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Income inequality, top shares of income and social classes in the 21st century

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This paper aims at providing new evidence about the link between personal and functional distribution and top-shares composition. We apply a novel class scheme based on two key features of contemporary capitalism i.e., individuals/households receiving multiple types of incomes, and the role of managers. The empirical application in Germany, Spain, and Italy over the period 2000-2017 reveals two main results. First, we observe a direct link between personal and functional distributions. In particular, a marginal increase in wages received by labourers would reduce inequality, whereas those received by capitalist households would increasing it. Second, we find that a significant portion of labour income at the top of the income distribution corresponds to wages received by capitalist households. We conclude that although the linear correspondence between income source and class location is more blurred today than it was 200 years ago, a class divide is still clear.

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JEL Codes: E250

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1 Introduction

Functional distribution of income i.e., how the national income is distributed in wages, profits and rents, is at the core of the contribution of classical economists. Notoriously, David Ricardo considered that determining 'the laws which regulate this distribution [between landowners, capitalists and labourers] is the principal problem in Political Economy' (Ricardo, 1817/1951, p. 5).

The interest in class-based analysis and functional income distribution declined with the ascent of neoclassical economic thought. According to neoclassical economics, each production factor is compensated based on its marginal productivity. As a consequence, economic research and theory should focus on production and consumption theories rather than distributional issues. Additionally, if every production factor receives remuneration according to its marginal productivity, there is no direct correlation between personal distribution and factor share, and social conflict is absent from this framework because everyone receives the perfect remuneration for their work.¹

However, the economic literature witnessed a renewed interest in distributional theories as economic inequality began to rise in the 1980s. In this context, 'factor shares are...making a comeback' (Atkinson, 2009, p. 4) as testified by the abundant research on the topic. In this vein, Glyn (2009) argues that studying the evolution of functional distribution is necessary to fully comprehend the dynamics of contemporary capitalism and advocates for new research to link functional and personal distributions. One of the most significant works in this direction is Piketty's "Capital in the XXI century" (2014). This is among the first contributions to analyse the evolution of top-income shares and capital shares in the very long run in developed countries. A central point raised by Piketty is that if the interest rate (or capital return) r is greater than the economic growth rate g, then the capital share of income tends to increase over time and, in turn, the capital income ratio. In other words, there is a historical positive association between personal and functional distribution of income.

However, Milanovic (2017) argues that such condition (r>g) is not sufficient to have a positive relationship between personal and functional distribution of income. For this to happen, the requirements are that (1) the capital share of income is more unequally distributed (with respect

¹ If the sum of marginal productivity remunerations equals the value of the total output.

to labour income) and (2) that there is a high-rank correlation between capital and total income. This implies that those at the top of the total income distribution should also be rich in terms of capital income.

Milanovic (2017) also argues that such transmission from factorial to personal distributions is more blurred today than it was in the era of "classical capitalism" when (richer) capitalists receive exclusively capital income and (poorer) labourers exclusively wage income. This is because contemporary capitalism is characterised by a lower degree of income composition inequality compared to classical capitalism (Ranaldi, 2022; Ranaldi and Milanovic, 2022). This narrative goes in hand with the increasing presence of wages at the top of the distribution of income (Aaberge et al., 2018; Atkinson et al., 2011; Atkinson and Lakner, 2021; Berman and Milanovic, 2020; Piketty and Saez, 2007, 2013). Because of such factors, connecting functional distribution to personal income distribution is more challenging in the present day than it was during the era of classical economy (Atkinson, 2009). Hence, two interconnected phenomena emerge. First, the relationship between functional and personal income distribution and, second, the growing presence of wages at the top of the distribution of income.

However, the renewed interest in functional income distribution is, in most cases, not accompanied by a reflection on the underlying class composition. Nearly the totality of contributions estimates the labour/capital share of income assuming (explicitly or implicitly) the conventional class scheme. From this perspective, there is a clear correspondence between sources of income, class location and class interests. The labour (capital) share reflects the income received by labourers (capitalists) which is uniquely composed of wages (profits and rents).

This view is in contrast with at least two aspects of contemporary capitalism. The first one is that it is increasingly common to earn multiple sources of income, which underpins the conventional idea of functional income distribution as a measure of the income received by labourers (Atkinson and Bourguignon, 2000).

The second aspect links to the role played by managers. Different authors note that the increasing presence of wages at the top of the distribution of incomes distribution is most likely due to the increasing compensations of "super-managers", CEOs, and high professionals in large corporations (Atkinson et al., 2011; Piketty and Saez, 2007). At the same time, another large and diverse group of scholars (Friedman 1970; Krueger 1999; Mohun 2006; Glyn 2009; Sotiropoulos et al. 2013; Milios 2018, among others) argues that managers' functions (and

interests) are more aligned with those of capitalists and therefore should not be included among the labour class, even though managers are mostly wage-earners. Therefore, part of the mounting presence of labour income at the top of the distribution income is received by a group of workers (i.e. managers) that, despite receiving wages, deploy capitalist functions. This aspect links to the composition of capitalists in contemporary society which, it is argued, are not comprised exclusively of profit earners and rentiers but also managers. It follows that the growth of labour income at the top of the distribution of income may hide the fact that those that are improving their income position are not labourers, but people in line with capitalist interests, i.e. managers.

Drawing from these insights, this paper addresses the relationship between functional and personal income distribution and the analysis of the wages among top earners proposing a new estimation of the *labourers* and *capitalists*' share of income. This estimation is based on an alternative definition of labourer and capitalist households which takes into consideration two key characteristics of contemporary capitalism, namely the fact that individuals/households often receive multiple sources of income (capital *and* labour income) and the fact that managers' interests are more aligned to capitalist households than labourers. This approach has the merit of considering important features of contemporary capitalism and, at the same time, preserving the foundational class dichotomy behind the construction of functional distribution analysis.

Other scholars have proposed new estimations of the labour share which are based on alternative class criteria (for more details, see Section 2 below). Nevertheless, to the best of our knowledge, this is the first time that the presence of multiple sources of income and the role of managers are addressed simultaneously in the same scheme. The resulting estimation of functional income distribution provides a fresh look at the relationship with personal distributions that can also be of help to better explain the composition of top income shares. From this picture, we can postulate two research objectives.

The first objective is to assess how the share of income received by labourer and capitalist households relates to more conventional contributions to the study of inequality. Specifically, we perform a decomposition of the Gini index (Lerman and Yitzhaki, 1985) to study what source of income, between wages, profits and financial income, contributes more to the level of personal inequality. We find that marginal increases in wages would reduce the overall level of inequality, while profits and property income (financial and rental income) augment it. More interestingly, not *any* type of wage would reduce inequality. Only wages received by labourers

would help to lower inequality, while those received by capitalists (i.e. managers in particular) would increase it. Additionally, - inspired by, for example, Daudey and Garcia-Peñalosa (2007) or Milanovic (2017)- we perform an unconditional quantile regression (Firpo et al., 2009, 2018) to study to what extent the revised measure of labour share links with the Gini index. We find that the labourers' share of income is negatively associated with the level of personal inequality, even under different specifications. Although these findings may appear as a logical consequence of capitalists being richer than labourers, they reveal that a (revised) class approach is still meaningful and contributes to explaining polarizing patterns between labour and capital.

