFC index for different definitions of labor and capital income. We start by considering labor income as the sum of payroll income (Y_{pa}), the labor component of self-employment income (Y_{sw}), pensions (Y_{pe}) and transfers (Y_{tr}). Capital income is defined as the sum of the capital component of self-employment income (Y_{st}) and property income (Y_{pr}). Figure 10 shows the trend of the novel series (IFC_2) compared to the benchmark series previously shown in Figure 4 (IFC_1). The gap between the two series remains roughly constant throughout the entire period. As shown by IFC_2 , the degree of income composition inequality decreases steadily from approximately 0.6 to below 0.4. The introduction of pensions and transfers in the definition of labor income has therefore increased the overall level of income composition inequality. This result reflects the fact that pensions and transfers are relatively concentrated at the very bottom of the total income distribution. This highlights that redistribution policies, which generally reduce income inequality, increase income composition inequality.

When we remove both the labor and capital components of self-employment income from the series IFC_2 , we obtain the series IFC_3 (Figure 11). In addition, IFC_3 shows a decreasing trend of income composition inequality over the period, although this trend is less marked than those of IFC_1 and IFC_2 . Finally, by removing pensions and transfers from the series IFC_3 , we obtain IFC_4 (Figure 12). Figure 12 shows that by defining capital income as property income and labor income as payroll income, the income composition inequality is always negative. This result illustrates that payroll income tends to be concentrated at the top of the income distribution relative to property income.

Overall, the four series IFC_1 - IFC_2 - IFC_3 - IFC_4 show that regardless of which definition of capital and labor income we adopt, income composition inequality has constantly decreased over the last three decades in Italy.

A.1 Combining survey data with national accounts

At this point in the analysis, we provide alternative estimates of both the factor shares and income composition inequality by combining the survey data with the national accounts. To this end, we first construct a new series of the functional income distribution in Italy and then consider the latter series, jointly with the ESA 2010 series, to obtain new estimates of the degree of income composition inequality for Italy.

To propose an alternative series of the functional income distribution in Italy, and specifically of the capital share of income, we combine information from both the national accounts and the Bank of Italy's SHIW. Specifically, the new series (the dotted purple line in Figure 13) is an adjustment of the ESA 2010 series in light of the estimates of the capital and labor components of self-employment income from the survey.¹¹ We denote the survey capital share at time t by π_t^s and the capital shares from the original and adjusted ESA 2010 series by π_t^{na1} and π_t^{na2} , respectively. Formally, if we denote the total survey capital and labor components of self-employment income by $Y_{s\pi}$ and Y_{sw} , respectively, we can define the adjusted capital share series π^{na2} as:

$$\pi^{na2} = \frac{VA - CE - Y_{sw} \times VA}{VA}, \quad (4)$$

where VA is value added, and CE is employee compensation.

Figure 13 shows that the trend of π^{na2} is similar to that of the *non-adjusted* ESA 2010 series, although its level is nearly 0.1 points higher throughout the period. This result indicates that the capital component of self-employment income accounts for 10% of the total value added.

To construct a different series of the IFC index, we replace the total level of the survey capital and labor shares with that of the two previously discussed series from the national accounts (π_t^{na1} and π_t^{na2}). For this purpose, we multiply each individual i 's relative share of capital income at time t by the level of the capital share obtained from the two ESA series at

¹¹Recall that the two components of self-employment income were obtained from the micro data by adopting the imputation strategy in Glyn (2011), which can be formally written as follows. We define the total income from the self-employment Y_s of individual i as $Y_{s,i} = Y_{s\pi,i} + Y_{sw,i}$, where $Y_{sw,i} = \begin{cases} Y_{s,i} & \text{if } Y_{s,i} \leq \bar{Y}_{pa} \\ \bar{Y}_{pa} & \text{if } Y_{s,i} > \bar{Y}_{pa} \end{cases}$, while $Y_{s\pi,i} = \begin{cases} 0 & \text{if } Y_{s,i} \leq \bar{Y}_{pa} \\ Y_{s,i} - \bar{Y}_{pa} & \text{if } Y_{s,i} > \bar{Y}_{pa} \end{cases}$, where \bar{Y}_{pa} is the average payroll income in the sample.

the same time. Formally, if we denote the relative share of capital of individual i by $\alpha_i = \frac{\Pi_i}{\Pi^s}$, we can define the adjusted concentration curves for capital as $\mathcal{L}_t^{na_1}(\boldsymbol{\pi}, p) = \pi_t^{na_1} \sum_{j=1}^i \alpha_j \forall i = 1, \dots, n$ and $\mathcal{L}_t^{na_2}(\boldsymbol{\pi}, p) = \pi_t^{na_2} \sum_{j=1}^i \alpha_j \forall i = 1, \dots, n$. Note that while the aggregate level of the capital share in the survey is replaced by that of the two national account series, each individual's relative share of capital remains the same, as the denominator of α_i is still the survey's total amount of capital. In other words, while we modify the aggregate level of π , we leave the two marginal distributions unchanged.¹²

In a similar manner, we modify the zero- and maximum-concentration curves and thereby obtain two novel series of the income factor concentration index, which we call IFC^{adj_1} and IFC^{adj_2} . Each of these adjustments is made for every income definition adopted; thus, we have four new series of the IFC index, $IFC_1^{adj_1}$, $IFC_2^{adj_1}$, $IFC_1^{adj_2}$ and $IFC_2^{adj_2}$. Figure 14 shows the result. These new estimates also confirm the decreasing trends of income composition inequality for both adjustments.

¹²Although it would be preferable to also modify the marginal distributions and thus correct for the capital income not captured by the survey, there is no consensus in the literature on how to adjust them.

B Correlation evidence

In this section, we further document the role played by income composition inequality in shaping the overall dynamics of income inequality as measured by the Gini coefficient \mathcal{G} . In particular, we separately discuss the impact of income composition inequality on income inequality due to its *variation* and that due to its *level*. To provide a more thorough methodological foundation for the following analysis, we adopt the analytical decomposition of income inequality variation proposed in Ranaldi (2019b). This method, which is based on the Lerman-Yitzhaki (LY) decomposition of the Gini coefficient in factor components (Lerman and Yitzhaki, 1985), affirms that a variation in income inequality can be interpreted as a result of three types of movements: (a) movements in the functional income distribution, (b) movements in the income factor concentration, and (c) movements in income factor inequality. This decomposition suggests that such movements explain a large part of the variance in income inequality.

These three motions are operationalized below by changes in the capital share of income (movement (a) and first term on the right-hand side), changes in the IFC index (movement (b) and the second term) and changes in the Gini coefficient of capital income (movement (c) and the third term). Because of the limited sample size (12 observations), this ordinary least squares (OLS) exercise is solely meant to provide the reader with correlation evidence and additional points of discussion for a comprehensive analysis of the dynamics involved. The first specification we consider is the following:

$$\Delta\mathcal{G} = \alpha_1 \times \Delta\pi + \alpha_2 \times \Delta\mathcal{I}_f(\pi) + \alpha_3 \times \Delta\mathcal{G}_\pi + \epsilon, \quad (5)$$

where Δ refers to absolute changes (first differences), \mathcal{G}_π is the Gini coefficient of capital income, and ϵ is the *iid* error term. The OLS results are shown in column (1) in Table 12:

	(1)	(2)
Variables	$\Delta\mathcal{G}$	$\Delta\mathcal{G}$
$\Delta\pi$	0.274 (0.232)	
$2(\tilde{\mu}_w - \tilde{\mu}_\pi)\Delta\pi$		4.065* (2.207)
$\Delta\mathcal{I}_f(\boldsymbol{\pi})$	-0.252*** (0.0591)	-0.238*** (0.0551)
$\Delta\mathcal{G}_\pi$	1.526*** (0.236)	1.407*** (0.228)
Observations	12	12
R-squared	0.857	0.880

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Correlation evidence between income inequality variation and movements a, b, c.

Column (1) in Table 12 shows that while changes in the capital share do not correlate with the variation in income inequality, the changes in income composition inequality and in capital income inequality are correlated. In particular and most important, the variation in income composition inequality is *negatively* correlated with the variation in income inequality, whereas the variation in capital inequality is positively correlated with it.

