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THE REDISTRIBUTIVE EFFECTS OF IN-KIND TRANSFERS IN ITALY

by Emanuele Dicarlo* and Marco Savegnago*

Abstract

In-kind transfers, such as healthcare and education services, represent a substantial portion of public expenditure in most advanced economies, yet they are rarely included in analyses of tax-benefit systems due to the methodological challenges in assessing their monetary value. This paper adds an in-kind transfer module to an otherwise standard microsimulation model of the Italian household sector. Following established methodologies, we evaluate the health, education, childcare, and social housing services enjoyed by each beneficiary. We find that in-kind benefits follow a distinctively U-shaped age profile and are more uniformly distributed across income levels compared to cash benefits. In-kind transfers increase net disposable income by 20 percent, on average, and almost 60 per cent for lower-income households, therefore playing a crucial role in reducing inequality. These results confirm the importance of including in-kind transfers in distributional analyses for a more complete understanding of welfare systems.

JEL Classification: H22, H23, H24, H31, C15, C63, H2, D31.

Keywords: redistribution, tax-benefit system, in-kind transfers, microsimulation, inequality.

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1. Introduction and literature review¹

According to latest Eurostat data, public health and public education expenditure in Italy amounted to almost 222 billion euro in 2023, absorbing more than 25 percent of total current primary expenditure. Despite their importance, transfers in kind are rarely included in analyses assessing the distributive impact of tax-benefit systems. The reason for this omission lies in the difficulty of assigning a monetary value to the use of a public service, a challenge that obviously does not arise in the case of cash transfers. This asymmetry has some undesirable consequences for the assessment of tax-benefit systems. First, it complicates international comparisons to the extent that the size and structure of in-kind transfers differ across countries. Second, it provides an incomplete picture of the “household-specific balance” in terms of what households receive from government and what they contribute through taxation. Finally, it makes it very difficult to assess the overall progressivity of the system as well as the redistributive effects of reforms affecting in-kind transfers, such as – for example – a reduction in personal income tax financed by an equivalent cut in public services.

The aim of this paper is to incorporate an in-kind transfer module into BIMic, the static and non-behavioural microsimulation model developed at Banca d’Italia (Curci and Savegnago, 2019; Curci et al., 2020) which allows the simulation of the main components of the Italian tax and benefit system and the analysis of their effects on income distribution and public accounts.

The new module assigns a monetary value to several in-kind transfers—such as health, education, childcare services, and social housing—for each individual in the BIMic database. Since appropriate market prices of publicly provided services are often difficult to observe, we follow the “production cost approach” in line with the relevant literature. Accordingly, the total value of in-kind benefits associated with a public service is equal to the total public expenditure related to that service. As discussed more in detail in the following section, this approach has the undeniable limitation of not accounting for quality (and therefore the utility value) of public services, which can exhibit a fair degree of heterogeneity.² Furthermore, this approach is unable to capture the potential price effect exerted by an increased purchase of public services on the private market, which is already non negligible for health and education.

For education and social housing, where actual users of these public services can be identified, we allocate benefits to individuals based on actual consumption; for health and early-child care, where beneficiaries and intensity of use are not directly observable and must be imputed, we adopt an insurance-value approach³.

Using the new module, we are able to determine an extended definition of post-tax income, which includes the sum of disposable income (including cash components) and the monetary value of public

¹ We are grateful to Andrea Brandolini, Nicola Curci, Marzia Romanelli, Martino Tasso, Pietro Tommasino and Roberto Torrini for the useful comments received and to Alessia Negrini for her excellent research assistantship. All errors are the authors’ responsibility. Any views expressed here are those of the authors and not necessarily those of Banca d’Italia.

² For example, people living in the South of Italy tend to seek medical services in different regions from the one they reside than people living in other areas of the country, a phenomenon typically interpreted as a signal of lower (at least perceived) quality of health services (AGENAS, 2024).

³ Under the insurance value approach, each individual belonging to a specific sociodemographic group (homogenous in terms of gender, age, education) receives the same amount of benefit, i.e. for health, irrespectively of his actual use of public health service. This is consistent with the idea that the price (and therefore the value, for a risk-neutral agent) of a hypothetical health insurance would be uniform *within* that group, while would certainly *between* groups (i.e. increasing with age).

services. Comparing the distributions of both disposable and “extended” income highlights the redistributive effects of the provision of public services.

Our work builds on previous research in this area. Amongst the latest contributions, Aaberge et al. (2017) assess the value of public services for 23 European countries and find that estimates of at-risk-of-poverty indicators and the Gini index are reduced by 40 and 20 percent, respectively, when moving from the narrow definition of disposable income to the broader concept of extended income. Vergnat et al. (2022) provides a useful description of the methodological challenges in deriving monetary values for in-kind transfers, with an application to Luxembourg.

Over the past decades, some papers have specifically analysed the Italian case. In a pioneering paper, Brandolini and D’Alessio (1996), based on data referred to 1993, find that an inequality-reducing effect of in-kind health subsidies, larger when the insurance approach is adopted as “ex ante benefits are more evenly spread across households than it is the case ex post”. Baldini (2007), based data referred to 2000 and 2002, provides a thorough discussion of the consequences of different imputation methodologies. He finds a remarkable inequality-reducing effect of in-kind transfers; in particular, the redistributive effects of health services are larger if benefits are imputed through the insurance approach. In fact, while the imputed benefits are relatively homogeneous under the insurance approach (as they differ only by age and sex), their distribution is much more erratic under the actual consumption approach, as the sample includes both people who never used public health services during the observation period and people who instead made extensive use them. This heterogeneity in the intensity of the use of public health services determines a high degree of reranking⁴ and therefore limits the estimate of the redistributive effect. A more recent contribution is Maitino et al. (2017), who use detailed administrative data to develop an in-kind transfers module for the Region of Tuscany. Giangregorio (2024), based on EU-SILC data referred to 2008 and 2017, shows that in-kind transfers, particularly healthcare and compulsory education, play a decisive role in reducing inequality, especially in countries starting with high levels. When allocating health expenditure, however, his approach does not consider the intensity of the participation or the type of health services (i.e. hospital care vs medicines) or the use between public and private health services.

Our work, based on more recent data, extends and updates to year 2022 the results of previous contributions. We find that in-kind transfers follow a distinct U-shaped age profile, with education services benefiting younger individuals and healthcare concentrated among older populations, contrasting with non-pension cash benefits that primarily target working-age individuals. While both cash and in-kind transfers are progressive, cash benefits show stronger progressivity, even if one excludes the pension component. Healthcare and, to a lesser extent, educational transfers are broadly uniform across income levels, while childcare and social housing benefits are more concentrated among lower-income households. In-kind transfers increase net income (post cash transfers and taxes on income and wealth and VAT) by 20 per cent on average, with effects ranging from almost 60 percent in the first income decile of net income to 7 percent in the top decile. Therefore, incorporating in-kind transfers mechanically shifts up the break-even point in the income distribution between net beneficiaries and net contributors to the welfare system. Finally, in-kind transfers reduce Gini income inequality by around 5.4 points, but the effect is halved switching from the insurance value to the

⁴ Many individuals that, according to the actual-consumption approach, turn out to receive no transfer for health, end up being overcome, in the ranking of extended incomes, by individuals who had lower disposable incomes but instead benefit from positive in-kind transfers.

actual consumption approach. Our analysis shows that in-kind transfers play a crucial role in reducing income inequality.

The paper is organized as follows. Section 2 describes the data and methodology, including the BIMic microsimulation model and our approach to valuing and allocating different types of in-kind transfers. Section 3 presents a descriptive analysis of the distribution of in-kind transfers across different population groups. Section 4 discusses redistributive effects and the impact on inequality and poverty indicators. Section 5 concludes.

2. Data and methodology

2.1 BIMic and SHIW

Our analysis is based on BIMic, the tax-benefit microsimulation model of the Banca d'Italia (Curci et al. 2017). BIMic is a static and non-behavioural model capable of reproducing the main features of the Italian tax-benefit system, such as social security contributions, personal income tax, taxes on real and financial wealth, indirect taxes (i.e. VAT) and means-tested benefits. The model is regularly updated to reflect policy changes and changes in the sample data. BIMic is based on the Household Income and Wealth Survey (Bank of Italy 2024), which is regularly conducted by the Banca d'Italia on a sample of households representative of the Italian population. The survey provides a wide and detailed range of information on socio-demographic characteristics, labour market status, income and wealth. Income is reported at the individual level, while wealth information is collected at the household level and covers both real assets (real estate, business property, valuables) and financial assets (savings instruments). Both income and wealth are used in BIMic to simulate the ISEE indicator, a synthetic measure of household income and wealth often used to determine eligibility for various means-tested benefits in the Italian social protection system.