The second objective of the paper is to study the composition of top incomes employing the alternative class definition defined in this paper. To tackle this research objective, we study to what extent the presence of wages increases at the top of the distribution of income and, more importantly, determine who (between labourers or capitalists) receives labour income at the top deciles of income. In line with the existing literature, we find that there is a significant presence of wages at the top of the distribution of income. Notably, however, this presence largely corresponds to wages received by managers, which in our approach are considered as part of the capitalist class, not as labourers. We complement this analysis by estimating the Income Factor Concentration (IFC) index developed by Iacono and Ranaldi (2021) and Ranaldi (2022) to study how the composition of labour and capital income changes across the income distribution. We compute the original version of the index and then adapt it to our class approach. The class based IFC index provides a much more polarised picture than the conventional measure. These findings contribute to the literature on income composition and top shares from an innovative angle. We conclude that it is true that a linear correspondence between income source and class location is more blurred today than it was in the wake of capitalism. Nevertheless, a class divide is still clear, at least in the countries analysed in our paper.

To perform the empirical analysis, we build a novel dataset which collects data on household finances in Germany (over the period 2000-2017), Spain (2002-2014) and Italy (2000-2016).

For Italy, we use the Survey on Households Income and Finance, in Spain the Household Income Survey while for Germany data come from the Socio-Economic Panel.²

The rest of the paper is organised as follows. The next section discusses the rationale for estimating alternative definitions of the labour share which is based on the alternative classification of labourers and capitalists. We show how our classification is rooted in a large body of literature and discuss similar studies that provide alternative definitions of the labour share of income. Section 3 describes the dataset while section 4 presents the results. Finally, section 5 concludes the paper by discussing the findings.

2 Labourers and capitalists: Rationale for a reclassification

In this section, we describe the criteria employed to propose the new class definition that is functional to build the labourer and capitalists' share of income. To this purpose, it is useful to recall the spirit behind the construction of conventional measures of functional income distribution. These estimations reflect the approach of classical political economists according to which there was a correspondence between class location (and class interests) and type of income. Workers would earn only wages, while capitalists obtain profits and rents.³ As Smith (1999: 356) puts it:

The whole annual produce of the land and labour of every country, [...] naturally divides itself [...] into three parts: the rent of land, the wages of labour, and the profits of stock; and constitutes a revenue to three different orders of people: to those who live by rent, to those who live by wages, and to those who live by profit.

The idea that each source of income would identify different social classes is also clear in Ricardo, who considered that 'the proportions of the whole produce of the earth which will be allotted to each of these classes, under the names of rents, profit, and wages' (Ricardo, 1951: 5). As it is well known, these classes have contrasting interests, and the growth of one's share of income would affect other classes' share.

² Other datasets collect similar information on a larger scale. One example is the Household Finance and Consumption Survey carried out by the European Central Bank since 2010. However, given the reduced time span we opted to use alternative sources to have access to a longer period of data. At the same time, the Luxemburg Income Survey data do not allow to clearly distinguish between profits and self-employment income.

³ For the sake of simplicity, we will use the term labour income and wages interchangeably.

This classification establishes a clear link between the type of income (wages or profits), class location and class interests. However, today things are less straightforward than they used to be in Smith's times. There are at least two aspects that we should consider in this respect and that motivate the elaboration of new labourer and capitalist classes and the corresponding functional income distribution: the diversification of the sources of income and the role of managers.

Nowadays many individuals and households have their income composed of multiple sources, such as labour and capital income. As Atkinson and Bourguignon (2000: 8) state, "rather than people being identified with a single source of income, they now receive income from a range of sources, so that one individual may receive wages, interest income and rent". This is certainly not a new phenomenon. Nevertheless, it can be argued that with the diffusion of financial instruments and the progressive financialization of the economy, during their lifetime households are exposed to a larger variety of sources of income (van der Zwan, 2014).

This scenario is coherent with what Milanovic (2017) labelled 'New Capitalism', in which individuals receive both capital and labour incomes – as opposed to 'Classical Capitalism' where there is a clear dichotomy between wage and capital earners. Hence, it becomes more difficult to distinguish exclusively between 'those who live by wages' and 'those who live by profit' as in the traditional formulation of the functional income distribution. If a person can contribute to both the labour and the capital share, the standard functional income distribution cannot reflect the class individuals belong to.

To disentangle this tension, the main rationale employed in this paper to distinguish between a wage earner, a traditional capitalist or a rentier is by observing the *main* source of income. It is assumed that an individual or household will be more interested in their principal source of income, and this will determine their class location. For example, a salaried worker who also receives property or entrepreneurial income that is greater than their labour income will be more interested in preserving the property and entrepreneurial income rather than labour income. In this case, the worker will be considered part of the capitalist class as rentier. On the other hand, workers who receive an entrepreneurial or property income that is lower than their salary will be considered labourers. This may be the case of a salaried worker who also receives returns from financial assets that represent a relatively small portion of total income.

The second factor considered in this paper is not related to the type of income received, and it has to do with the role played by managers. Managers are a peculiar kind of workers since,

despite being largely wage earners, deploy functions and have interests that are very much aligned with those of traditional capitalists. This impinges on the traditional idea of having a linear correspondence between the type of income and interests within the capitalist mode of production. To deal with this tension we consider managers as part of the capitalist class.

We ground this approach drawing from well-established and diverse literature. Already in the 19th century, it was understood that the capitalist mode of production can create wage-earning positions that control the functioning of the business without owning the means of production. In Volume III of Capital, Marx highlighted that the rise of stock companies involved the 'transformation of the actual functioning capitalist into a mere manager, in charge of other people's capital, and of the capital owner into a mere owner, a mere money capitalist' (Marx, 1991, p. 567). The important point is that despite being largely wage earners, managers assume and promote the interests of traditional capitalists. Milios (2018, p. 100) states that 'certain functions belonging to the relation of possession of the means of production have been conferred [to managers]'. From this perspective, managers are the 'functioning capitalist' that constitute, together with the formal proprietors, the 'space of capital' (Sotiropoulos et al., 2013, pp. 51–52). With the evolution of businesses, the intensification of the division of labour and the sophistication of production processes fuelled the progressive separation between ownership and management and helped to consolidate a managerial class in charge of guaranteeing the functioning of the capitalist firm (Braverman, 1974).

Similar arguments are shared by authors from very different backgrounds from those mentioned in the previous paragraph. The idea that there is a fundamental alignment of interests between managers and capitalists has been eloquently proposed by Friedman (1970), who argued that 'the manager is the agent of the individuals who own the corporation ... and his primary responsibility is to them'. This implies that business owners commonly delegate important decisions about the enterprise to managers who act in their behalf. Analogously, Chandler (1984, p. 473) maintained that so-called 'managerial capitalism' is characterised by the fact that 'basic decisions concerning the production and distribution of goods and services were made by ... salaried managers who had little or no equity ownership in the enterprise they operated'. Hence, also from this perspective managers can be seen as delegates of business owners.

The alignment of interests between managers and traditional capitalists can be found also in the principal-agent literature. Proponents of this approach argue that it is common to have a situation of "moral hazard" (as per Arrow, 1963), where the principal (capitalist in our case, e.g., firm owner) aims to influence and guide the agent's actions (e.g., manager) such that these are aligned with the principal utility function. Indeed, the closer the interests of the principal and the agent, the lower the costs of moral hazard will be. Therefore, higher incomes – both in the forms of wages, financial flows and power - are incentives offered to the managers to exercise the capitalists' interests. In this line, Wright (1996) argues that authority i.e., the ability to "dominate" and exercise power over subordinates is an important dimension to defining class location. It follows that managers can be viewed as capitalists as they exercise power in line with capitalists' interests. The higher the power that this type of *salariat* can exercise, the closer it will be to capitalist interests.