We set up an alternative model specification (column 2 in Table 12), in which the absolute change in capital income (movement (a)) is replaced by its product with the elasticity $2(\tilde{\mu}_w - \tilde{\mu}_\pi)$, as in equation 3. This modification can be interpreted as introducing a weight on $\Delta\pi$ that reflects the degree of its *condition of transmission*. Formally, this modified specification reads:

$$\Delta\mathcal{G} = \beta_1 \times 2(\tilde{\mu}_w - \tilde{\mu}_\pi)\Delta\pi + \beta_2 \times \Delta\mathcal{I}_f(\boldsymbol{\pi}) + \beta_3 \times \Delta\mathcal{G}_\pi + \epsilon. \quad (6)$$

The results reported in column (2) of Table 12 show that the newly introduced term $2(\tilde{\mu}_w - \tilde{\mu}_\pi)\Delta\pi$ appears to be more highly correlated with the variation in income inequality than $\Delta\pi$ was in the first case. Additionally, $2(\tilde{\mu}_w - \tilde{\mu}_\pi)\Delta\pi$ is positively correlated with the variation in income inequality, which is consistent with equation 3. In fact, equation 3 predicts that if the IFC index is positive (which is the case here), then an increase in the capital share positively affects the Gini coefficient.

The results from Table 12 highlight how changes in the degree of income composition inequality (movement (b), the second term in both model specifications) correlates with changes in income inequality. Specifically, the negative correlation between the variations in these two variables stresses a very important aspect: the reduction in income inequality caused by redistribution policies designed to transfer income from the top to the bottom of the distribution in the form of labor income is associated with an increase in income composition inequality. This occurs because such policies hamper the degree of concentration of both labor income at the bottom and capital income at the top of the income distribution, as shown by the areas of the concentration curves for capital and labor in Figures 5 and 6, respectively.

C North-South divide

The origins of the regional divide between northern-central and southern Italy (including the islands) can be considered "one of the oldest and most controversial issues in Italian economics and politics" (Federico et al., 2017). The long-lasting backwardness of the southern part of the country is well documented in the economic history literature (for an overview, see Felice, 2018) and is supported by a vast range of statistical indicators reflecting low regional performance, such as lower per capita disposable income (13512 euros versus 21307 euros in the North), a lower share of individuals having completed tertiary education (20.7% versus 28.6% in the North), and a lower employment rate (47% versus 70.6% in the North)¹³

Figure 15 shows the evolution of the Gini coefficient under the definition of income used in this study. The three regions or macro areas (North, Center and South) display similar *patterns* of income inequality, with a sharp increase in 1991 due to the currency and financial crisis that occurred at that time and a stable decline from 1995 onward.

Although the patterns of income dispersion within each area show very similar dynamics, the movement of income *composition* inequality highlights important differences across Italy. Figure 16 shows the evolution of the *IFC* series over the time period considered. Interestingly, the level of income composition inequality is lower in the South than in the Center and the North throughout the period considered. However, its decreasing trends for all areas reflect the national trend. The entire Italian economy is hence moving towards a new type of capitalism characterized by multiple sources of income for an increasing number of individuals.

How can this evidence be interpreted? The series portray a dichotomous Italy with higher *concentrations* of income sources in the North and Center. Borrowing again the definitions from Milanovic (2017) as in Section 3, the evidence in this section indicates that Italy is divided into a *Northern Classical Capitalism* and a *Southern New Capitalism*. This suggests that the effect of changes in the capital share of income on personal inequality would be stronger in the former than in the latter areas.

In conclusion, a result that can be relevant for future research, although it lies outside the scope of this paper, is as follows: *low* levels of income composition inequality are associated

¹³These data refer to 2016 and can be found at the official ISTAT webpage (www.istat.it).

with *high* levels of the unemployment rate, as illustrated in Figure 19. The causality behind this association must be more properly investigated in future research.

D A simple model

This appendix develops a partial-equilibrium model whose rationale is simply to provide a more thorough explanation of Proposition 5.1. Specifically, we show that under incomplete information regarding changes in the functional income distribution and the level of income composition inequality, an inequality-averse social planner can choose a suboptimal vector of taxes to reduce income inequality in the society.

For the sake of simplicity, consider an economy composed of 2 agents, A and B, with total incomes Y_A and Y_B , respectively. The total income in the economy is the sum of the capital and labor income, $Y = \Pi + W$. The two agents may hold shares of each income source as follows:

$$Y_A = \alpha_A \Pi + \beta_A W,$$

$$Y_B = \alpha_B \Pi + \beta_B W.$$

where $\alpha_A, \alpha_B, \beta_A$ and β_B are the relative shares of capital and labor of each agent, respectively. The utility function of agent $i = A, B$ is given by:

$$U_i(Y) = \log(Y_i). \quad (7)$$

Assume that the social planner of this society is inequality-averse á la Rawls; hence, she maximizes the following social welfare function (SWF):

$$\max_{\{Y_A, Y_B\}} SWF = \max \min\{Y_A, Y_B\}. \quad (8)$$

A baseline and an alternative scenario will be analyzed below.

D.1 Baseline Scenario

In this baseline scenario, we assume the following: $0 < Gini < 1$; $\Delta \Pi = 0$; $Y_A > Y_B$; $\alpha_A = 1$, $\alpha_B = 0$, $\beta_A = 0$, and $\beta_B = 1$; hence, $Y_A = \Pi > Y_B = W$. Income composition inequality is therefore maximal, and no changes in the factor shares will occur between $t = 1$ and $t = 2$.

Suppose that at $t = 1$, the Rawlsian social planner seeks to reduce the positive level of income inequality, although she is unaware of the high degree of income composition inequality in the society.

Therefore, to reduce income inequality, the Rawlsian social planner finds it optimal to transfer income between agents. This can be formalized by the following maximization problem:

$$\max_{\{Y_A, Y_B\}} SWF = \max \min\{Y_A, Y_B\}, \quad (9)$$

subject to the constraint given by the following balanced government budget:

$$t_\pi \Pi + t_w W = \Omega, \quad (10)$$

where Ω represents the value of the redistributive transfer.

This maximization problem ends only when full equality of incomes between agents is achieved. Hence, the SWF is maximal when:

$$Y_A(t_\pi, t_w) = Y_B(t_\pi, t_w). \quad (11)$$

By solving the maximization problem, we find the following result

$$\Pi(1 - t_\pi) = W(1 - t_w). \quad (12)$$

The optimal vector of taxes $\mathbf{t}^*(t_\pi, t_w)$ that solves this problem is not unique. For simplicity, we assume that the Rawlsian social planner intends to redistribute income solely by moving it from the rich to the poor. Hence, by substituting $t_w = 0$, we find that $\mathbf{t}^*(t_\pi, t_w) = [\frac{\Pi - W}{\Pi}; 0]$.

At time $t = 2$, the optimal vector of taxes \mathbf{t}^* reduces income inequality, as measured by the Gini coefficient, to 0. In other words, in the baseline scenario with unchanged factor shares of income, knowledge of the degree of income composition inequality was irrelevant for the social planner.

D.2 Alternative scenario

In this alternative scenario, we further assume that $\Delta\Pi > 0$, and $\Delta W < 0$. Hence, changes in the factor shares will occur between $t = 1$ and $t = 2$, and income composition inequality is still maximal.

At time $t = 1$, since the Rawlsian social planner is unaware of the role played by the degree of income composition inequality, she adopts the same redistribution policy described in the baseline scenario, given by the optimal vector of taxes $\mathbf{t}^*(t_\pi, t_w) = [\frac{\Pi-W}{\Pi}; 0]$ and the corresponding transfer Ω^* .¹⁴

At this point, the positive degree of income composition inequality implies that the change in the factor income shares has a substantial effect on income inequality, invalidating the optimality of the specific redistribution policy derived in the baseline scenario.

Indeed, at $t = 2$, equality of incomes between agents would be ensured by $\mathbf{t}^{**}(t_\pi, t_w) = [\frac{\Pi'-W'}{\Pi'}; 0] \neq [\frac{\Pi-W}{\Pi}; 0] = \mathbf{t}^*(t_\pi, t_w)$ since $\frac{\Pi'-W'}{\Pi'} > \frac{\Pi-W}{\Pi}$. This result invalidates the optimality of the redistribution policy of the baseline scenario. In other words, having knowledge of the degree of income composition inequality in the society has proved to be crucial in determining equality in incomes in the society.