BIMic supplements its main database with data from the Household Budget Survey (HBS) conducted by the Italian National Statistics Institute (Istat).⁵ For both datasets we rely on their 2022 vintage, and we therefore refer the analysis to income, consumptions and transfers of the same year.

In the remaining part of the paper, we will refer to different definitions of income, whose components are listed in the Table 1.

⁵ The model exploits the very detailed information on household consumption expenditure contained in this latter survey to reproduce the absolute poverty indicator used by Istat. More details on the statistical matching can be found in Curci et al, 2020.

Table 1: Income definition and main components

Income definition	Main components
A) Original income	Before-tax labour and capital income + minor components ⁶
B) Gross income	Original income + pensions income + other cash transfers (including unemployment benefits, child allowances, minimum income scheme, anti-inflation one-offs measures)
C) Disposable income	Gross income – social security contribution and taxes on income and wealth
D) Net income	Disposable income minus VAT
E) Extended income	Net income + in-kind transfers

2.2 In-kind transfers

Welfare systems in developed countries typically provide different levels of services through public expenditure. Typical examples of non-cash transfers are public health, education, justice and defence. For the purposes of this analysis, we only consider transfers in kind that can be directly attributed to their beneficiaries, such as health, education and social housing. Accordingly, we do not consider collective indivisible services that benefit households collectively, such as defence, law and order, etc. There are two reasons for this exclusion. First, we focus only on transfers to households, whereas the beneficiaries of collective goods (such as defence, but also road maintenance) also include firms. Second, even if we could identify the share of public expenditure on, say, defence that goes to the household sector, the allocation between households would raise further and more complicated issues. For example, if we assume that the primary purpose of law and order is to guarantee civil rights, the obvious implication is that each individual benefits to the same extent; if, on the other hand, we assume that the ultimate purpose of law and order is to protect private property, then we might assume that the individual amount of benefit is directly proportional to the individual's net worth. These two alternative interpretations lead to opposite results, since the redistributive effects of law and order would be much greater under the first choice (uniform) than under the second (proportional to wealth).

In this paper we consider four types of in-kind transfers: *i)* health; *ii)* education; *iii)* child care; *iv)* social housing. Long-term care (LTC) is not explicitly singled-out as most of its expenditures are included either into the cash benefits or into the in-kind health services⁷. Together, they represent most of all in-kind public transfers and around 25 percent of General government's current primary expenditure. The inclusion of these transfers in a microsimulation analysis requires two steps: first, the definition of a monetary value for the service provided; second, the identification of the direct

⁶ Alimony, recurrent gifts from relatives and friends, and so on.

⁷ According to the latest data (RGS, 2024), long-term care expenditures amounted to 1.6% GDP in 2023, of which *i)* 0.7% represented by *indennità di accompagnamento* (a cash benefit granted to mutilated or totally disabled persons for whom it has been ascertained that they are unable to walk without the help of a companion or are unable to perform the daily acts of living); *ii)* 0.6% GDP represented by the health component of LTC; *iii)* 0.3% GDP due to "other services". Our analysis only omits the last category, that includes a wide arrears of interventions typically provided by municipalities and for which it is difficult to simulate the propensity and the intensity to use the corresponding service.

beneficiaries and their intensity of use of the service, which is necessary to assign to each individual the cash equivalent of the in-kind transfer.

As regards the first step, in principle there are two ways of assigning a monetary value to the provision of public goods. The first method, used in this analysis, is the production cost approach, which assumes that the value of the good is equal to the cost to the government of producing it (Smeeding et al. 1993). In practice, this means resorting to national accounts and aggregating expenditure on specific goods, such as schooling or medical care, with the aim of identifying the production cost of each service, possibly in a detailed way (e.g. the cost of primary schooling). Most (if not all, to our knowledge) of the relevant literature only exploits this first method. The alternative would be to use market prices, which are often either not observable for public goods – as they are typically provided directly to the user rather than sold in a market – or non-informative – as they are influenced by the very existence of a large public provider.

As for the second step, identifying the beneficiaries of public services is important because not everyone uses them and those who do may differ in the intensity of their use. For example, public spending on education benefits only those of school age, whereas the use of health services tends to increase with age, as older people have a much greater need for support. The literature typically proposes two approaches to identify who benefits from a public service: *i)* the actual consumption directly identifies the beneficiaries of a particular service; *ii)* the insurance value approach instead assigns a probability of use by grouping individuals according to observable characteristics. We use the latter approach for the provision of health and child-care services (since the beneficiaries cannot be observed from our data⁸) and the actual consumption approach for the other transfers in kind.

While these approaches allow the value of in-kind transfers to be taken into account in distributional analysis, each of them has some limitations, as they rest on some restrictive assumptions. First, they assume the absence of externalities. In practice, this means that one member of a household who benefits from a public service does not affect other members of the household. This is a reasonable assumption in the context of a static microsimulation model, although it may be unrealistic in some circumstances: for example, the health behaviour of adults may affect those of their partners or children, even if this is unlikely to happen in the very short term (the fact that an adult visits the dentist, for example, does not affect the likelihood that the daughter will also visit the dentist). We now highlight this methodology in detail for each public service.

⁸For healthcare spending, we also impute public costs to a simplified “actual consumption” approach, matching healthcare usage between individuals in SHIW and EHIS based on the following information in both datasets: number of family members, gender, age, nationality, geographical area, educational attainment, occupational condition. This approach however implies that the only beneficiaries are the ones observed in a specific year and produces a high-variability distribution (as noted, for example, in Baldini, 2007). Our approach instead relies not on the actual use of healthcare services, but on the insurance function of public spending. This latter approach is simpler in terms of calculations and produces a distribution where each citizen is assigned an average (according to his gender-age-education group) “insurance cost” of the public service.

2.2.1 Healthcare

For healthcare services, we use the insurance value approach and identify beneficiaries based on the probability of using these services by people in the same socio-demographic group (based on age, gender and education). We match our SHIW data with the European Health Interview Survey (EHIS 2015)⁹, which contains detailed information on public (and private) health care use, such as hospital admissions, consultations, number of physicians' visits, etc.

From the EHIS we construct four categories of medical services: *i)* general medical care; *ii)* specialized medical care; *iii)* hospital care; *iv)* medicines. For each category, we then assign an intensity of use to each group of individuals based not only on a combination of age and gender, as is typically done in the literature, but also on educational attainment, the latter being relevant because it allows us to capture the socio-economic gradient in health¹⁰. We group the educational attainment of each individual into three categories: low (up to lower secondary education), medium (high school diploma and equivalent), high (any university degree). Based on this information, we are able to create a profile of a typical user of a given service: for example, we find that, on average, a 55 to 59-year-old male with a low level of education uses 60 percent more hospital care than the general average.

To define the monetary value of each of the four categories of health care, we rely on the national accounts of the statistical office (*Conti della protezione sociale* 2022). We then calculate a per capita cost of health services that reflects the intensity of use according to the group to which the individual belongs. In the example above, the monetary value of hospital care for men aged 55-59 with a low level of education is on average around 2500 euro, i.e. 60 percent higher than the national average (1400 euro)¹¹.

2.2.2 Education

In the case of education, we follow the actual consumption approach. The individual value of benefits in-kind is derived from official statistics provided by Eurostat (Annual expenditure on educational institutions per pupil/student based on FTE, by education level and program orientation, 2022) and the European Commission (EACEA/Eurydice, National Student Fee and Support Systems in

⁹ The survey is conducted every 5 years. We rely on the 2015 vintage as this is the last version of the survey including individuals below the age of 15 years. We therefore assume the relative needs of healthcare services remained relatively stable across age, gender and education in the last decade.