This alignment has perhaps strengthened in recent decades with the rise of the maximisation of shareholder value as a new form of corporate governance (Lazonick and O'Sullivan, 2000). Financial markets represent a channel for disciplining managers and aligning their interests with those of shareholders. As stressed by Froud et al. (2000, p. 5), agency theorists believe that 'firms exist for the benefit of shareholders who own the firm and who should exercise control so that the interests of management are beneficially aligned with those of the owner shareholders around the pursuit of profit'. This has crucial implications for the functions and objectives pursued by managers. Analogously, Glyn (2009, p. 112) argues that 'many of those at the top of the pay distribution are more akin to entrepreneurs'.

Finally, among the major advocates for reconsidering the classification of managers and the consequent new estimations of the labour share we can mention Krueger (1999, p. 50), who claims that:

with the rise of employee stock ownership and pension funds, and the increase in compensation for top executives, labor and capital no longer divide so neatly into mutually exclusive categories. These considerations suggest that there would be value from improving the measurement of labor's share, and from devising alternative categories for functional shares. The increase in the number and variety of available wage sources in recent decades should facilitate this endeavor.

He concluded that "because corporate officers control the firm's capital and in many cases include the owners of the firm, one could argue that much of their compensation should be classified as capital income" (Krueger, 1999, p. 46).

Overall, this section has shown that different perspectives in the literature have reached similar conclusions regarding the role of managers in contemporary capitalism. This discussion is

relevant to measuring factor shares of income. In the standard estimations of factor shares, the wages of managers contribute to the labour share. However, it can be argued that some wage earners deploy functions that are comparable with those of traditional capitalists. In this respect, managers can be regarded as delegated by traditional capitalists to run the production process and preserve their interests. Like capitalists, managers appropriate part of the surplus of the company. Furthermore, they can hold part of the surplus precisely because they have control over their corporations. In that sense, their function is analogous to that of capitalists, with the difference that their source of power is managerial control instead of capital ownership. For these reasons, and in line with the above literature, it seems appropriate to consider managers as part of the capitalists.

So far, there are only few studies that proposed alternative definitions of labourers and capitalists and/or provided alternative estimations of the labour share. A contribution that is close to our approach is that of Mohun (2006, p. 362), who acknowledges that 'the separation of ownership and control made the functions of control the prerogative of an increasingly "professionalised" management. Companies are managed by employees in a hierarchical pyramidical structure, at the apex of which, "management" has to deliver a performance satisfactory to shareholder-owners'. Hence, Mohun provides a definition of capitalist that does not include only business owners. Rather, capitalists are those that hold capitalist interests. Even though Mohun does not consider explicitly the role played by multiple sources of income, his approach is coherent with the arguments presented in the previous section regarding the role of managers and their class position.

Other studies exclude the top 1% of wage earners from the computation of the labour share of income. Among these contributions, Glyn (2009) uses data from Piketty and Saez (2007), to estimate the American labour share by subtracting the top 1% of employment income. These estimations lead to a much sharper reduction in the labour share in recent decades than aggregate conventional calculations. Analogously, Duenhaupt (2011) applies this methodology to the German case, showing that there can also be significant changes in estimated factor shares in a country that has not been so heavily involved in the process of financialization. It is important to note that the assumption behind these works is that the class interests of top earners are more aligned with those of the capitalist class, rather than the working class. This observation is undoubtedly true and coherent with our approach. The top 1% usually comprises top managers whose interests, as discussed in the previous section, are more aligned with capital earners. However, this estimation has the limitation that it does not explicitly consider

the functions deployed at work. For example, it can be safely argued that there are managers who, despite being within the bottom 99% of income distribution, perform functions that are more aligned with those of the traditional capitalist class.

By using the criteria described in this section, it is possible to build a *revised* capitalist class and a *revised* labourer class, each one composed of subgroups. Table 1 summarises the main criteria employed to classify labourers and capitalists, and each subgroup within these categories. There are seven subgroups. Wage earners are represented by those units (individuals/households) who mostly live on labour income. Traditional capitalists collect those units that are business owners and whose main income is profits. Managers include managers and management cadres while rentiers are represented by those units whose main income is represented by rents.

In addition to these categories, special treatment is needed to classify self-employed workers. As widely acknowledged, the classification of self-employed income is an object of debate which has important implications for the estimations of the labour share (for a discussion, see Gollin, 2002; Glyn, 2009; OECD, 2015). We include among the capitalists those households whose main source of income is self-employment and who are within the top one-third in the distribution of self-employment income. Self-employed labourers include the remaining bottom 2/3 of households whose main source of income is self-employed factor shares (OECD, 2015).

Table 1. Class definition.

Labourers							
Wage earners	This group includes all units whose main income is represented by wages. Households in this group could also have other sources of income in addition to wages as long as they do not represent the main source of income.						
Self-employed (bottom 2/3)	Self-employed labourers include the bottom 2/3 of the distribution of income of those households whose main source of income is from self-employment. In this case, self-employed income includes only those activities that do not involve any employee.						
Capitalists							
Traditional capitalists	This category closely reflects the conventional idea of the capitalist. It comprises all units whose main source income is represented by profits, as defined above.						
Managers	This group includes managers and management cadres.						
Self-employed (top 1/3)	Self-employed capitalists comprise the top 1/3 of the distribution of income of those households whose main source of income is from self-employment.						
Rentiers	This category includes households whose property incomes (rents from properties plus financial income) represent their main source of income and have a total income above the average.						

3 Data

To address the research objectives, we assemble a harmonised dataset starting from three different sources of micro-data. We use the Survey on Household Income and Wealth (SHIW) in the case of Italy, which is a bi-annual panel running from 1976 to 2020, published by the Bank of Italy. Similarly, the Bank of Spain distributes the Survey of Household Finances (*Encuesta Financiera de las Familias*, EFF) every three years starting from 2002, with the last available data in 2017. Lastly, the Deutsche Institut für Wirtschaftsforschung (DIW) produces the Socio-Economic Panel (SOEP) from 1984 to 2020 (last available wave). To have a comparable period between the three countries we restrict the analysis from the beginning of the 2000s.⁴

⁴ For Spain we have observations for the years 2002, 2005, 2008, 2012 and 2014; 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016 in both Italy and Germany. In the case of Germany, robustness with wealth will be limited to the years 2002, 2007, 2012 and 2017, the only ones having wealth information.

These data sources provide information about the individuals within the household. For our analysis, we use the household as the main unit of analysis, so that all income definitions are defined at the household level i.e., the sum of all income sources within the household. The combined final dataset includes harmonised information about socio-demographic variables, labour market information, flows of income and stock of wealth at the household level.

Socio-demographic variables include information on gender, age and the highest level of education. To classify managers according to the proposed class scheme we require sufficient information on the occupational qualification of the respondent. Italy has the least detailed information in this respect, although it is possible to distinguish sufficiently between types of occupation and – most importantly – to identify managers. Spain provides the national occupational code at one digit (which is almost identical to the ISCO-88 one digit), while Germany provides the four-digit for both ISCO-88 and ISCO-08 codes. Despite these differences, it is possible to trace uniquely managerial occupations in all countries. To identify the main occupation, we refer to the household head as the reference unit of analysis.