¹⁴Note that after the redistribution policy adopted by the social planner, the level of income composition inequality has decreased given that the poor agent has received some capital income. However, the level of income composition inequality remains positive.

E Figures

Legend:

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Capital Share

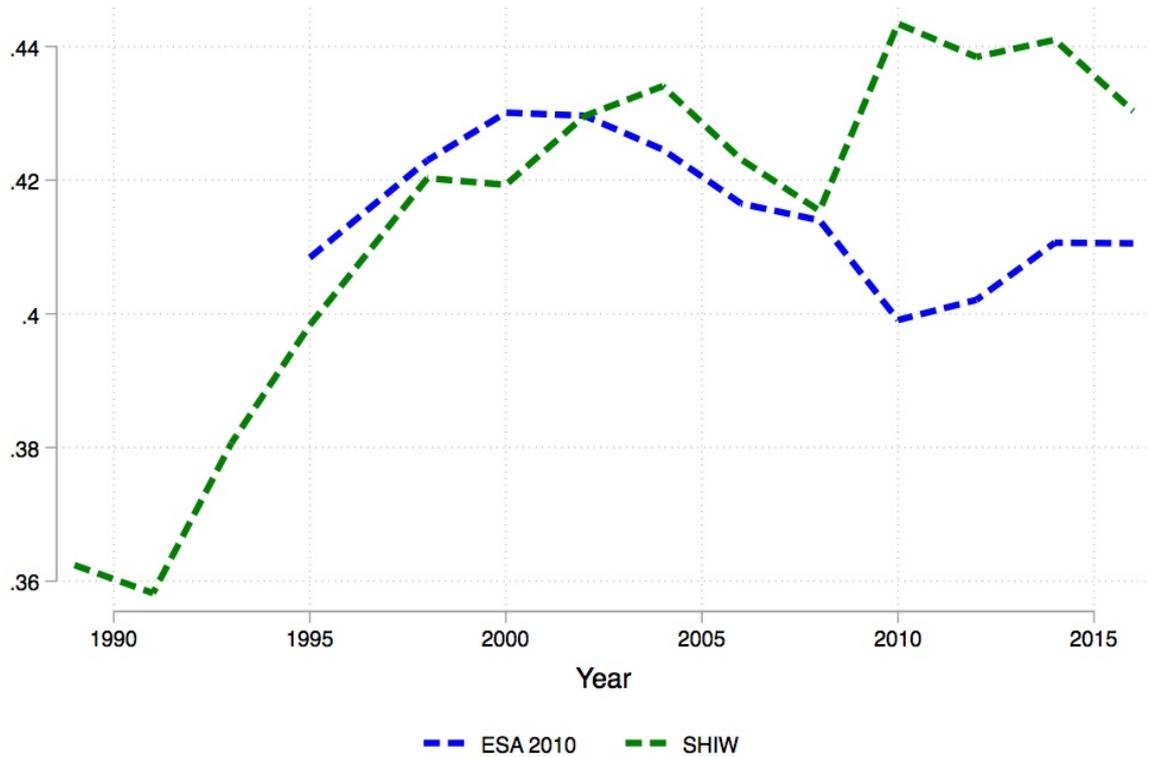


Figure 1: Two series of the capital income share in Italy are presented here. The first series (ESA 2010), which runs from 1995 to 2016, is constructed from the ESA 2010 National Accounts and is calculated as the difference between value added at factor prices minus employee compensation. To account for self-employed workers, we assume that they earn the same as waged employees in all sectors. The second (SHIW 2) series (dotted green line), which covers the period between 1989 and 2016, is built from the Survey of Household Income and Wealth (SHIW) prepared by the Bank of Italy. Total income is the sum of payroll income and net self-employment income. Capital income equals property income plus the capital component of net self-employment income. The latter is imputed following Glyn (2011).

Concentration Curves - Italy 1989

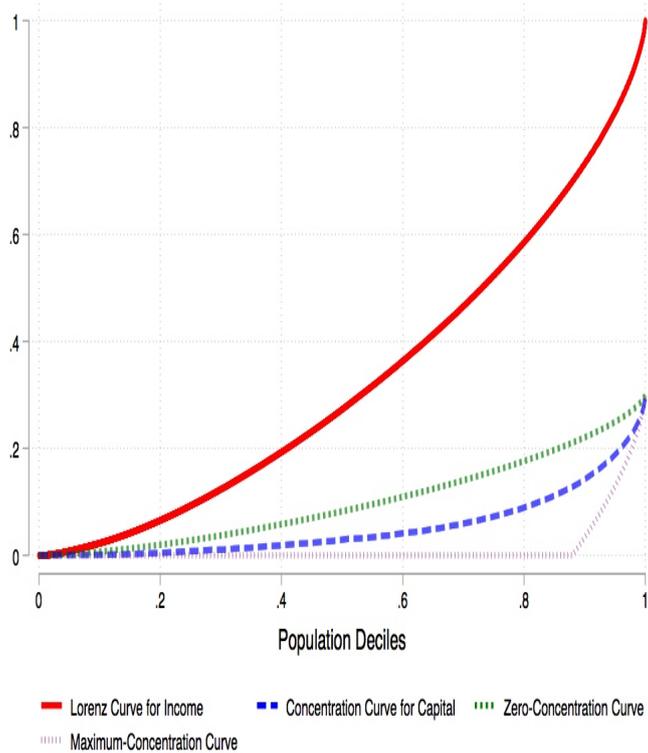


Figure 2: The concentration curve for capital (blue line), the zero-concentration curve (green line), the Lorenz curve for income (red line) and the maximum-concentration curve (purple line) for Italy in 1989 are presented using data from the 1989 *Survey on Household Income and Wealth* (SHIW) carried out by the Bank of Italy. Capital income is defined as the sum of property income and the capital component of net self-employment income. Labor income is defined as the sum of payroll income, pensions, net transfers and the labor component of mixed income. Both the capital and labor components of self-employment income are imputed following Glyn (2011).

Concentration Curves - Italy 1989

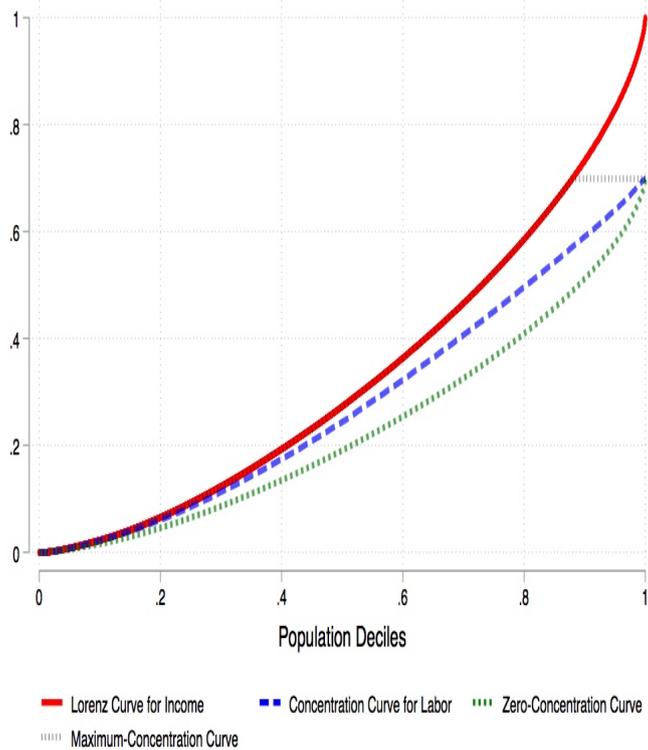


Figure 3: The concentration curve for labor (blue line), the zero-concentration curve (green line), the Lorenz curve for income (red line) and the maximum-concentration curve (purple line) for Italy in 1989 are presented using data from the 1989 *Survey on Household Income and Wealth* (SHIW) carried out by the Bank of Italy. Capital income is defined as the sum of property income and the capital component of net self-employment income. Labor income is defined as the sum of payroll income, pensions, net transfers and the labor component of mixed income. Both the capital and labor components of self-employment income are imputed following Glyn (2011).