¹⁰ Ardito et al. (2024). Grossmann (2006) highlights that the insurance value approach, typically matching on age and gender only, assumes that the value of the health premium is not affected by the position of the individual in the income distribution. This simplification contrasts the EU evidence suggesting a positive relationship between income and health status. Our approach, matching also on the level of education, partially accounts for this bias. In other words, we rationalize that lower access to public services and (therefore lower costs) is the outcome of competing forces: some pushing for lower use of public services (better health status and higher propensity to resort to private care) and some for higher use (higher demand for health and better access).

¹¹ The analysis does not include citizen's co-participation in the cost of service (named "ticket"). Their inclusion should not affect the results, because of their limited amount (around 1 billion euro in 2022, less than 1% of the overall health expenditures; AGENAS, 2023).

European Higher Education 2020/21¹²) and is equal to the total public expenditure per level divided by the number of students enrolled at each level.

We define five levels of education: *i*) pre-primary, *ii*) primary, *iii*) lower secondary, *iv*) upper secondary, *v*) tertiary. We assume that every individual between the ages of 3 and 16 is in education and belongs to the educational level corresponding to his or her age. Individuals aged 16-24 are assumed to be in education if they report this directly in SHIW. For students in tertiary education, we net public expenditure with our own estimates of tuition fees (based on the ISEE indicator). We assume that each “observed student” is enrolled in a public school, since we cannot distinguish pupils attending private schools or universities.

2.2.3 Child Care and social housing

Here we refer mainly to early childhood education. While we do not directly observe whether children are enrolled in public kindergartens, we define beneficiaries based on other observable characteristics. In particular, we first assign children aged 1 and 2 to early childhood if all other adults in the household are working and there is no retiree or student (who could take care of the child’s needs in the family). We then rank the households according to their ISEE and allocate the babies to public childcare, starting with the families with the lowest ISEE, until we reach the total number of officially enrolled pupils in early childhood. The per capita expenditure per child enrolled is obtained from Istat (*Nidi e servizi integrativi per la prima infanzia*, 2023). At the present stage of the analysis, we are not able to account for the distribution of childcare availability at subnational levels.

In the case of social housing, beneficiaries implicitly receive a transfer in the form of lower rents compared to market rents. In the SHIW, we directly identify households that report living in social housing. Assessing the monetary value of the transfer then involves estimating the gap between the rent actually paid and the rent that households would have to pay on the market (based on observable characteristics such as surface area, year of construction, number of bathrooms, etc.).

2.3 Equivalence scales

In order to compare the economic well-being of individuals belonging to heterogeneous households, it is crucial to account for the composition and characteristics of the members of the household itself. When looking at cash income and transfers in particular (including means-tested benefits which already take into consideration the needs of the beneficiaries) it is necessary to consider both the economies of scale in household consumption and how income is shared among its members. For example, a single person with a disposable income of 10,000 euros is likely to have a lower level of well-being than a couple with a disposable income of 20,000 euros, because some of the consumption within the couple (such as heating the home) is characterised by economies of scale. Note that in this framework it is assumed full sharing of resources in the household (so it is irrelevant how the 20,000 euros is divided between the two components).

¹² Higher education institutions set variable fees based on socioeconomic background, field, cycle, and study status (min. €200 in 2020/21) captured by the ISEE indicator, with mandatory exemptions for supported students. Fee income cannot exceed 20% of public funding. In 2018/19, 73% of first-cycle and 75% of second-cycle full-time students paid fees. Students with ISEE up to €13,000 are exempt.

Equivalence scales allow this limitation to be overcome making households' well-being comparable. The most common in applied research is the so-called modified OECD scale, according to which each member of the household is first assigned an equivalence value: 1.0 for the first adult; 0.5 for the second and each subsequent person aged 14 and over; 0.3 for each child under 14. The sum of these values is the household equivalence scale. Returning to the example above, a couple of adults with a nominal disposable income of 20,000 euro will have an equivalence scale of 1.5; each of the two members will have an equalized income of $20,000 / 1.5 = 13,333$ euro. While access and intensity of use of public services reflect the needs of different individuals, using the OECD scale (mostly accounting for economies of scale in consumption) to compare the value of in-kind transfers is less appropriate¹³. Consider an 80-year-old man and a 30-year-old man, both with a cash income of 10,000 euros. According to the OECD scale, focusing only on disposable income, both have the same level of well-being. If the older person receives an additional 10,000 euros in hospital care, the OECD scale (which assign both individuals a weight equal to 1) would indicate he is twice as rich as the younger person. The fact that health risks and the subsequent use of public services differ by age justifies the need for a different scale to capture the heterogeneity of households. The idea is thus to adjust the scale considering the value of in-kind transfers relative to a reference group in the population.

In this paper, we rely on the concept of a needs-adjusted scale (NA), introduced by Aaberge et al. (2010, 2017), which takes into account the relative needs of each household. Following with the same example as above, we find that the NA equivalence scale of an 80-year-old man is 1.25 (See Appendix for details on the computation). In this case the equivalent extended income of the elderly person would be $20,000 / 1.25 = 16,000$, providing a more realistic welfare comparison.

Therefore, in the subsequent analyses we will use both modified-OECD and NA equivalence scales.

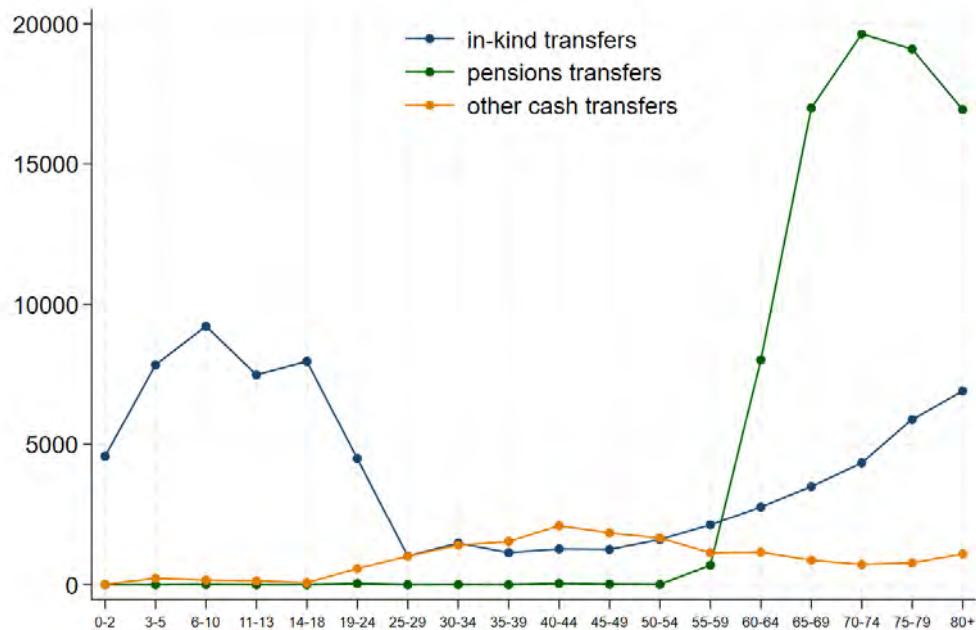
3. Descriptive analysis

Here we report the overall picture of the distribution of in-kind transfers, as opposed to the distribution of cash benefits, bearing in mind that the latter category also includes pension income; we then analyse healthcare and educational transfers in detail. Figure 1 reports the average value of in-kind and cash transfers by age.

The most evident feature of the graph is the somewhat U-shaped profile of in-kind benefits, which reflects the contribution of education (as well as paediatrics) for people aged less than 24 and of public health service for individual in the later stages of life. Conversely, in Italy non-pension cash benefits are mostly concentrated to individual in working ages, even if it should be noted that the allocation of some cash benefits among individuals within the household has some elements of arbitrariness, especially if the program is specifically targeted to the households (like the minimum income scheme or family allowances). Despite the last caveat, it is apparent that age is the most relevant determinant of the use of public services, whereas the distribution of non-pension cash benefits is mostly determined by the socioeconomic conditions of the households.

¹³ Using the same OECD scale, one would need to assume that relative needs do not change when comparing different definitions of income.

Figure 1: Average annual value of in-kind and cash transfers, by class of age (euros)



Note: for in-kind transfers, expenditure is allocated to the person who ultimately benefits from the service (e.g. kindergarten for children aged 1-3, primary education for 6-10, etc.). For other cash transfers, family allowances are allocated to the reference person in the survey. This choice does not affect the distributional analyses reported below, as incomes are aggregated by household.