Data on income include the amount of employee income, self-employed income, profits and property income (which is composed of rental and financial income) received by the household. Employee income refers to the wages and salaries of employees in annual terms. The distinction between self-employment income and profits (or entrepreneurial income) is less straightforward because the definition of self-employment income in the original datasets varies across countries. To homogenise data across sources, we restrict self-employed income to the income generated by those who are self-employed and have no employees while profits are represented by the income obtained by the self-employed and entrepreneurs with at least one employee. As will be discussed in more detail below, this classification leads to a reduction in the number of self-employed households compared to other types of estimations. Nevertheless, this classification allows us to have a consistent approach across countries and distinguish consistently between profits and self-employment income.⁵

⁵ Note that there are differences between countries refer to the role of taxation: Italy displays net values only while Spain reports only gross values. Germany is the only country where it is possible to compute both dimension as it reports data about gross incomes and taxes which can be employed to obtain net income values. Hence, the estimations below refer to net values, in the case of Italy, and gross values in the case of Spain and Germany.

Financial income refers to the annual interest and dividends on accounts, and from bonds/stocks and other financial activities. This source of income is homogenous across countries. This is also the case for rental income, which is harmonised in the three countries. For further details regarding the construction of the dataset and complete variables codebook, see Giangregorio and Villani (2023).

Once the dataset has been assembled, it is possible to move to the empirical analysis. The revised labourers' (capitalists') share of income is simply the share of total income received by these two classes. Total income is equal to:

$$Y = Y_l + Y_s + Y_e + Y_P 1$$

Where Y_l is the income from labour, Y_s is the self-employment income, Y_e represents profits, and Y_P is the income from properties, which includes income from rents and financial assets⁶.

Total income is split between the income received by capitalists (Y^K) and labourers (Y^L) .⁷ As detailed in the previous section, in our classification capitalists' and labourers' income can include all sources of equation **Error! Reference source not found.** although the proportions will vary considerably across each group. The capitalists' and labourers' shares of income⁸ can be consequently estimated as:

$$k = \frac{Y^K}{Y}$$
 2

$$l = \frac{Y^L}{Y}$$
 3

4 Results

In this section, we present the income distribution between capitalist and labourer households. In particular, we compute the standard labour share of income and (revised) labourers' share of income, i.e. the share of income received by labourers as defined in Section 2. Figure 1

⁶ As in other studies (e.g. Iacono and Ranaldi, 2021), we exclude pensions and other transfers from the analysis because our interest lies in defining how the income derived from the production process is distributed among those that actively contribute to creating it.

⁷ This implies that $Y^L = \sum Y_{li}^L + \sum Y_{ei}^L + \sum Y_{si}^L + \sum Y_{pi}^L$ and $Y^K = \sum Y_{li}^K + \sum Y_{ei}^K + \sum Y_{si}^K + \sum Y_{pi}^K$, for each household *i*. Analogously, we can estimate the income received by each subgroup detailed in Table 1.

⁸ In the remainder of the paper, we will also refer to these magnitudes as revised labourers and capitalists' shares.

shows the evolution of the revised labourers' share of income for the three countries over the selected period.



Figure 1. Standard labour share and (revised) labourers' share (%) of income.

Source: Authors' elaboration using SHIW, EFF and SOEP data.

The standard labour share of income obtained using our dataset is higher than the one that is normally reported in national accounts statistics that, for the selected countries, is between 58 and 64% of income during the period covered. This discrepancy is partly related to the fact that in our study we do not include imputed rents in the calculations, which would have lowered the standard labour share.⁹ Nevertheless, it should be noted that our estimation of the standard labour/capital share of income without imputed rents does not differ significantly from estimations performed with a similar methodology to ours (Iacono and Ranaldi, 2021).

It is interesting to observe that there are different trends among the three countries. The gap between the standard labour share and the labourers' share of income is especially pronounced (and widening) in Spain, whereas it is more contained (and decreasing) in Germany. In this country, the (revised) labourers' share of income shows an upward trend, while in Spain it decreases by almost ten points during the period. In Italy, the distance between the two lines is

⁹ In a previous study for Italy (Fana and Villani, 2022), it was possible to include imputed rents in the estimations, and, in fact, the resulting labour share is lower, while the labourers' share of income is not majorly affected.

rather steady and so is the labourers' share of income, which shows only a mildly inverted "U" shape during the period. Once we have estimated the revised labourers and capitalists' share of income it is possible to address the two research objectives.

4.1 Revisited factor shares and personal income distributions

This section addresses the first research objective which is to link the class analysis proposed above with the study of income inequality. To start with, we estimated the Gini index in the three countries (Table 2).

	Germany	Spain	Italy
2000	0.391	•	0.369
2002	0.417	0.350	0.377
2004	0.435		0.355
2005		0.363	
2006	0.437		0.344
2008	0.448	0.373	0.342
2010	0.429		0.343
2011		0.405	
2012	0.434		0.361
2014	0.446	0.426	0.350
2016	0.448		0.351
Note: Gini	is computed	on the gross	market income for

Table 2. Gini index. Source: Authors' elaboration using SHIW, EFF and SOEP data.

Note: Gini is computed on the gross market income for Spain and Germany, while it is the net market income in the case of Italy.

The first step to link total income inequality with the revised shares of income is to establish how the growth of each source of income would contribute to the level of personal inequality. To do so, we decompose the Gini index by sources of income using the Lerman and Yitzhaki (1985) methodology (based on the work of Shorrocks 1982). This methodology makes it possible to estimate the marginal contributions of each source of income to total inequality and has been largely employed in the literature (e.g. Milanovic & Yitzhaki 2002; Amarante 2016; Nolan et al. 2021). The contribution of each source of income to total inequality can be considered as the elasticities of the Gini coefficient as a result of a marginal change in a given income source (holding everything else constant). Analytically, total income inequality measured by the Gini coefficient can be decomposed as:

$$G = \sum_{k=1}^{K} S_k G_k R_k$$

Equation 4 implies that the total Gini coefficient is equal to the sum of the product of three elements for each income component *k*:

- 1. S_k is the share of the income source k on the total income.
- 2. G_k is the Gini index for the specific k^{th} source of income.
- 3. R_k is the (rank) correlation between the k^{th} income source and the total income. A positive (negative) value means that factor k is positively (negatively) correlated with total income.

Therefore, if an income source is unequally distributed (high G_k) and negatively correlated ($R_k < 0$) with total income, its increase might reduce income inequality. Conversely, if the k^{th} source is unequally distributed and significantly and positively correlated with total income, then its increase might contribute to deepening income inequality¹⁰.

As anticipated, an important aspect of the Lerman and Yitzhaki (1985) approach is that it makes it possible to estimate the effect on inequality as a consequence of a marginal change in each income source. For example, consider a marginal change in the income source k equal to ε . The partial derivative of the Gini coefficient with respect to ε is:

$$\frac{\partial G}{\partial \varepsilon} = S_k (G_k R_k - G)$$
 5

Therefore, the percentage change in income inequality as a consequence of a 1 percentage point change in income source k would be:

$$\frac{\partial G/\partial \varepsilon}{G} = \frac{S_k G_k R_k}{G} - S_k \tag{6}$$

In other words, the Gini elasticity is equal to the relative contribution $(\frac{S_k G_k R_k}{G})$ to inequality of income source *k* minus the share of source *k* in the total income.

We apply this method to estimate the elasticity of total income inequality for each source of income. In our case, there are three types of income (k = 3), labour income, self-employed income & profits and property income.

¹⁰ If the concentration coefficient ($G_K R_K$) is high, then the *k*-th source of income leads to an increase in the Gini coefficient. This is the condition expressed by Milanovic (2017) to argue that an increase in capital share translates in higher income inequality.