Income Composition Inequality

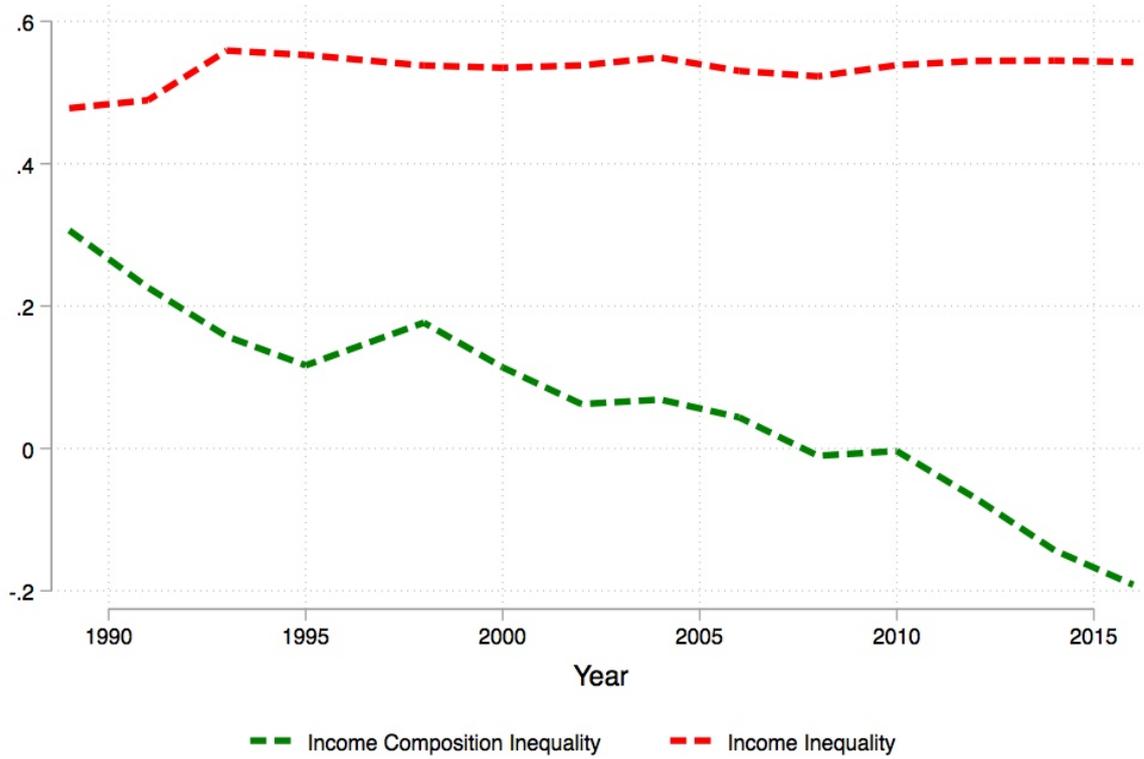


Figure 4: Series of the income factor concentration index and the Gini coefficient constructed using the SHIW data.

Area of the Concentration Curve for Capital

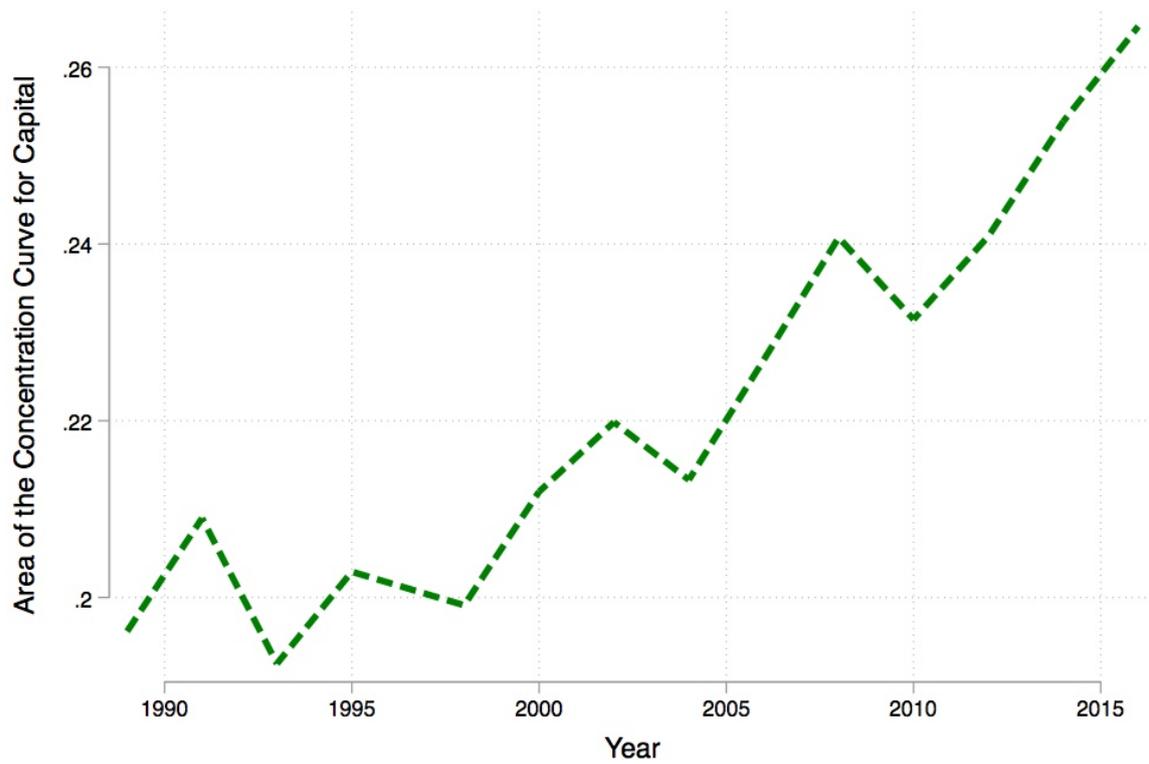


Figure 5: Series of the area of the concentration curve for capital constructed using the SHIW data.

Area of the Concentration Curve for Labor

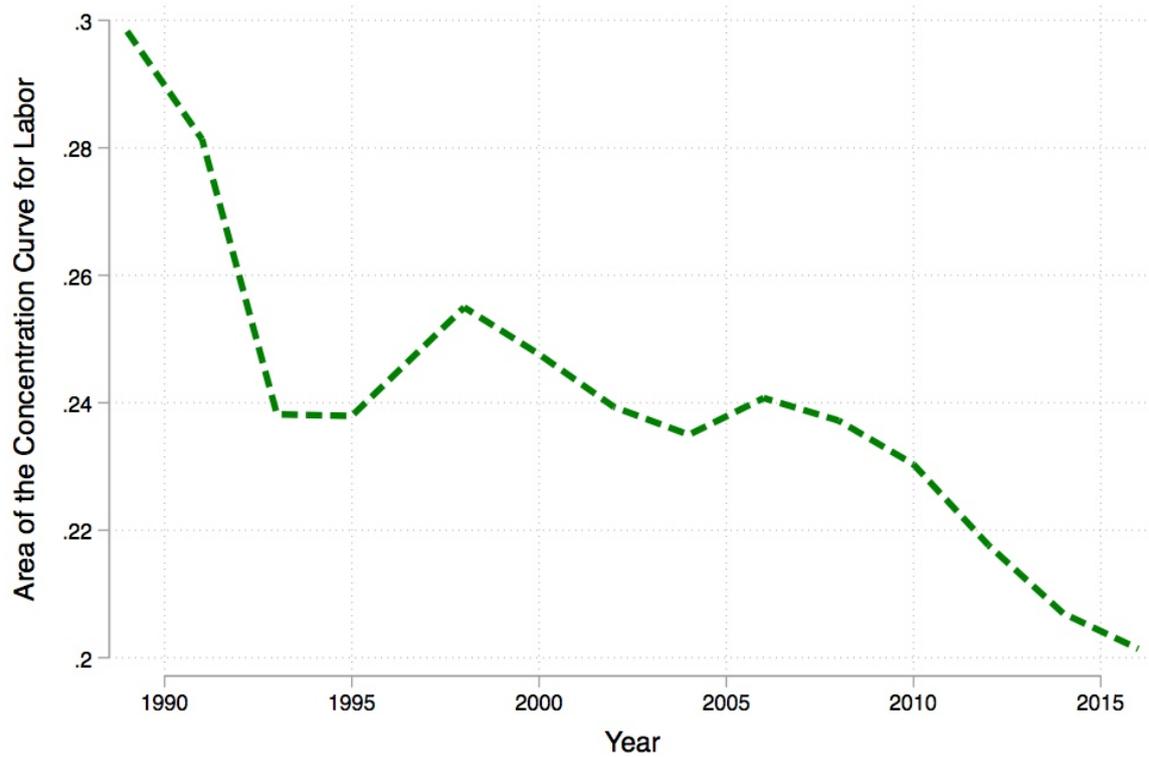


Figure 6: Series of the area of the concentration curve for labor constructed using the SHIW data.