Healthcare

Figures 2 and 3 show, for different age groups, the average imputed value of health transfers by gender and by level of education. Several facts are worth noting: first, as can be seen especially in the first chart, health expenditure follows a U-shaped pattern, being higher for infants and the elderly and lower for those in the middle age groups; second, health expenditure is relatively similar for men and women, with the exception of higher expenditure for women during reproductive age and for men over 60; finally, health expenditure is lower for people with a higher level of education, possibly reflecting both their better health status and their higher propensity to access private health care.

Figure 2: Average annual cost of public health, by gender and age group (euros)

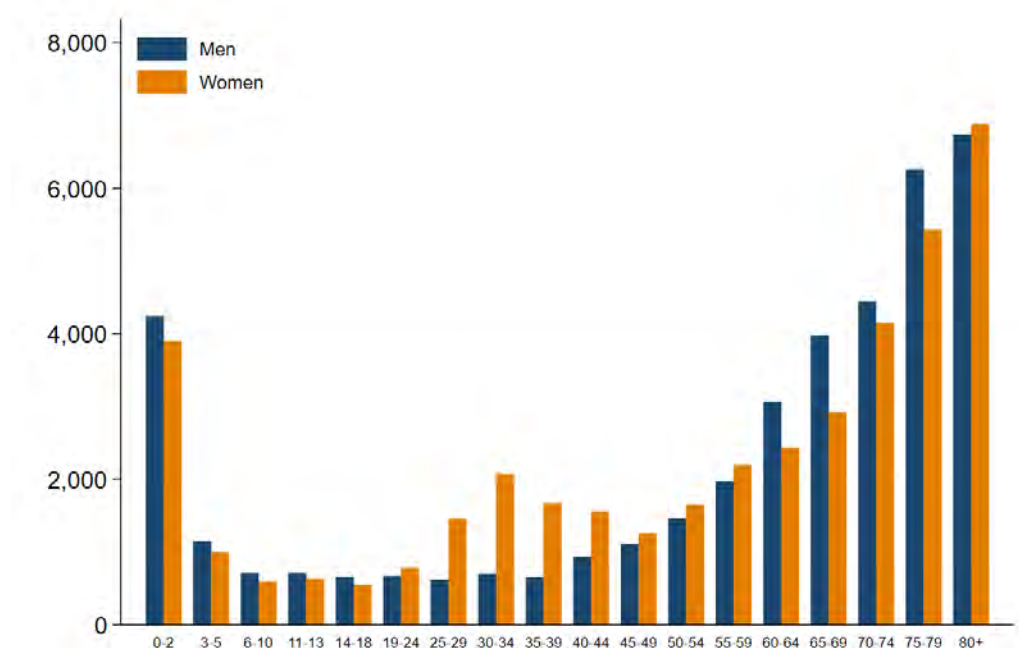
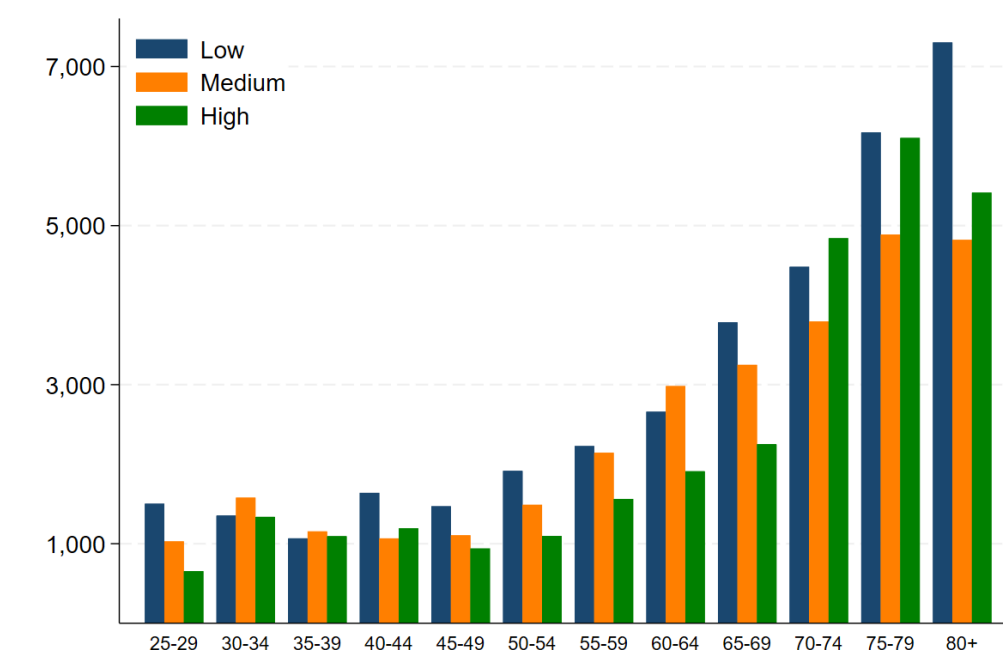


Figure 3: Average annual cost of public health, by level of education and age group (euros)

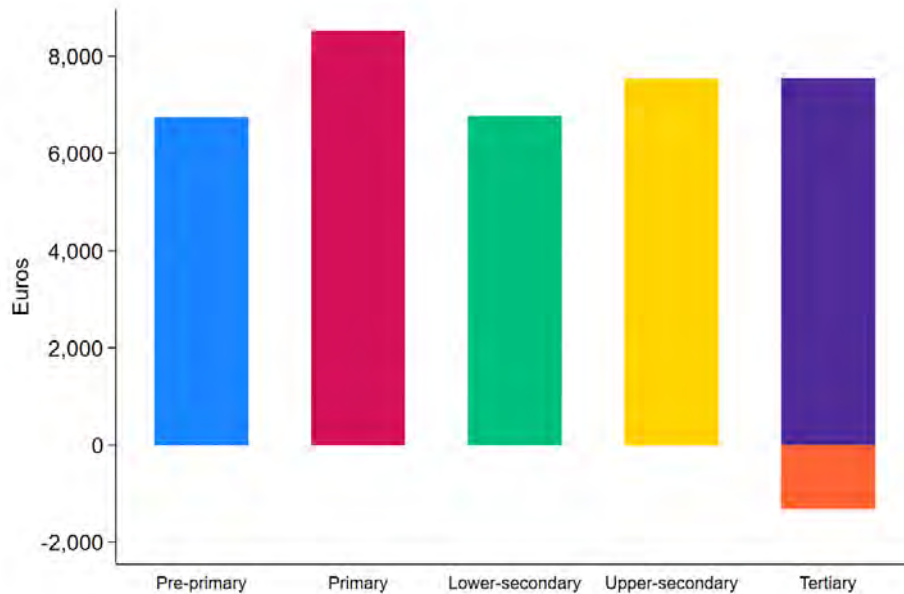


Education

Figure 4 shows the average cost of expenditure per pupil, with a relatively flat profile (similar to what found in Vergnat 2022 for Luxembourg). The amounts range between almost 7,000 euros for primary and lower-secondary education to more than 8,000 euros for primary education. Compared to other EU countries, Italian figures fits in the middle of the distribution, and are very much in line with the

EU average both in terms of average resources per pupil, as well as in terms of distribution of resources between educational levels¹⁴.

Figure 4: Average annual cost of education per pupil, by level (euros)



Note: the negative bar reported for tertiary education represents tuition fees.

4. Redistributive effects

In the previous section we presented a characterisation of the value of in-kind transfers by age of individual. Here, we take into account net equalized income, which considers not only disposable income but also the effect of indirect taxes.

Figure 5 shows concentration curves for net income, the four in-kind services analysed in this paper, and for the resulting extended income. Each item is equivalised with the OECD modified scale. The figure shows that in-kind transfers are more equally distributed than net income: for example, the poorest 40% in terms of net income, who is entitled to 15% of the overall net income in the economy (blue line, which in this case represents the Lorenz curve for net income), receives around 40% of the expenditures for health, 47% of education, 65% for kindergarten, and almost all of the public spending for housing. Adding these items to the net income therefore results into an extended income (red line) that is more equally distributed than the net income itself.