The results of this decomposition (Figure 2) show that the growth of wages has a negative impact on inequality. At the beginning of the period, for a 1% increase in labour income, the Gini coefficient tends to decrease by around 0.15% in both Germany and Italy, and around 0.07% in Spain, all else being equal. The elasticity of labour income tends to be lower for both Germany and Italy in the last year available, while in Spain the coefficient has a mild reduction. Yet, these values are only slightly different than in the first year of observations and do not change the overall picture.

By contrast, the growth of self-employed income & profits and property incomes contributes to increasing inequality, although with some differences across countries. In Germany, property income contributes more to inequality than profits and self-employment income, while in the two Mediterranean countries profit is the element with the strongest positive elasticity. This is especially true in Italy, where in 2000 a 1% increase in profits and self-employment income leads to an increase in the Gini coefficient of 0.08%. In the last period of observation, Italy and Spain have very similar values, while in Germany property income continues to be the most disequalizing source of income.





Source: Authors' elaboration using SHIW, EFF and SOEP data. Note: First and last year: Germany, 2000-2016; Spain, 2002-2014; Italy, 2000-2016.

These results suggest that it exists a direct link between functional and personal distributions. However, they do not consider the class perspective. Since in our scheme labourers and capitalists receive multiple sources of income, it is important to distinguish which classes earn a given income source to verify whether class location still matters. For this reason, we expand the analysis carried out in Figure 2 by observing what happens to total inequality when we distinguish between the three sources of income by class. The results of this exercise are presented in Figure 3.





Source: Authors' elaboration using SHIW, EFF and SOEP data. Note: First and last year: Germany, 2000-2016; Spain, 2002-2014; Italy, 2000-2016.

It can be appreciated that – in all countries - a marginal increase in wages (and, to a minor extent, profits & self-employment income) received by *labourer households* would lead to a reduction in total inequality. By contrast, wages received by capitalists contribute to an increase in the Gini coefficient.

These findings deserve special attention as they indicate that not all wages have an equalising effect in society. It is the labourers' wages that would provide the largest contribution to income inequality. A marginal increase in the other sources of income received by labourers (profits & self-employment income and property income) would also contribute to diminishing inequality. Nevertheless, their contribution is much less minor than that of wages, which links to the reduced presence among labourers' households (see next section for a discussion on the composition of income across different households). These results imply that class belonging and its relation to the source of income is relevant when assessing the potential impact of changes in the level of income on inequality. The elasticity of the source of income alone explains only part of the inequality dynamics. It is not only the type of income that matters but also who receives it. To achieve a more egalitarian society, it is not sufficient to increase wages indiscriminately. Instead, it would be necessary to increment wages of labourers thus reducing the wage ratio between capitalists and laborers.

After presenting the results for the Lerman and Yitzhaki's decomposition, we explore econometrically the link between functional and personal distributions. The existing literature finds mixed results on this relationship. While most of the existing studies find a correspondence between functional income distribution and personal inequality (e.g. Daudey and Garcia-Peñalosa 2007, Milanovic 2017 Jacobson and Occhino 2012) other authors do not find evidence of this link (Francese and Mulas-Granados, 2015). We explore econometrically this relationship using the revised labourers' share of income instead of the standard labour share. This procedure is functional to determine if and to what extent the labourers' share of income obtained using our approach relates to personal income inequality.

Different from most of the literature, the estimations do not rely on standard (pooled) OLS regression at the country level. Instead, we estimate the unconditional quantile regressions (or RIF-OLS) introduced by Firpo et al., (2009, 2018), on our household level units, which allows us to control for additional important variables (e.g., education, gender, social class) associated with total income inequality. Compared to standard OLS analysis, the advantage of the RIF-OLS estimation is that it allows for estimation of associations beyond the mean. While OLS estimations are based on mean statistics, even at the population level through the law of iterated expectations, the RIF-OLS enables the estimation of different types of statistics, such as Gini coefficients, variances, percentiles ratios, and more. These statistics are not available in the standard regression technique, and therefore, the RIF-OLS method provides a more comprehensive analysis of associations in the data. In this way, the RIF-OLS approach can

provide a more robust and nuanced understanding of the relationship between variables, which can be useful in a variety of research contexts.

In addition to its ability to estimate different types of statistics beyond the mean, the RIF-OLS analysis also preserves the unconditional or marginal effects interpretation. This means that it allows for the inference of changes that affect every individual in the population, even if our covariates are measured at the household or head level (as in our case). This is important because it enables researchers to examine the impact of policies or interventions at a population level, rather than just at the household or individual level. By preserving the unconditional interpretation, the RIF-OLS approach provides a more accurate representation of the impact of changes on the entire population.

The building block of the RIF-OLS methodology is the so-called influence function. Considering a given distributional statistic v(Fy) – for example, the Gini coefficient – computed on the distribution *F*, then the influence function of v(Fy) represents the effect of an infinitesimal change in the function *F* at a given point *y* (of our total income distribution). When covariates are present, and we are interested in understanding their association to a distributional statistic v(Fy), Firpo et al. (2009) link these covariates to the Recentred Influence Function (RIF) through a linear function (OLS) such that:

$$v(Fy) = E[RIF(y; v, Fy)] = E(X\beta) + E(\varepsilon)$$
⁷

where the coefficient β represents the unconditional partial effect. The interpretation of this coefficient is different from that of a standard OLS regression: β represents the expected change in the distributional statistic if the (unconditional) average of *X* increases by one unit.

For example, the estimated coefficient for a continuous variable indicates what happens to the outcome variable if the average of the continuous variable (e.g., years of education) in the population increases by one unit (e.g., one year). In the case of dummies (or categorical variables in general), the interpretation of the coefficients consists in the expected change of the distributional statistic if the proportion of a given category (e.g., women) in the population increases by - for example - 1%. Therefore, it is possible to estimate any distributional statistics referring to the population level, like the Gini coefficient.

In our case, the final equation is:

 $v(Fy) = E[RIF(y; v, Fy)] = E(LS \beta_{SL}) + E(X_{hh} \beta_{hh}) + E(\gamma_{Country}) + E(\gamma_{years}) + E(\varepsilon)$

Where the term LS indicates the labourers' share of income at the country level. X_{hh} is the matrix of the household head control variables i.e., age category, educational level, gender,

social class (detailed in the seven subclasses described in Table 1), and net wealth (standardized). Finally, the terms $\gamma_{Country}$ and γ_{Years} represent the country and year fixed effects. We run three step-wise specifications. The first includes only age and education as control variables, in the second we add the detailed social class, and finally, we add net wealth, country and year fixed effects. The results of the estimations are presented in Table 3.

	m1	m2	m3					
Labour Share (standardized)	-0.006***	-0.004***	-0.017***					
Age:								
Age 30-44	0.067***	0.077***	0.077***					
Age 45-59	0.037***	0.029***	0.020***					
Age >=60	0.120***	0.082***	0.066***					
Education:								
Primary education	0.065***	0.072***	0.075***					
Upper secondary	-0.036***	-0.043***	-0.050***					
Post-secondary non-tertiary	-0.065***	-0.083***	-0.097***					
First stage tertiary	-0.066***	-0.091***	-0.107***					
Second stage tertiary	0.101***	0.070***	0.063***					
Gender:								
Male	-0.023***	-0.033***	-0.033***					
Social Class (detailed):								
Self-Empl. Workers		0.109***	0.104***					
Traditional Capitalists		0.285***	0.250***					
Managers		0.065***	0.054***					
Self-Empl. Capitalists		-0.059***	-0.072***					
Rentiers		0.680***	0.630***					
net wealth (standardized)			0.291***					
Country FE	No	No	Yes					
Year FE	No	No	Yes					
Constant	0.432***	0.429***	0.456***					
R-squared	0.010	0.030	0.037					
N	293,784	293,784	293,784					
Rif-Mean	0.438	0.438	0.438					
Note: +<0.1; * p<0.05; ** p<0.01; *** p<0.001; age bracket 17-29, lower								
secondary education, women, and wage earners are the references.								