Area of the Concentration Curve for Capital - Decomposition by Type of Capital

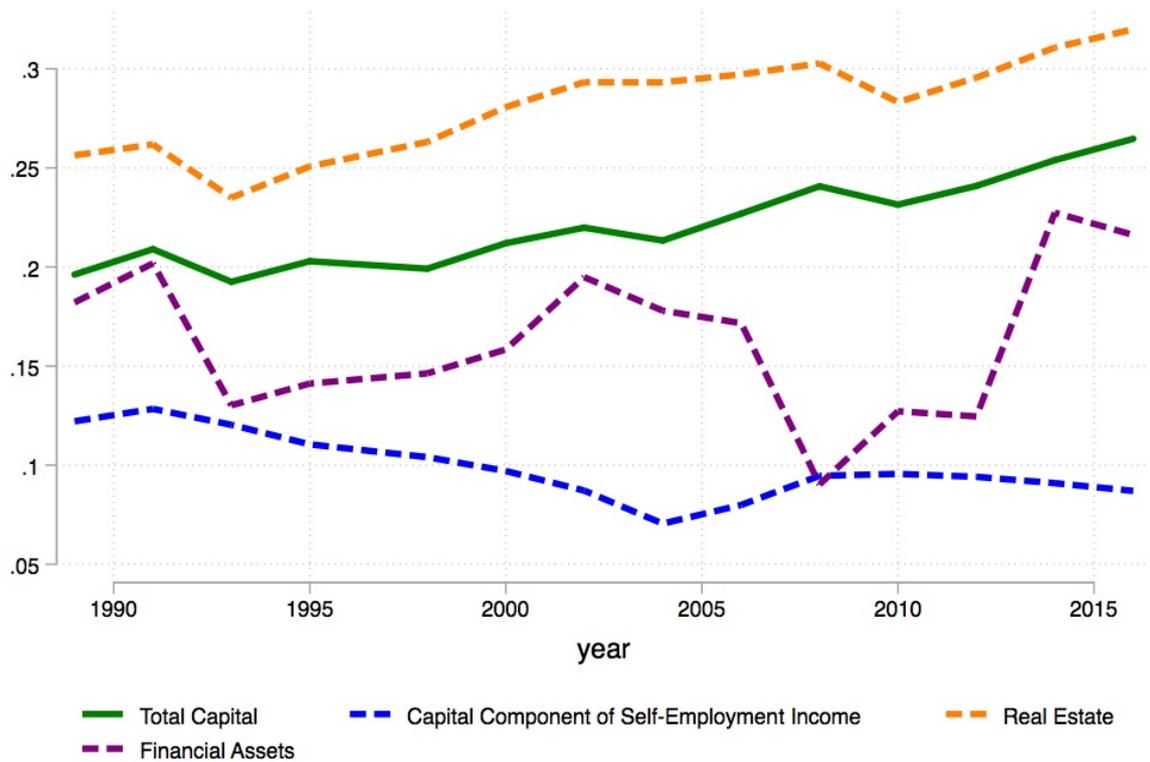


Figure 7: Series of the area of the concentration curve for capital (green line) and the areas of the concentration curves for the capital component of self-employment income (blue line), real estate (orange line) and financial assets (purple line) constructed using the SHIW data.

Area of the Concentration Curve for Labor - Decomposition by Type of Labor

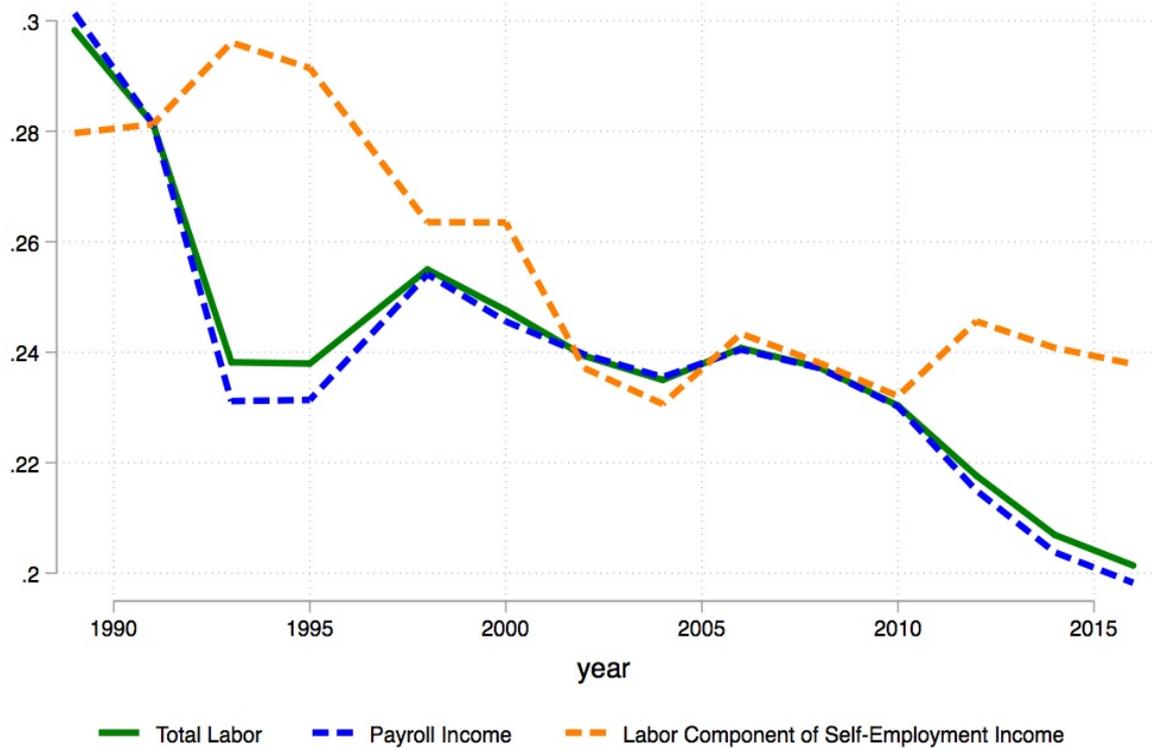


Figure 8: Series of the area of the concentration curve for labor (green line) and the areas of the concentration curves for payroll income (blue line) and the labor component of self-employment income (orange line) constructed using the SHIW data.