¹⁴ See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Educational_expenditure_statistics

Figure 5: Concentration curves

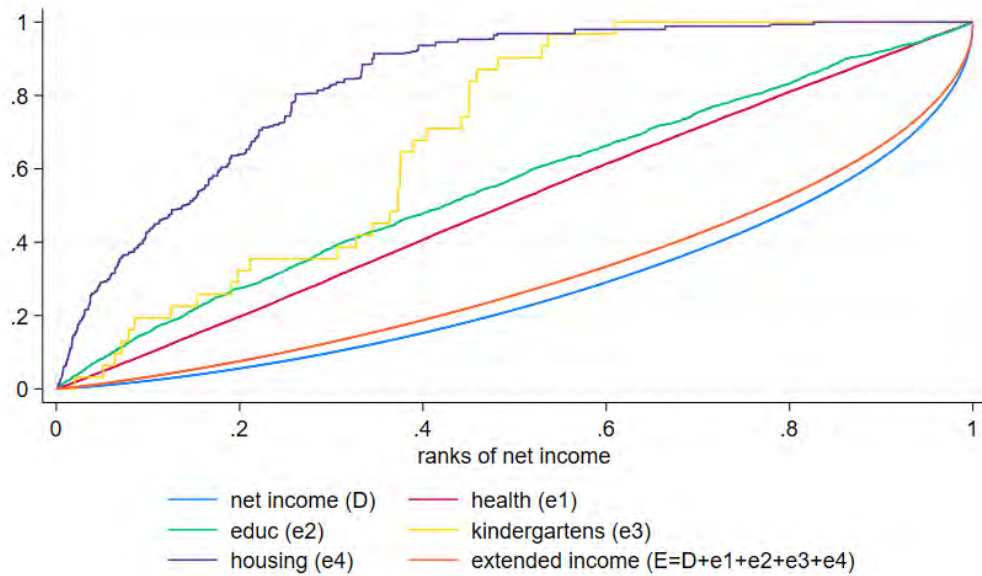
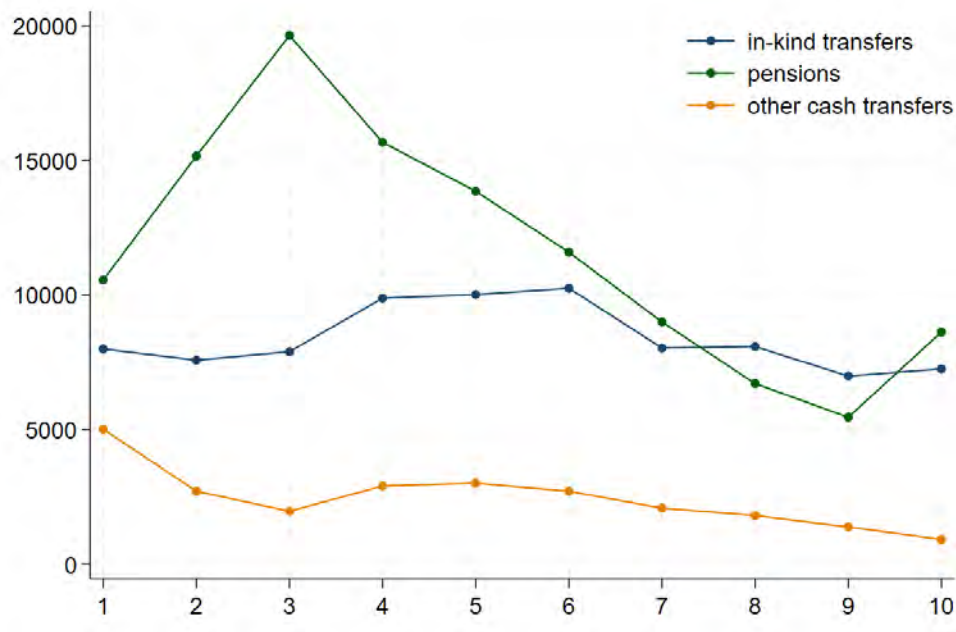


Figure 6: Cash and in-kind transfers over deciles of equivalised original income

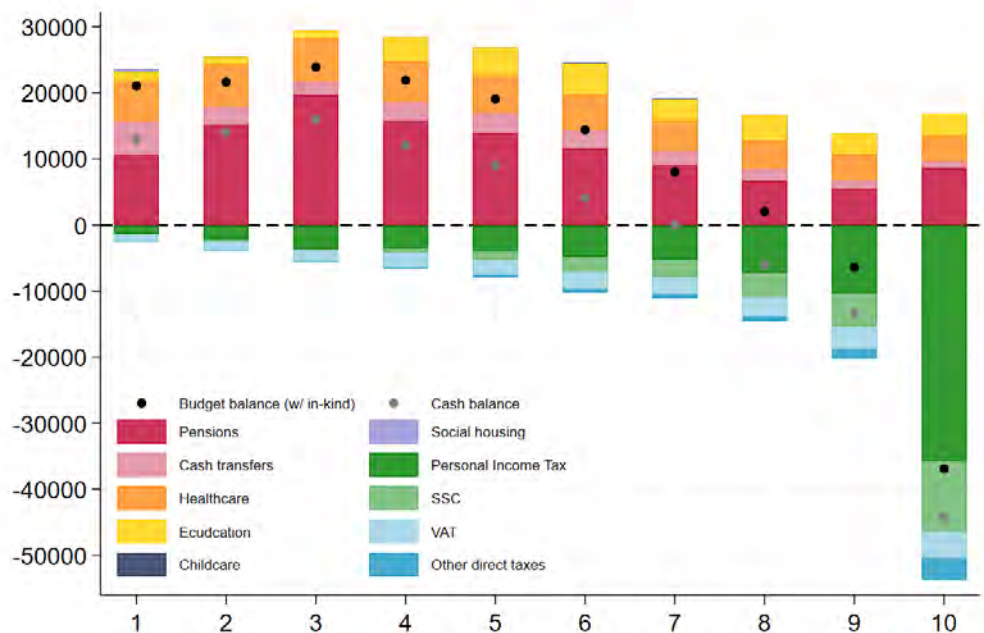


Another way – maybe less rigorous but more intuitive – to grasp the progressivity of cash and in-kind transfers is reported in Figure 6, showing the distribution of both types of transfer by decile of equalized original (market) income. As expected, cash transfers show a clear decreasing profile with respect to original income, reflecting the fact that pensions account for the largest share of cash transfers. Conversely, in-kind transfers show a much flatter profile.

By computing the amount of direct and indirect taxes paid by each household, the amount of cash benefits received, and attributing the value of in-kind transfers to each family, it is possible to derive a “household specific balance” in order to understand which families are net contributors or net

beneficiaries of the Italian welfare system. According to Figure 7, considering only cash benefits (grey dot), the break-even point between net beneficiaries and net contributors to the welfare system falls at the seventh decile. When in-kind transfers are taken into account, the picture changes, as the break-even point moves between the eighth and ninth decile (black dot) where households receive as much from the Government as they pay in taxes. In other words, the Italian welfare state is crucial for the middle classes as well, as they benefit of large-scale universalistic services such as education and health care.

Figure 7: Budget balance with and without in-kind transfers, over vingtiles of equivalised original income



The same figure decomposes the household-specific balance into each tax or benefit component of the welfare system included in the analysis. As widely known, *Irpef*, the Italian personal income tax is highly progressive and plays a prominent role in the redistribution of resources. Households in the top decile of the income distribution indeed bear most of the resources raised through personal income taxation paying, on average almost 35,000 euros each. VAT and other indirect taxes, on the other hand, are regressive with respect to income and show a smaller increase moving from lower to higher deciles of the distribution, because lower income households typically consume a higher share of their income. Looking at cash transfers, the magnitude of pensions predominates in lower deciles where retired individuals without other income sources are located¹⁵.

¹⁵ The treatment of pension transfers in a static microsimulation model frequently gives rise to non-trivial methodological choices. Firstly, it is important to note that pensions can be divided into two distinct components: an "actuarial" component, which reflects the present discounted value of contributions paid, and a "welfare" component, which is independent of the contributions paid. In the context of a static microsimulation model, it is virtually impossible to quantify the two components, as this would necessitate the knowledge of the past working history of each current pensioner. In this paper, the treatment of pensions as a public transfer is consistent with the approach adopted by government statistics. By contrast, social security contributions are regarded as a tax. This choice has mechanical implications for the market income distribution, with pensioners constituting the poorest segment of the population due to their negligible labour income. Furthermore, given the significance of pension transfers, a comparison between market

Other cash transfers are more evenly distributed though they slightly decline toward top deciles. Finally, in-kind benefits are overall evenly distributed across households, but their components are not. Healthcare spending is higher in lower deciles due to the higher concentration of pensioners; the relative contribution of educational expenditure on the other hand is increasing in the top deciles of original income as households of pensioners typically do not have kids.