Table 3. RIF-OLS estimation results. Dependent variable: Gini coefficient.

The results show a negative correlation between the labourers' share of income and the Gini coefficient in all the specifications. In the full specification of the model, an increase of one standard deviation in the average revisited labour share reduces the Gini coefficient by around -4%.¹¹ Overall, these findings confirm the existence of a direct link between personal inequality and the labourers' share of income.

¹¹ Computed as (-0.017/0.438) = -0.039, where -0.017 is the coefficient of the variable of interest and 0.438 is the RIF-Mean value. The coefficient of the independent variable represents the expected change in our outcome if the average of *X* increases by one unit. We have standardised our labour shares; therefore, we interpret our results as the expected change in outcome if the average of *X* increases by one standard deviation.

4.2 Top distribution of income

The findings of the previous subsection link to the second objective of the paper, that is, the analysis of the growing presence of wages at the top of the income distribution. To approach this topic, Table 4 shows how each class (and subclass) is distributed in each quintile of income. It can be appreciated that in the three countries, the presence of labourers across the quintiles of income is quite stable at the beginning and end of the period. In Spain and Italy, there is a mild downgrade of capitalist households, whose presence increases at the bottom of the distribution. Germany records the opposite trend, with a movement of capitalists towards the top 4th and 5th quintiles.

	Germany										
	2000								2016		
Quintile	1	2	3	4	5	_	1	2	3	4	5
Wage Earners	21.5	21.2	21.0	20.1	16.1		21.4	20.4	21.0	20.1	17.1
Self-Empl. Lab.	47.0	33.7	19.3	0.0	0.0		38.5	42.2	19.3	0.0	0.0
Total Labourers	22.4	21.6	21.0	19.5	15.6		22.0	21.2	20.9	19.4	16.5
Traditional capitalists	6.2	13.7	14.0	21.2	44.9		1.7	16.8	12.0	17.3	52.3
Managers	5.8	10.5	15.3	26.0	42.5		5.7	11.3	14.1	28.5	40.4
Self-Empl. Capitalists	0.0	0.0	12.8	35.5	51.6		0.0	0.0	4.5	41.2	54.2
Rentiers	0.0	0.0	10.3	11.5	78.3		0.0	0.0	13.6	18.0	68.4
Total Capitalists	4.7	9.5	13.9	23.4	48.6		2.6	9.5	11.8	25.5	50.6
	Spain										
			2002						2014		
Quintile	1	2	3	4	5		1	2	3	4	5
Wage Earners	21.0	21.7	20.7	20.2	16.4		19.6	20.5	23.0	21.3	15.6
Self-Empl. Lab.	43.9	24.8	20.3	11.0	0.0		61.4	35.4	3.2	0.0	0.0
Total Labourers	21.9	21.8	20.7	19.9	15.8		21.1	21.1	22.3	20.6	15.0
Traditional capitalists	9.7	18.4	14.4	22.1	35.4		23.4	14.1	12.0	13.4	37.1
Managers	11.0	12.6	14.6	17.2	44.6		12.7	20.6	6.8	11.1	48.8
Self-Empl. Capitalists	0.0	0.0	0.0	28.7	71.3		0.0	0.0	25.8	31.3	42.9
Rentiers	0.0	0.0	5.0	25.1	69.9		0.0	0.0	5.1	25.7	69.2
Total Capitalists	8.9	13.3	12.6	20.8	44.4		15.1	14.4	10.7	15.1	44.8
					It	aly					
			2000						2016		
Quintile	1	2	3	4	5		1	2	3	4	5
Wage Earners	20.7	23.3	20.5	21.6	13.9		20.0	23.0	21.7	19.9	15.4
Self-Empl. Lab.	48.0	21.6	30.4	0.1	0.0		46.6	22.9	30.2	0.3	0.0
Total Labourers	23.3	23.1	21.4	19.6	12.6		21.9	23.0	22.3	18.5	14.4
Traditional capitalists	15.9	15.4	15.2	13.9	39.7		21.8	9.9	8.9	22.0	37.4
Managers	2.6	8.6	17.6	18.4	52.8		2.5	2.4	9.9	21.5	63.6
Self-Empl. Capitalists	0.0	0.0	0.0	43.6	56.4		0.0	0.0	0.0	52.2	47.8
Rentiers	0.4	2.0	11.8	13.2	72.6		0.0	2.0	36.3	27.8	33.9
Total Capitalists	6.2	8.4	12.7	21.3	51.3		10.5	5.3	8.4	27.6	48.2
Source: Authors' elaboration using SHIW, EFF and SOEP data.											

Table 4. Distribution of classes across income quintiles. First and last year available in each country.

As to capitalists, it is interesting to observe that there are similar changes in the three countries. In Spain and Italy, the more pronounced movement towards the bottom of the distribution involves traditional capitalists and, to a lesser extent, self-employed capitalists and rentiers. Another common feature is the growing presence of managers in the 5th quintile, which is evident in Spain and Italy that seems to reflect a common trend in western economies (on the causes and implications of this phenomenon, see Huber et al. 2019).¹² As to labourers, their presence in the top quintile of income slightly increases in the case of Germany and Italy and decreases in Spain. These changes are minor, indicating that there are no major modifications in the distribution of labourer households between the beginning and the end of the period.

To deepen the analysis of income distribution and social classes, Figure A1 in the Appendix shows the decomposition of total income by source of income for each subgroup of households. What is immediately evident is that there are no major changes in the mix of sources of income by type of household. Wage earners' income is largely constituted by wages. While this could be expected, it is interesting to observe that even before the global financial crisis – a period characterised by a large diffusion of financial instruments– property income continues to be a very small fraction of the total for this type of household. Unsurprisingly, in traditional capitalist households, the lion's share of income is represented by profits and self-employed income. Managers' income composition does not modify significantly, but it can be noted that Germany and Spain have a certain income mix that is particularly due to the role played by property income and profits. In Italy, this share is not significant and is decreasing.

Although informative, this evidence is not conclusive about the composition of labour income at the top of the distribution of income. To address this issue, we estimate the wage share by deciles of total income and compare it with the wage share of labourers only. The standard claim in the literature on the growth of wages at the top of the distribution is that there is a growing presence of wages at the top of the income distribution. By estimating, for each decile of total income, the *total* wage share and the wage share for *labourers only* it is possible to establish what class contributes to the presence of wages at the top of the distribution of income (Figure 4).

¹² Regarding these results, the following caveat should be considered. the definition of profit income includes any self-employed income received by individuals whose business accounts at least one employee. Hence, it is possible that a relevant part of the traditional capitalists' income at the bottom of the distribution corresponds to households that, with an alternative classification would be part of self-employed households.

Figure 4. Share of wages over total income by decile of income. Total wages and wages received by labourers only.



Source: Authors' elaboration using SHIW, EFF and SOEP data.