Getting Redistribution Right

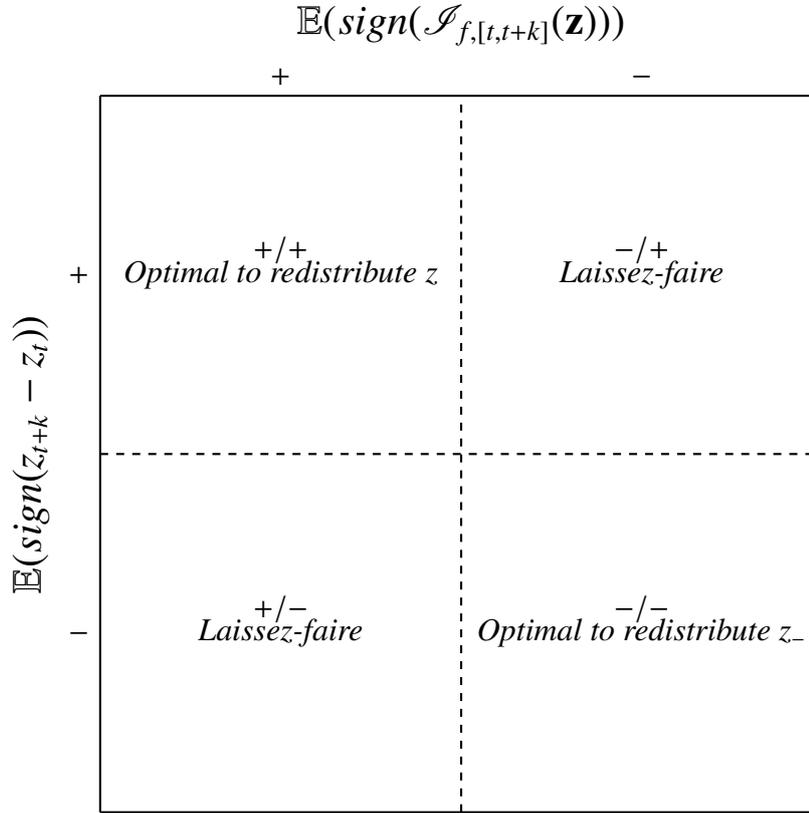


Figure 9: This figure shows the four scenarios behind Proposition 5.1 in Section 5. **Scenario 1:** As long as the level of income composition inequality (top of the table) is expected to be positive (e.g., capital income is concentrated primarily at the top of the distribution, and labor income is concentrated at the bottom) and the *capital* income share (on the left of the table) is expected to rise, it is preferable to redistribute income in the form of *capital* (e.g., housing or financial assets) so that the expected increase in the capital income share will not have a strong impact on income inequality. **Scenario 2:** This scenario depicts the opposite case. For a negative level of income composition inequality (e.g., capital income mostly accruing at the bottom of the distribution, and labor income accruing at the top), an expected increase in the *labor* share in the upcoming years will indicate that *labor* income has to be redistributed to reduce inequality in the longer run. **Scenarios 3 and 4:** For the sake of completeness, we consider two other scenarios that might arise. When the two signs in the above proposition differ, the expected change in the income source z is already acting in favor of the redistribution of income in the long run.

Income Composition Inequality

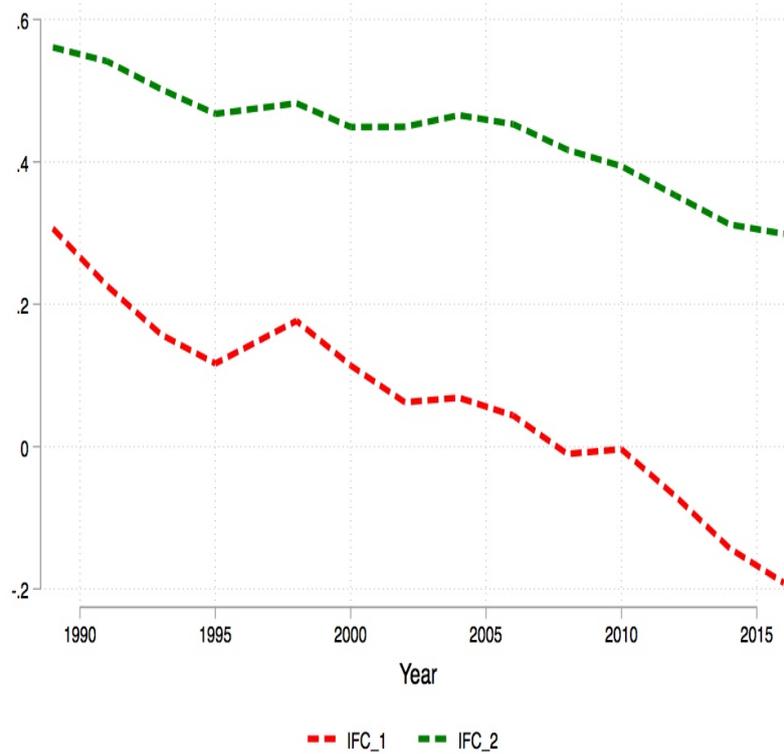


Figure 10: The series IFC_1 considers capital income to be the sum of the capital component of self-employment income (Y_{sr}) and property income (Y_{pr}), and it considers labor income to be the sum of payroll income (Y_{pa}) and the labor component of self-employment income (Y_{sw}). In contrast, the series IFC_2 includes pensions and transfers in the definition of labor income, leaving the definition of capital income unchanged.

Income Composition Inequality

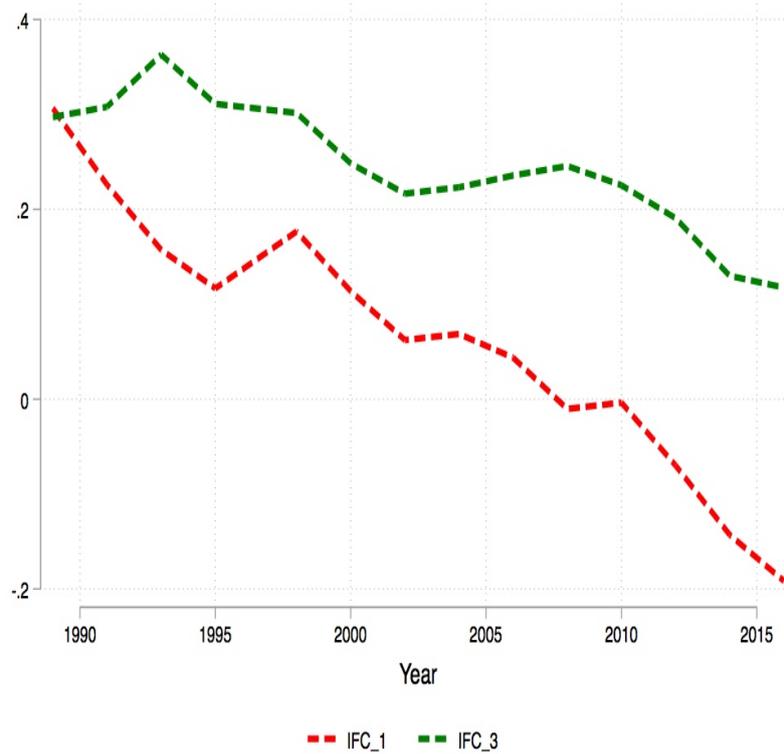


Figure 11: The series IFC_1 considers capital income to be the sum of the capital component of self-employment income (Y_{sr}) and property income (Y_{pr}), and it considers labor income to be the sum of payroll income (Y_{pa}) and the labor component of self-employment income (Y_{sw}). In contrast, the series IFC_3 includes pensions and transfers in the definition of labor income, and it excludes both the capital and labor components of self-employment income.

Income Composition Inequality

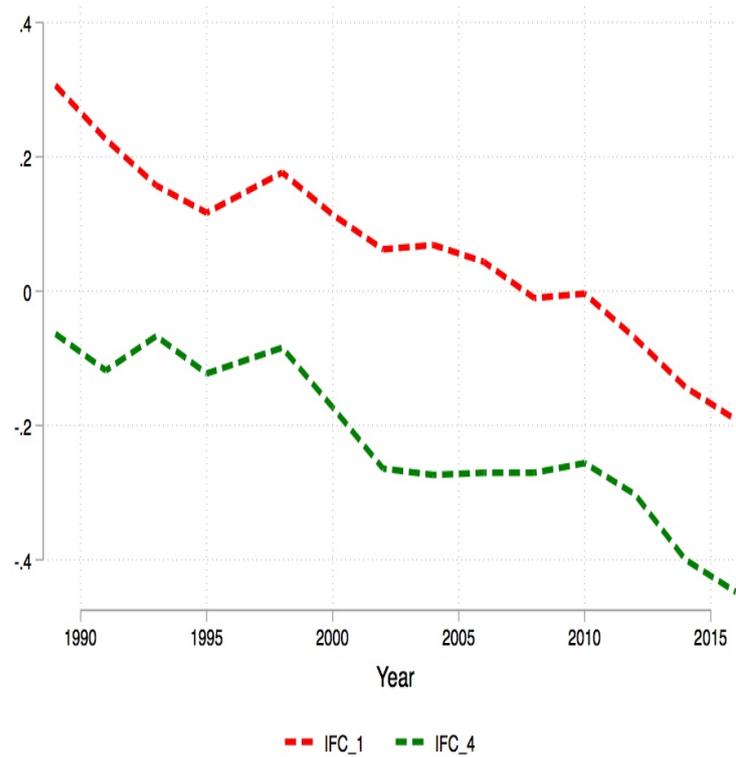


Figure 12: The series IFC_1 considers capital income to be the sum of the capital component of self-employment income (Y_{sr}) and property income (Y_{pr}), and it considers labor income to be the sum of payroll income (Y_{pa}) and the labor component of self-employment income (Y_{sw}). In contrast, the series IFC_4 excludes both the capital and labor components of self-employment income.