It should be noted, however, that even a flat transfer in nominal terms (as the one characterizing in-kind transfers) can be highly progressive when evaluated in relative terms, i.e. in relation to household income¹⁶. This last point is an important element in assessing the impact of in-kind transfers on income inequality.

Table 2 ranks Italian households according to their decile of equivalised original (market) income and shows income changes as percentage of average net income in each decile. Consistently with the grey dots in Figure 7, households in the top six deciles have a higher original than net income. For the total population, pensions account on average for 28 percent of net income and they significantly increase income of households with retired individuals, who have almost zero labour income. Social security contributions and the personal income tax reduce original income by 25 percentage points on average. The profile of SSC increases toward higher deciles, representing on average 6 percent of net income. The lowest values are found in the first deciles where there is a higher proportion of unemployed or out-of-the-labour-force individuals while it increases for higher deciles, reflecting the higher share of labour income in the upper part the distribution. PIT receipts account for 19 percent of net income and, as widely discussed, show a strong progressivity, rising from 9 percent of net income in the first decile to 34 percent in the top decile. Cash transfers account on average for about six percent of net income, but they significantly inflate it in the first decile only, representing 35 percent of the respective net income. They then decrease along the income distribution and account for 1 percent only of net income in the top decile. On the contrary, indirect taxes display a regressive pattern, absorbing 8 percent of disposable income in the first decile but only 4 percent in the tenth one.

In-kind transfers increase net income of households by 20 percent on average. They have a strong progressive pattern as they account for 56 percent of net income in the first decile, then decline from 38 percent in the second decile to 19 percent in the seventh and to 12 percent in the ninth one. For top earners, in-kind transfers account for only 7 percent of net income. Healthcare and educational transfers clearly play the largest role, while housing and childcare account for a negligible share. Total transfers for healthcare are again concentrated in the bottom of the income spectrum, primarily determined by the age of the recipient. In contrast, transfers related to education and childcare are more widespread across the distribution. Finally, social housing plays a role in the first decile only.

income (before government intervention) and disposable income (after taxes and benefits) typically results in substantial reductions in inequality indices. In the event of an alternative choice being made, it would be considered that pensions are a form of deferred compensation and that social security contributions are a form of (forced) savings. In this case, the estimated redistributive effects of the tax-benefit system would be much smaller. It is important to note that this choice does not affect the ultimate objective of the paper, which is to compare the cash-based definition of net income (which includes pensions, regardless of whether they are considered market income or social transfers) with extended income (which adds in-kind transfers to net income).

¹⁶ Just as lump-sum taxes are regressive because the fixed amount represents a larger proportion of income for low-income individuals, lump-sum (in-kind) transfers are progressive for the same reason.

Table 2: Income components by deciles of equivalised original income

	1	2	3	4	5	6	7	8	9	10	Total
Original income	9	30	37	57	73	89	100	112	124	142	99
Pensions	73	76	77	56	42	31	21	14	10	8	28
SSC	0	-1	-1	-2	-4	-6	-6	-7	-9	-10	-6
PIT	-9	-11	-14	-12	-12	-13	-12	-15	-18	-34	-19
Other direct taxes	0	0	0	-1	-1	-1	-2	-2	-3	-3	-2
Cash transfers	35	14	8	10	9	7	5	4	2	1	6
Disposable income	108	107	107	108	107	107	106	106	106	104	106
Indirect taxes	-8	-7	-7	-8	-7	-7	-6	-6	-6	-4	-6
Net income	100	100	100	100	100	100	100	100	100	100	100
In-kind transfers	56	38	31	35	31	27	19	17	12	7	20
<i>of which</i>											
Healthcare	43	32	26	22	18	15	11	9	7	4	13
Schooling	10	6	5	13	13	12	8	8	6	3	7
Housing	3	0	0	0	0	0	0	0	0	0	0
Childcare	0	0	0	0	0	0	0	0	0	0	0
Extended income	156	138	131	135	131	127	119	117	112	107	120

4.1 Impact on inequality and poverty indicators

Figure 8 shows the change in inequality, measured by the relative Gini coefficient, when accounting for each component of the Italian tax-benefit system. In a sequential accounting exercise, we measure inequality starting from original income, and then add each tax and transfer component to measure the change of inequality in each step. We equivalize income using the OECD modified scale up to net income definition and the NA scale when extended income is considered.

The Gini coefficient, estimated at 53.3 for original (market) income, declines by more than 10 pp after the inclusion of pension incomes and by further 3.5 pp when other cash payments are considered, reaching a level of 39.2 for gross income. As expected, social security contributions are almost proportional, while the application of the personal income tax and of other taxes on income and wealth reduces the Gini coefficient to 34.1 per cent (disposable income). Then, the regressivity of indirect taxes increase back income inequality moving the Gini coefficient up to around 35.0. Finally, when considering extended income, we note that in-kind transfers play a substantial inequality-decreasing role, with the Gini coefficient now falling at 29.6. Out of the 5.4 pp inequality reduction achieved by in-kind transfers¹⁷, almost 3.1 are explained by health expenditures and 1.9 by education¹⁸, while the impact of other services is more muted.

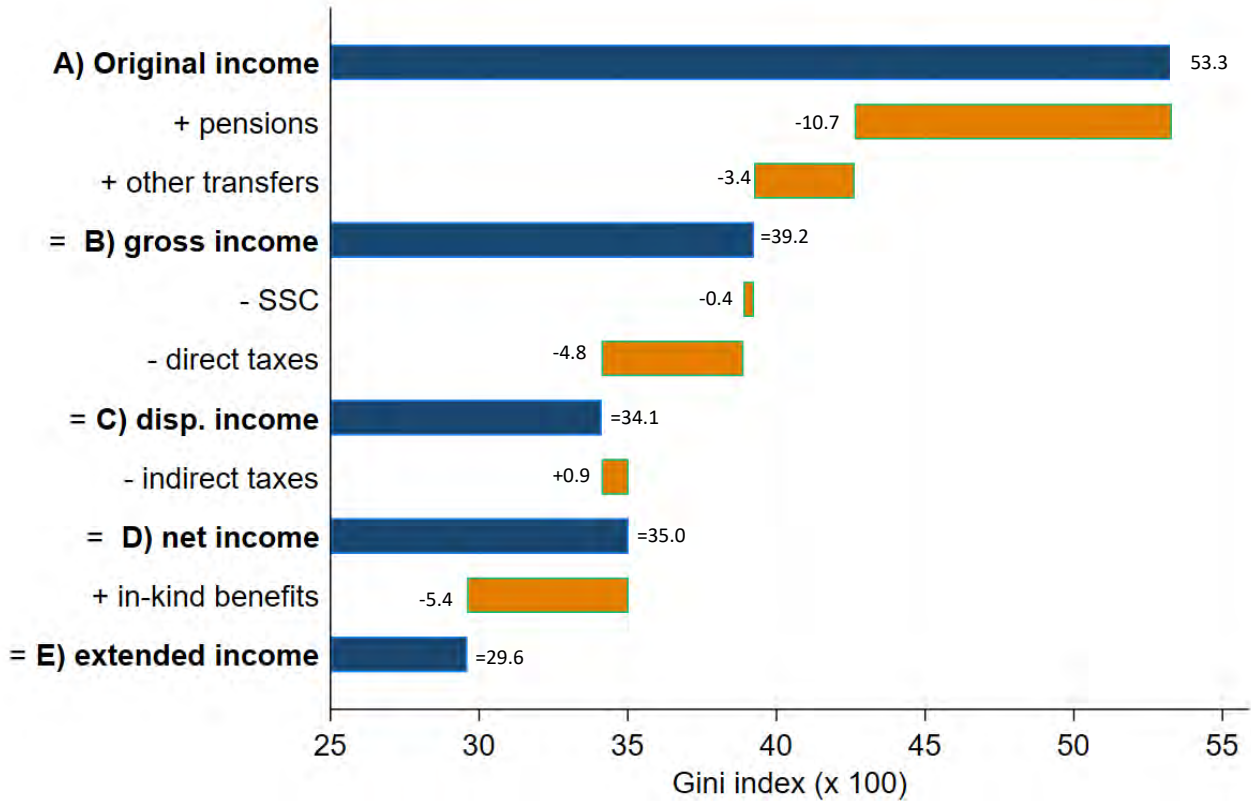
The reduction measured in Gini after accounting for the inclusion of in-kind transfers is sensitive to the methodology applied to assign healthcare spending to beneficiaries. The approach we followed in the paper relies not on the actual use of healthcare services, but on the insurance function of public spending. However, if we use the “actual consumption approach”, the reduction in inequality is

¹⁷ The magnitude of this effect is broadly in line with both Baldini (2007) and Aaberge (2013).