As expected, the share of wages over total income decreases as we move along the distribution of income. This is because capital income tends to be concentrated at the top of the distribution of income. However, the presence of labour income in the top quintile is not negligible, in line with the argument proposed by the literature (e.g., Milanovic 2017; Aaberge et al. 2018). At the same time, it is interesting to observe that only in Italy there is a clear growth of the total wage share between the first and last year of the period. In Germany, the wages at the top 10% of the distribution are substantially unchanged while in Spain the presence of wages at the top of the distribution is slightly lower in 2014 than in 2002. These findings seem to contrast with the literature on the *growing* presence of labour income among top incomes. Part of this discrepancy can be the result of the years employed in the analysis. It is possible that using a different period we would obtain a different picture that, in the long run, would result in an increase in the presence of wages at the top of the distribution.

Nevertheless, the added value of this type of analysis emerges clearly when comparing the two lines plotted in the figure, which makes it possible to establish what class is responsible for the presence of wages at the top of the distribution of income. Naturally, the labourers' wage share is lower than the total wage share. This is because labourers' wages are a subsample of total wages. Yet, what is more relevant is that the gap between the two lines increases considerably as we move towards the top of the distribution and becomes very pronounced in the top 10% of income. The share of wages in the top 10% of income received by labourers is about half of the total wage share in Spain and Italy. In these countries, the share of labourers' wages in the 10th decile is around 20-30% compared to 60-70% in the case of the total wage share. This is a considerable gap that reveals that major differences can emerge once class location of households, and not just the type of income, is taken into consideration. The case of Germany is different. In this country, the gap between the two lines, although sizeable, is more contained, revealing that even in the top decile of income a large share of wages is received by labourers. It should also be acknowledged that, while there is a slight growth of labourers-only wage share in the top decile of income in Italy and Germany, there is a considerable reduction of this indicator in Spain, which contrasts with the argument of a growing presence of labourers among top earners.

To have a clearer perspective of the changes over time, Figure 5 shows the values of the difference between the total wage share and the labourers' wage share of income between the first and last year available by decile of income. A small difference implies that the total wage share is a good proxy of the labourers' wage share. In this case, the share of wages appropriated

by capitalists is limited. On the contrary, larger differences between these two measures indicate that the total wage share is not a good proxy of the share of wages received by labourers, meaning that this difference is appropriated by capitalist households.

Figure 5 makes it immediately clear that the distance between the total wage share and the labourer's wage share of income is low for the bottom deciles and tends to increase at the top of the distribution, except for Germany. For Italy and Germany, the distance between the two measures for the bottom deciles of income is lower at the end of the period. At the bottom of the distribution, the total wage share of income captures the labourers' wage share well, and this is increasingly true for Italy and Germany. However, at the top of the distribution, the total wage share is far from capturing the labourer's wage share. Moreover, the gap between the total wage share and the labourers'-only wage share at the top of the income distribution increases in Spain and Italy. This suggests that the standard wage share becomes less precise in capturing the labourers' wage share at the top of the distribution. A relatively high share of wages can indeed be found at the top of the income distribution, but this presence corresponds to a large extent to wages received by households that, according to our approach, belong to the capitalist class.



Figure 5. Difference between the total wage share and the labourers' wage share by decile of income. First and last year available.

Source: Authors' elaboration using SHIW, EFF and SOEP data.

Finally, we estimate the Income Factor Concentration (IFC) index proposed by Ranaldi (2022) and Iacono and Ranaldi (2021). The IFC index measures how the composition of labour and capital income changes across the income distribution. This index can have values comprised between minus one and one. An index closer to one implies that capital income is concentrated at the top of the distribution of income, while labour income is at the bottom. This would correspond to what Milanovic (2017) labels "classical capitalism". On the contrary, as the index approaches zero the society moves towards "new capitalism" in which there is "no longer any clear mapping between social class and income source" (Iacono and Ranaldi, 2021: 6). A negative index would indicate that it is labour that is concentrated at the top of the distribution of income at the bottom. In other words, high values would indicate a "class-based" society while low values of the index would be more aligned with the narrative of disappearing social classes (Ranaldi and Milanovic, 2022). Within this framework, labourers and capitalists are defined depending on the source of income received in line with the classical distinction between classes.

However, a central point of our paper is that the source of income does is not sufficient to distinguish between labourers and capitalists in contemporary capitalism. For this reason, we also estimate a second IFC index (for simplicity, we label it IFC2) that is consistent with our class approach. The formulation of this indicator is similar to the original one, with the difference that labour and capital income are replaced by, respectively, labourers' and capitalists' income (as defined in footnote 7). The interpretation differs from the original IFC index in that it does not reflect the homogeneity of the distribution of labour and capital incomes across the distribution, but the homogeneity in the distribution of the two classes described in our approach. An index equal to one means that all capitalists' (labourers') income is found at the top (bottom) of the distribution. An index equal to zero indicates that the income received by labourers and capitalists is equally distributed across the income distribution, while negative values would correspond to a society in which labourers' income is more concentrated at the top of the distribution of income.

Figure 6Figure 6 presents the results of these computations. The standard IFC estimation shows a downward movement in Italy, an upward trend in Spain and a substantially unvaried level in

Germany. These trends reflect those estimated by Iacono and Ranaldi (2021) and Ranaldi (2022) for Italy and Germany.¹³

What is more relevant to our contribution is the evolution of the class-based IFC index (IFC2). The values of this index lie constantly above the standard IFC. In Italy and Germany, this index is substantially steady, while it is growing in Spain. These findings imply that when features of contemporary capitalism are employed to adapt the traditional distinction between labourers and capitalists, a much sharper class division emerges. In Germany and Italy, the class concentration is quite stable, while it is growing in Spain. Interestingly, unlike for the standard IFC index, the three countries have similar values of the IFC2 at the end of the period.

Before concluding this section, we shall also stress that this estimation has also important implications concerning the first research objective because the IFC index can be considered a proxy of the link between functional and personal distribution of income (Iacono and Ranaldi, 2021: 3). The higher values of the IFC2 index reveal a strong link between revised functional income distribution and total income inequality which is consistent with the evidence proposed in section 4.1 above.





Source: Authors' elaboration using SHIW, EFF and SOEP data.

¹³ The discrepancies in absolute values can be linked to the different sources employed or the type of income included in the computation. For example, Ranaldi (2022) uses EU-SILC data for Germany. Moreover, he also includes allowances, cash transfers and other types of benefits in the estimation of labour income.

4.3 Considering wealth

The class definition proposed in this paper has considered two features of contemporary capitalism, the role of managers and the fact that households can earn multiple sources of income. It could be argued that, in addition to these factors, wealth plays an important role in shaping class belonging, between labourers and capitalists. There are different reasons for which wealthy households can be considered more akin to capitalists than labourers. As argued by Wolff and Zacharias (2009, 2013) large levels of wealth allow the individuals/households not to engage in wage labour and, at the same time, to potentially influence the political process. Moreover, Duvoux and Papuchon (2022) have highlighted that traditional class schemas fail to account for the significant influence of wealth on life chances and the shaping of class-based beliefs (Breene, 2005; Savage et al., 2013). Having a significant amount of wealth may potentially lead to the extraction of high levels of rents, thus making wealthy similar to rentiers.

Including wealth levels in the class definition also allows to consider some limit cases. For example, a rich entrepreneur that keeps most of his fortune within her companies (undistributed profits), without distributing dividends to herself and that has a modest wage income that she receives from some consultancy. This implies that her wage income might exceed her property/entrepreneurial income. Taking wealth into account permits to correct for this type of situations, as she is however clearly a capitalist/rentier.

For this reason, as robustness test, we also perform the analysis adding wealthy household as subgroup of capitalist households. A household is considered to be wealthy if it is part of the top 10% of the wealth distribution *and* it is not part of any other capitalist subgroup. If another capitalist household (e.g. managers) is also in the top 10% of the wealth distribution, its classification is not altered. This implies that the wealthy category includes households that were previously listed among labourers.