Capital Share (alternative)

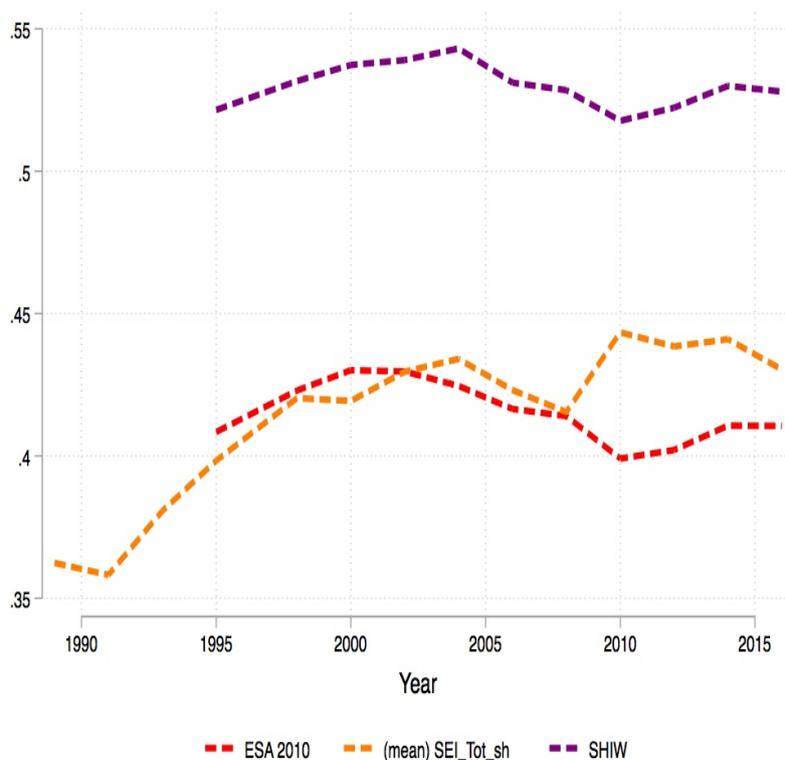


Figure 13: Three series of the capital income share in Italy are presented. The first series (ESA 2010), which runs from 1995 to 2016, is constructed from the ESA 2010 National Accounts and is calculated as the difference between value added at factor prices minus employee compensation. To account for self-employed workers, we assume that they earn the same as waged employees in all sectors. The second (SHIW 2) series, which covers the period between 1989 and 2016, is built from the Survey of Household Income and Wealth (SHIW) prepared by the Bank of Italy. Total income is the sum of payroll income, net self-employment income and property income. Capital income is equal to property income plus the capital component of net self-employment income. The latter is imputed following Glyn (2011). The third series is built by combining information about the capital and labor components of self-employment income and the national accounts.

Adjusted Series of Income Composition Inequality

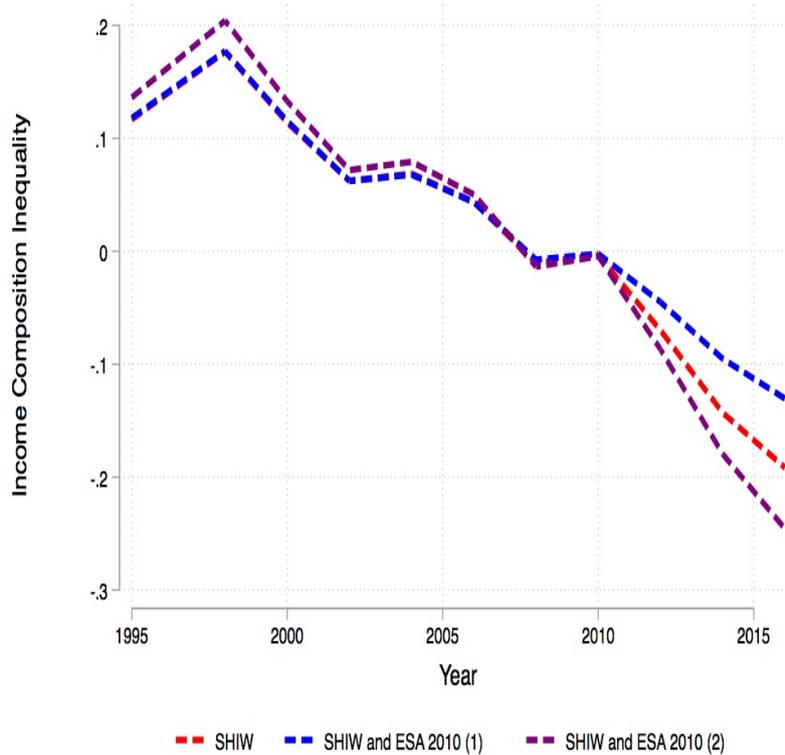


Figure 14: The series of income composition inequality constructed using data from SHIW (red line) is compared with (i) the series of income composition inequality when the survey capital and labor shares are replaced by those from ESA 2010 (blue line) and with (ii) the series of income composition inequality when the survey capital and labor shares are replaced by those from the adjusted ESA 2010 (purple line). The adjusted ESA 2010 series is obtained by combining information about the capital and labor components of self-employment income from SHIW with information from the national accounts. The definition of income considered here is Y_2 (i.e., individuals are ranked according to Y_2).

Income Inequality by Region

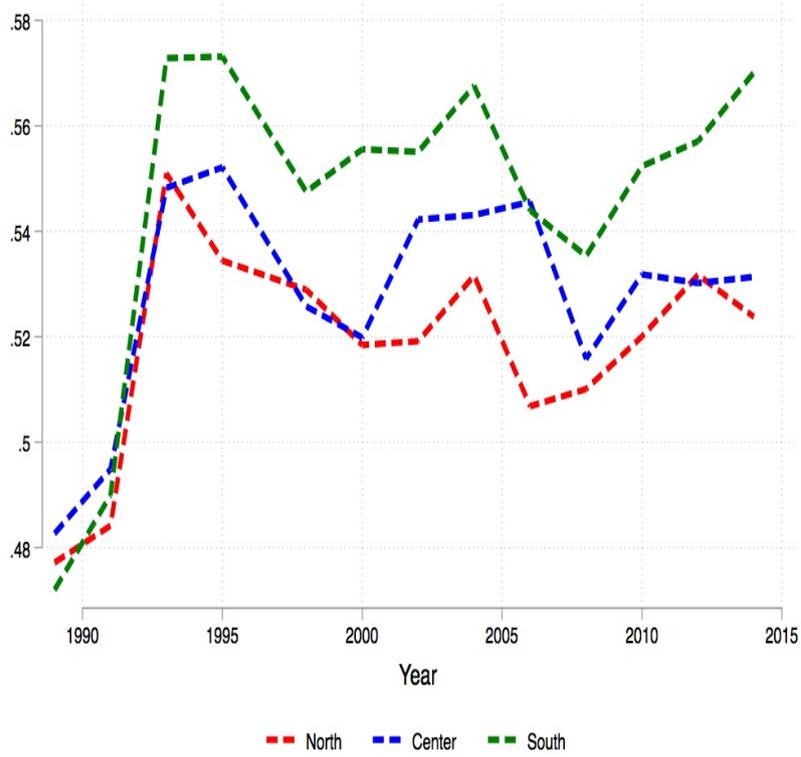


Figure 15: Series of the net income Gini coefficients for northern, central and southern Italy, 1989-2016, constructed using data from SHIW. The definition of income considered here is Y_2 .