¹⁸ These impacts are derived applying in-kind transfers sequentially, in descending order of relevance (measured by aggregate spending). However, their contribution only marginally changes when the order is reversed.

halved¹⁹. As we already highlighted, the latter approach produces a high-variability distribution determining a high degree of reranking²⁰, which negatively contributes to the overall redistributive effect.

Figure 8: Gini coefficients moving from original to extended income



4.2 Extensions: elasticities by income source and absolute inequality evaluations

To analyse how different components of income contribute to overall inequality, we adopt the framework developed by Lerman and Yitzhaki (1985). This approach helps us disentangling, within a single income component (say for example health expenditures), the relative contribution of *i*) the absolute amount of resources against *ii*) the way these resources are redistributed (its own progressivity) and *iii*) the correlation of this income component with total income. The Gini coefficient for total income inequality, G , can be decomposed as:

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

where S_k represents the share of source k in total income, G_k is the source Gini corresponding to the distribution of income from source k , and R_k is the Gini correlation of income from source k with the distribution of total income. This decomposition provides an intuitive interpretation of how each income component affects total inequality through three distinct channels: *i*) the importance of the

¹⁹ Disposable incomes are slightly under-estimated in BIMic with respect to national account (by around 7% overall). Taking into account this, the impact of in-kind benefit would be only marginally affected (the reduction in the Gini index would be of 5.1 percentage points rather than 5.4).

²⁰ See footnote 4.

income source relative to total income (S_k); *ii*) how equally or unequally the income source itself is distributed (G_k); and *iii*) how the income source correlates with the overall income distribution (R_k).

Even if an income source represents a large share of total income, it cannot influence inequality if it is perfectly equally distributed ($G_k = 0$). Conversely, if an income source is both large and unequally distributed (high S_k and G_k), its effect on inequality depends on which households receive it. If the income source flows disproportionately toward those at the top of the income distribution (high positive R_k), it will increase inequality. However, if it is primarily directed toward lower-income households, it may have an equalizing effect despite being unequally distributed.

This framework also allows us to estimate the effect of marginal changes in specific income sources on overall inequality, all else being equal. Lerman and Yitzhaki (1985) show that the percent change in inequality resulting from a small percent change in income from source k equals:

$$\frac{(\partial G / \partial e)}{G} = \frac{S_k G_k R_k}{G} - S_k$$

This formula reveals that the marginal effect equals the original contribution of source k to income inequality minus source k 's share of total income. This approach is particularly valuable for our analysis of in-kind transfers, as it helps us understand how these transfers affect overall inequality compared to other income components.

Table 3 reports, for each subcomponent of our extended definition of income, the share of total income, the estimated change in total extended income Gini coefficient resulting from a 1% proportional change of each income component and the change in total extended income Gini coefficient resulting from a 0.1% GDP in 2022 (around 2 billion euros) change of each income component. The reference to GDP is useful as income components are very different in terms of sizes.

For example, a proportional 1% increase of taxes on income and wealth decreases inequality by 0.195%, implying a reduction of Gini index by 0.057 percentage points, from 30.975 to 30.918. Analogously, a 1% increase in social housing decreases inequality by only 0.004%. It should be noted, however, that the comparison of these marginal effects should take into account the different shares these components have in the total income, with taxes on income and wealth being extremely larger in absolute values than social housing (in other word, a 1% increase of a component that represents the 0.2% of total income, such as social housing, is unlikely to exert a strong effect on the overall inequality).

For this reason, in the last two columns of the table we make this metric homogenous with respect to the size of income variation, in this case the 0.1% of GDP. If the Government would increase resources to education by 2 billion, and these extra resources were given proportionally to the one already existing, Gini index would decrease by 0.106%, or 0.031 percentage points.

Lastly, based on these findings, one could argue that a budget neutral increase of health expenditures financed through indirect taxation (which per se, as extensively documented in the literature, has a regressive effect; Curci and Savegnago, 2019), would still result into an inequality reduction.

Table 3: Gini decomposition and marginal effects

Income component	Share of extended income	Effect on total Gini increasing income component by 1%		Effect on total Gini increasing income component by 0,1% GDP	
		%	pp	%	pp
Original income	79,9%	0,375	0,110	0,073	0,021
Pensions	27,1%	0,058	0,017	0,039	0,012
Other cash transfers	4,7%	-0,091	-0,027	-0,293	-0,086
Social security contribution	-5,0%	-0,022	-0,006	-0,067	-0,020
Taxes on income and wealth	-17,6%	-0,195	-0,057	-0,180	-0,053
Indirect taxes	-5,0%	0,022	0,006	0,071	0,021
Health expenditures	11,3%	-0,103	-0,030	-0,152	-0,044
Educational expenditures	4,4%	-0,040	-0,012	-0,106	-0,031
Kindergarten expenditures	0,0%	0,000	0,000	-0,120	-0,035
Social housing	0,2%	-0,004	-0,001	-0,506	-0,148
Total = extended income	0,0%	0	0	0	0,000

The analyses carried out so far was centred on the (relative) Gini index. As well known, the relative Gini is scale invariant (does not change if incomes are multiplied by a positive constant), while can be very sensitive to translation (if a positive constant is added to the income of each individual). Instead, the absolute Gini coefficient has the opposite characteristics (scale variant and translation independent)²¹. Which concept of inequality to adhere is ultimately a normative assessment. The relevance of this discussion emerges very clearly for the analyses of in-kind transfers that, as we documented in Figure 6, are relatively homogenous with respect to income.

Table 4 shows our estimates of both relative and absolute Gini coefficient, for both net and extended income, as well as the estimate relative poverty rates (i.e. the share of households with an equivalent income lower than the 60% of the median of the corresponding distribution). The first part of the table confirms that, even using the NA scale, the reduction in relative Gini inequality moving from net to extended income is remarkable. The overall picture changes when using absolute Gini, that is to say the average absolute difference between equivalent incomes in the population: relying on OECD scale the inclusion of in-kind benefit only slightly decreases inequality, from 9,060 to 9,002. The intuition rests on our finding that in-kind transfers are relatively homogeneous (in nominal, absolute terms) across income and, as we recalled above, absolute Gini is translation invariant. However, when adjusting for the needs through the NA scale, also absolute Gini decreases substantially: the lack of this adjustment in the OECD scale overestimates the equivalent income of certain segments of the population, leading to a strong attenuation of the inequality-reducing impact of in-kind transfers. Finally, we estimate the headcount ratio of relative poverty in 21.2% in net equivalent incomes using the OECD scale, which declines to 14.1% in terms of extended income. The application of NA equivalence scale further reduces relative poverty to 12.7%. In sum needs-

²¹ In other words, a lump-sum transfer decreases the conventional relative Gini coefficient but leaves the absolute Gini unchanged.

adjusted scales seem to have a mild effect for the estimation of relative inequality, which however turns remarkable for the measurement of absolute inequality and poverty.

Table 4: Relative and absolute Gini coefficient and relative poverty indicator

Relative Gini coefficient (x 100)		
Net income	OECD	35.0
Extended income	OECD	29.2
Extended income	NA	29.6
Absolute Gini coefficient		
Net income	OECD	9,089
Extended income	OECD	9,020
Extended income	NA	7,106
Relative poverty (head count ratio; percentage points)		
Net income	OECD	21.0
Extended income	OECD	14.2
Extended income	NA	13.1

5. Conclusion

This paper develops and implements a comprehensive methodology for incorporating in-kind transfers into distributional analysis using the BIMic microsimulation model. By assigning monetary values to public services such as healthcare, education, childcare, and social housing, we provide a more complete picture of the redistributive effects of Italy’s tax-benefit system.