We perform the empirical analysis of this paper using this revised classification. The results, reported in the appendix (Figures A2-A4 and Table A1). As it can be appreciated, no major changes are found compared to the reference results. The Lerman and Yitzhaki's (1985) decomposition shows that labourer's wages continue to be the most important equaliser source of income. Since the threshold of 10% may be seen arbitrary and because other authors use lower thresholds (e.g. Rehm et al., 2016), we also performed this test considering wealthy households as those in the top 5% and 1% of the distribution of wealth (Table A1 in the appendix). Also in this case, the main findings are confirmed.

As to the top of the distribution of income, Figure A3 shows that the distance between the total labour share of income and the labourers' share of income increases once wealthy are included as subgroup. This is understandable, as part of labourer households are now considered capitalists. Finally, Figure A4 reproduces the revised IFC index including wealthy households among capitalists. Results are largely in line with the previous findings. A class divide is much more accentuated than using the standard IFC index.

In sum, the framework proposed in this paper can be adapted to include other features of contemporary economies, such as wealth. In this case, there are no significant differences with respect to the baseline classification.

5 Conclusions and Discussion

This paper investigates the relationship between social classes, inequality and top incomes in Germany, Spain and Italy. To do so, we adopted a novel approach in the definition of labourer and capitalist households that takes on board some characteristics that had been previously highlighted in the literature, namely the fact that individuals and households can receive multiple sources of income (e.g. Atkinson, 2009; Milanovic, 2017) and the role of managers who, despite being mostly wage earners, have their interests and functions largely aligned with those of traditional capitalists (e.g. Krueger, 1999; Mohun, 2006; Glyn, 2009; Milios, 2018). Although a vast body of literature indicates that managers should be considered part of the capitalist class, it is surprising how few empirical studies have incorporated this key feature of contemporary capitalism in class analysis and inequality research. The approach proposed in this paper addresses these issues and, at the same time, it preserves the foundational class dichotomy behind the construction of functional distribution analysis.

From this perspective, we addressed two specific objectives. First, we linked our estimations of the labourers' and capitalists' shares of income to total income inequality. We applied the Lerman and Yitzhaki (1985) decomposition technique to understand the marginal effects of each source of income on the Gini coefficient. The results of this exercise show that a marginal increase in labour income contributes to the reduction of the overall inequality in the three countries, while the increase in profits and property income foster to its growth. Importantly, not any type of labour income contributes to the reduction of inequality. Only wages received by labourers contribute to the reduction of inequality, while a marginal increase in those received by capitalists (mostly concentrated in the managerial group) boosts it. These findings have important policy implications as they indicate that the reduction of inequality

must involve the increase of labourers' wages (as defined in this paper) in absolute and relative terms. These findings are complemented by RIF-OLS econometric estimations that show a negative relationship between the labourers' share of income and personal inequality. The link between class and personal inequality is also confirmed when using the revised IFC index.

These results connect closely with the second area of inquiry of the paper, which is the growth of wages at the top of the distribution. Consistent with the existing literature (among others, Piketty & Saez 2007; Atkinson et al. 2011; Piketty & Saez 2013; Aaberge et al. 2018; Atkinson & Lakner 2021), we find that there is a significant presence of labour income in the top of the income distribution. What is more relevant from our perspective, however, is who receives this labour income. Indeed, labourers can be found throughout the income distribution, including the top. Nevertheless, the share of wages received by labourers in the top decile is considerably lower than the total share of wages, and this gap widens as we move up the income distribution. This implies that at the higher end of the income distribution, the presence of labour income is primarily due to capitalist households, as we have defined them. Specifically, this substantial presence can be imputed to managers who, in Italy and Spain, have increased their presence in the top quintile of the income distribution over time (Table 4) and that is the type of household that, among capitalists, receives the higher share of labour income (Figure A1).

A special case is that of Germany, where these findings are more nuanced. The gap between the total and labourers' wage share of income is lower than in the other two countries. In this respect, Germany is the only country where managers do not increase their presence in the top quintile of income. This lack of relative upgrading of managers' income in this country may explain the lower gap between the two curves at the top income in Figure 5.

In our view, these findings are crucial in the current debate. It is undeniable that there is a presence of labour income at the top of the distribution, but this income is largely received by households whose interests, it can be argued, are closer to those of capitalists than of labourers. Although labourers are present throughout the entire distribution of income, a class divide is still relevant and, in some cases (Spain), it is even growing.

These findings are further reinforced when we examine the income factor concentration dynamics. By employing a revised class-based IFC index, we have demonstrated that the class divide is much more pronounced than with the conventional class scheme that classify labourers and capitalists according uniquely on the type of income received.

32

In conclusion, a key takeaway from this paper is the importance of explicitly considering the role of different sources of income and managerial functions in shaping class location. This exercise may be useful in better linking macroeconomic aggregates with households' perceptions of their income position and evolution, which Atkinson (2009) describes as one of the main reasons for the factor shares analysis. Further research should attempt to explore other countries and datasets to expand our findings. Moreover, the framework proposed in this paper is flexible and could also be applied to discuss other subjects such as wealth inequality, inter and intra-generational mobility. At the same time, we have shown that the approach could be modified and expanded to include other relevant characteristics of contemporary capitalism, such as the role of wealth in determining class location (Duvoux and Papuchon, 2022; Wolff and Zacharias, 2009). Other theoretical contributions in this direction are welcome and needed. More generally, we hope that this work will feed into future discussions on the dichotomy between labour(ers) and capital(ists) in our times.

6 References

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7 Appendix

Figure A1. Average composition of income (% of the total) by detailed subgroup. Note: for the sake of simplicity, self-employed income and profits are presented jointly. Property income = income from financial assets + income from rents



Source: Authors' elaboration using SHIW, EFF and SOEP data.



Figure A2. Lerman and Yitzhaki's decomposition of the Gini index by income source including wealthy as subgroup.

Note: Germany first observable and last observable years are now 2002 and 2017.

Table A1. Decomposition of the Gini index by income source (elasticities) received by labourers and capitalists using top 5% and 1% robustness thresholds for wealth classification.

	First available year						Last available year					
	IT		ES		DE		IT		ES		DE	
	Top	Тор	Top	Top	Top	Top	Тор	Top	Top	Top	Top	Top
	5%	1%	5%	1%	5%	1%	5%	1%	5%	1%	5%	1%
Wage L	-0,269	-0,261	-0,220	-0,186	-0,184	-0,184	-0,265	-0,245	-0,219	-0,204	-0,148	-0,148
Wage K	0,133	0,129	0,125	0,090	0,066	0,066	0,179	0,158	0,105	0,092	0,043	0,043
Property in L	-0,003	-0,004	-0,002	0,001	0,005	0,005	0,006	0,007	0,000	0,001	0,005	0,005
Property in K	0,061	0,066	0,041	0,039	0,066	0,066	0,008	0,008	0,033	0,033	0,052	0,052
Profits L	-0,046	-0,042	-0,026	-0,025	-0,016	-0,016	-0,043	-0,044	-0,013	-0,012	-0,018	-0,018
Profits K	0,124	0,112	0,083	0,081	0,063	0,063	0,114	0,115	0,094	0,090	0,067	0,067

Figure A3. Share of wages over total income by decile of income. Total wages and wages received by labourers only, including wealthy as subgroup.



Figure A4. IFC index and revisited class-based IFC including wealth subgroup.



Note: Germany includes only 2002, 2007, 2012 and 2017 years.