Income Composition Inequality by Region

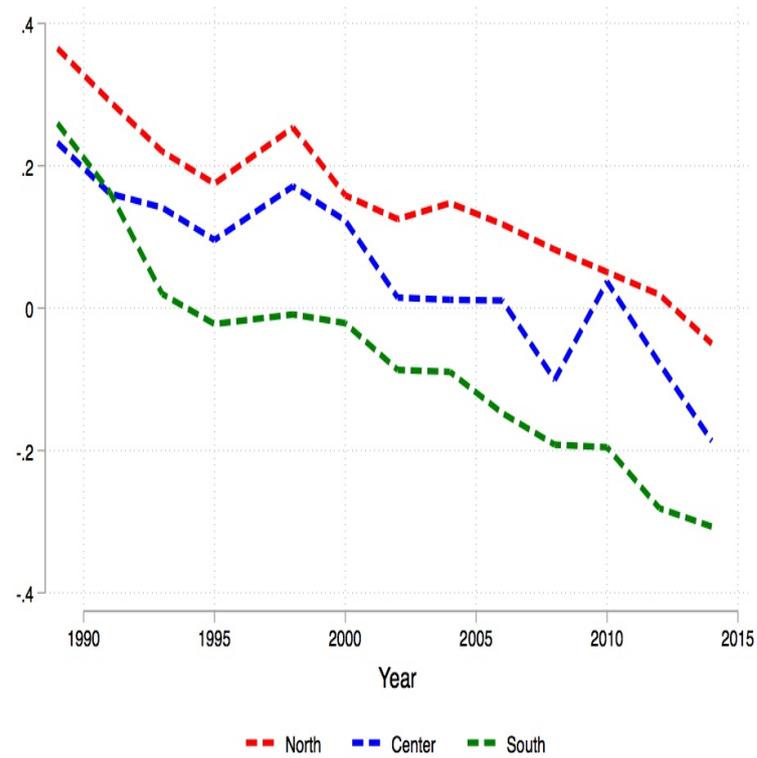


Figure 16: Series of the income factor concentration indexes for northern, central and southern Italy, 1989-2016, constructed using data from SHIW. The definition of income considered here is Y_2 (i.e., individuals are ranked according to Y_2).

Areas of the Concentration Curve for Capital by Region

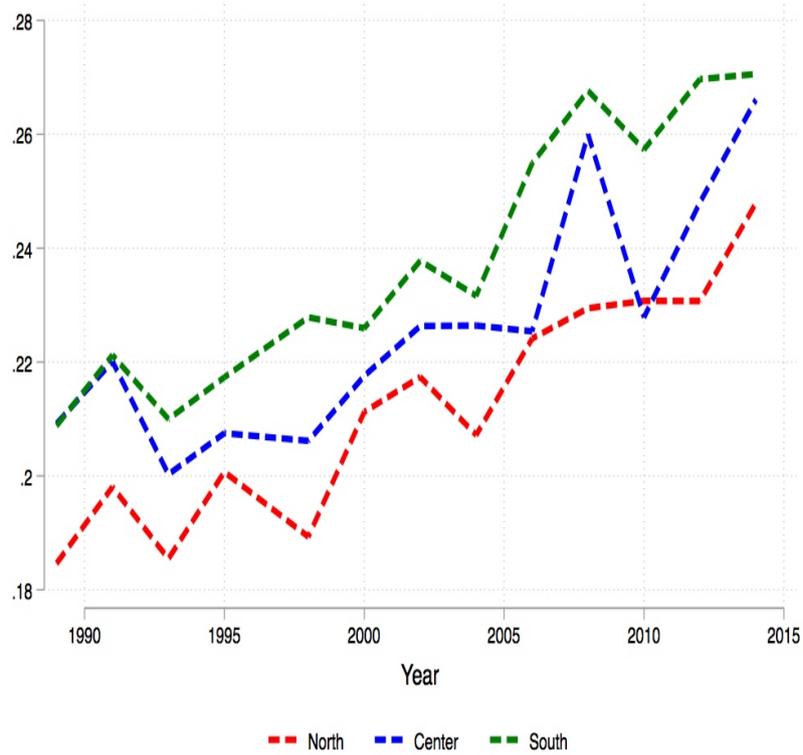


Figure 17: Series of the areas of the concentration curve for capital for northern, central and southern Italy, 1989-2016, constructed using data from SHIW. The definition of income considered here is Y_2 (i.e., individuals are ranked according to Y_2).

Areas of the Concentration Curve for Labor by Region

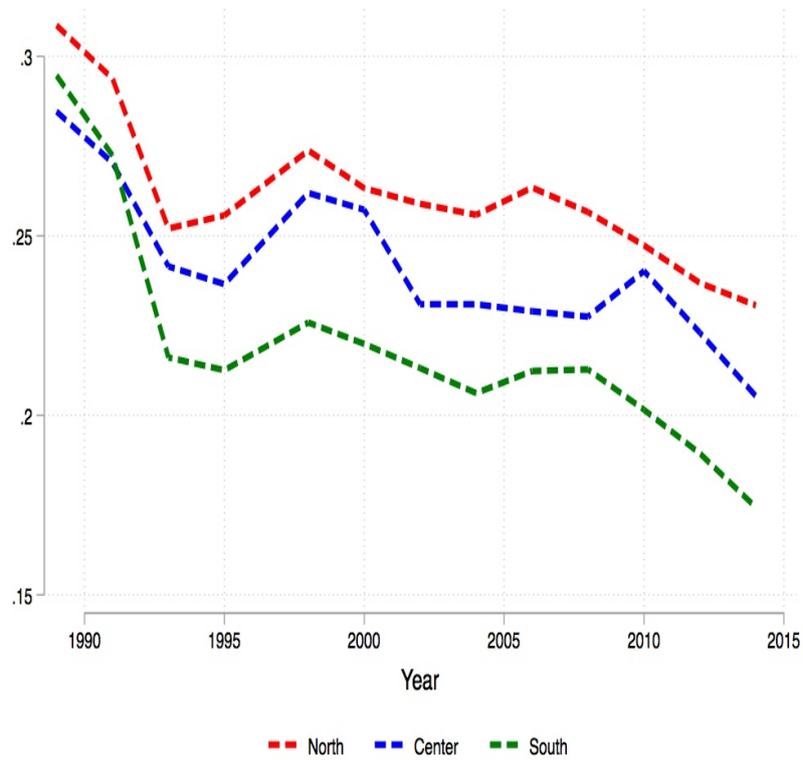


Figure 18: Series of the areas of the concentration curve for labor for northern, central and southern Italy, 1989-2016, constructed using data from SHIW. The definition of income considered here is Y_2 (i.e., individuals are ranked according to Y_2).

IFC and Unemployment Rate by Region

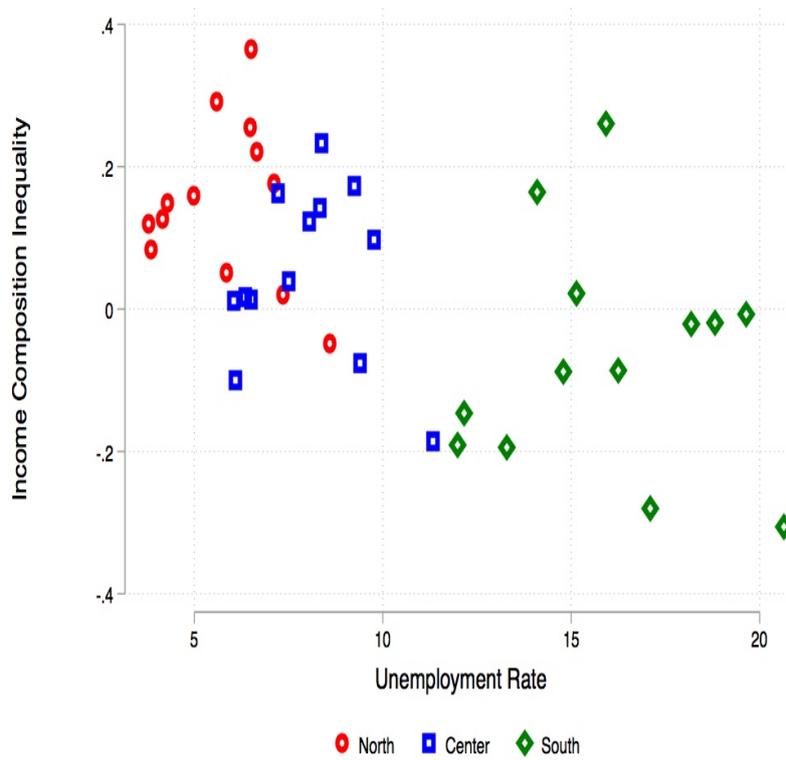


Figure 19: Scatter plot of the income factor concentration index and unemployment rate for northern, central and southern Italy. The definition of income considered here is Y_2 .