Our analysis highlights several facts. First, in-kind transfers follow a distinct U-shaped age profile, with education services primarily benefiting younger individuals and healthcare services concentrated among older populations. This contrasts with non-pension cash benefits, which are predominantly distributed to working-age individuals based on socioeconomic conditions. Second, while both cash and in-kind transfers are progressive, cash benefits show significantly stronger progressivity. Healthcare and, to a lesser extent, education are broadly uniform across income levels, being primarily determined by age and gender, while childcare and social housing benefits show greater concentration among lower-income households. Third, in-kind transfers increase net disposable income by an average of 20 percent, with particularly strong effects at the bottom of the income distribution - increasing disposable income by 56 percent in the first decile compared to just 7 percent in the top decile. Fourth, in-kind transfers reduce Gini income inequality by around 5.4 points, but the effect is halved switching from the insurance value to the actual consumption approach.

These results confirm that the main public welfare services in Italy play a crucial role in reducing inequality, even though their incidence on GDP is below the European average²². Moreover, these results are important in several policy debates, concerning for example how envisaged changes in the provision of public services might affect different population segments or the potential trade-offs between cash, in-kind transfers and taxation in achieving redistributive goals. For example, according to the 2024 European Commission Ageing Report, the incidence of health expenditures on GDP in

²² See Panetta, 2025 where preliminary estimates of the redistributive effects of in-kind transfers were also reported, based on less recent data and relying on the “actual consumption approach” only.

Italy is expected to steadily increase compared with the 2024 figure, up to 0.7 percentage point in the following decades. Based on our results on Gini decomposition and absent any consideration on the effects on VAT efficiency and on price dynamics, one could argue that a budget neutral increase in indirect taxes would still result in an inequality-reducing policy mix.

Finally, our analysis shows that in-kind transfers play a crucial role in reducing income inequality, even larger to the one taxes on income and wealth. However, the choice of equivalence scale is critical when measuring these effects. While using the OECD scale with extended income produces larger shifts in the income distribution, the needs-adjusted scale better accounts for households' differing needs for public services, resulting in a more stable distribution pattern. The work also highlights how different methodological assumption can result in large differences in the estimated impact on income distribution: in this regard, more studies using refined techniques or datasets (for example able to capture the intrinsic territorial heterogeneity of public services, especially in health and education) would contribute to enhance the external validity of the results discussed above.

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Appendix: Details on the computation of equivalence scales

In this paper, and consistently with the most recent literature, we rely on the concept of a needs-adjusted scale, introduced by Aaberge et al. (2010, 2017), which takes into account the relative needs of each household. In particular, the Individual Non-Cash Income Equivalence Scale (*SNCI*) is derived from the ratio of the minimum public service needs of individuals in group j to the minimum needs of the reference individual r . The Needs Adjusted (*NA*) scale is then the weighted sum of the OECD scale and the aggregated household non-cash income scale. In this paper we implement the Simplified Needs-Adjusted (*NA*) scale using group averages.

After grouping individuals homogeneously based on age, gender, and household composition (e.g. single men aged between 55 and 59), the $SNCI_j$ is given by the ratio of in-kind transfers in group j relative to the average in the reference group r (single males aged 35-39).

The NA_h scale is then given by

$$NA_h = \theta_r OECD_h + (1 - \theta_r) \sum_j h_{hj} SNCI_j$$

Where θ_r is the relative share of cash over cash and non-cash transfers for the reference individual. The *NA* scale instead accounts for the relative need for public services. As shown in Table A1, the equivalent extended income of the elderly person would be $20,000 / 1.25 = 16,000$, providing a more realistic welfare comparison.

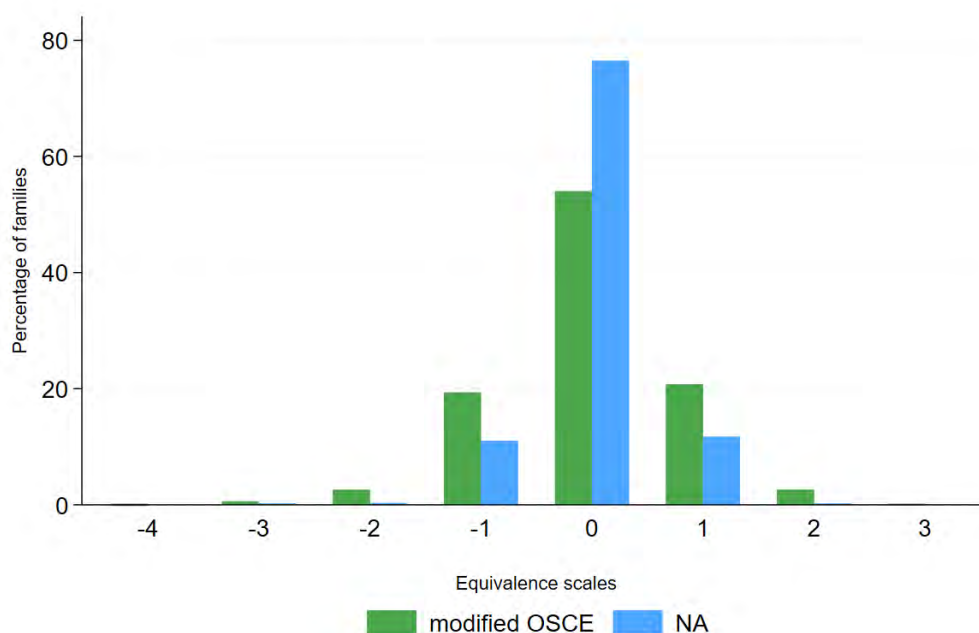
In the context of analysing the economic wellbeing of families, we can now account for equivalent extended income. As highlighted above, one needs to correct for the appropriate equivalence scale when including non-cash income. The graph below demonstrates why this correction is important.

Figure A1 classifies families into deciles of extended income relative to deciles of disposable income according to both the OECD or *NA* scale; the choice of the appropriate equivalence scale is important when comparing heterogeneous households and incomes.

Table A1: Equivalence scales for selected household profiles

Gender	Age group	Education	Scale	
			OCSE	NA
Single man	19-24		1.00	1.00
	25-29		1.00	1.00
	30-34		1.00	1.00
	35-39		1.00	1.00
	40-44		1.00	1.01
	45-49		1.00	1.02
	50-54		1.00	1.03
	55-59		1.00	1.05
	60-64		1.00	1.10
	65-69		1.00	1.13
	70-74		1.00	1.15
	75-79		1.00	1.24
	80+		1.00	1.25
Couples without children	19-24		1.50	1.54
	25-29		1.50	1.55
	30-34		1.50	1.58
	35-39		1.50	1.56
	40-44		1.50	1.57
	45-49		1.50	1.56
	50-54		1.50	1.59
	55-59		1.50	1.63
	60-64		1.50	1.68
	65-69		1.50	1.73
	70-74		1.50	1.81
	75-79		1.50	1.94
	80+		1.50	2.00
Single woman, one child (boy)	35-39	No school	1.30	1.57
	35-39	Nursery school	1.30	1.69
	35-39	Primary	1.30	1.75
	35-39	Upper secondary	1.50	1.88
Couples, one child (boy)	40-44	No school	1.80	2.09
	40-44	Nursery school	1.80	2.21
	40-44	Primary	1.80	2.27
	40-44	Lower secondary	1.80	2.18

Figure A1: Difference between income definition (deciles) across equivalence scales



Note: The chart represents two histograms. The x axis reports the difference between the decile of disposable income and the decile of extended income, the y axis the percentage of families. The green bars show the difference when both incomes are equivalized using the modified OECD scale. The blue bars represent the same difference but using the NA equivalence scale for extended income.

Not accounting for the need of public services overestimates equivalent income of households so that using the OECD scale with extended income produces larger shifts in the income distribution compared with the NA scale. Using the OECD scale, less than 60 percent of households is allocated to the same decile of disposable income; the remaining 40 percent of households display up to 4 deciles shifts in the extended income distribution compared to their position in the distribution of disposable income. Accounting for the need of public services with the NA scale tends to preserve the original distribution, with almost 80 percent of households remaining in the same decile and around 20 percent moving up or down by one decile only when accounting for extended income.