

Publicly Provided Services and the Distribution of Households' Economic Resources

by

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Introduction	2
Findings from previous research	5
Health care	5
Education	8
Social housing	10
New empirical evidence	11
Size and composition of public services to households	11
Estimates based on individual records	12
Estimates based on grouped data	19
Conclusions	24
Notes	25
Bibliography	28
<i>Annex Table A.1. Main findings from selected studies on the distributive impact of public services</i>	<i>32</i>

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Introduction

Most studies on income inequalities, within a country or internationally, are based on the concept of household monetary income. This choice is not without consequences. The fact is that many factors other than income contribute to individuals' well-being and, by leaving them out, conventional income measures may give a biased impression of both the average level of well-being and its distribution. This article focuses on one of these factors, i.e. those government-provided services to households that confer a personal benefit to users. Households pay taxes to finance these public services; but while (part of) these taxes are deducted from their income, the services provided in return do not affect traditional income measures.¹ A more accurate table of inequalities and standards of living should, in principle, include the value of the public services from which households benefit.

The omission of this category of resources is due both to the difficulty of measuring it and to more profound conceptual questions, evoked in Box 1. While there are no simple answers to many of these questions, excluding such services from the analysis of how households economic resources are distributed is unfortunate since, in the majority of OECD countries, their budgetary cost is comparable to that of cash transfers. Consequently, and despite the conceptual problems referred to, a long tradition of analysis in certain OECD countries (United Kingdom, United States and Australia in particular) has addressed the effect of public services on distribution.²

Box 1. Conceptual and methodological issues

Considering the influence of government services on the distribution of economic resources available to households requires broadening the definition of resources, from the more narrow concept of disposable income – i.e. the sum of market income (earnings, rents, dividends, etc.) and cash transfers (from both public and private sources) that households receive, less the direct taxes and social security contributions they pay – to one that includes additional non-market elements, such as government-provided services, that are usually omitted from conventional statistics. Shifting from household income towards a broader concept of economic resources raises a range of questions: some are conceptual, and mainly relate to the valuation of these services and to their distribution across individual beneficiaries; others are methodological – and probably less controversial – but can crucially affect numerical results.

- *What services should be included?* The boundaries of what can be included under the heading of “public services” to households are ill defined. Major items of public expenditure such as education and health are certainly included, but *a priori* any public expenditure – either directly or indirectly – benefits households, from spending on military equipment to operating costs of institutions. One can, however, categorise these different types of expenditure. Some services provided by government benefit households individually, as in the case of health, education and social housing. Others,

Box 1. **Conceptual and methodological issues** (cont.)

conversely, benefit the whole population more or less indivisibly, for example infrastructure or security. A few studies have sought to allocate all public expenditure to households, from agricultural subsidies to construction of motorways (e.g. Ruggles et al., 1981). Others have relied on a more precise classification of public services according to their impact on households (e.g. Wolff et al., 2004).¹ In practice, most studies have focussed on more limited sectors of activity – notably education, health and certain other items of social expenditure – where services provided confer a personal benefit upon users.

- *How to value government services to households?* Public services are typically provided outside market settings. Because of the lack of market prices, these services are generally valued, in the national accounts system, at their production cost – which, in most cases, is further limited to labour costs, i.e. excluding costs for the use of capital equipment. This is a controversial choice when the objective is to value the well-being of individuals and households. An alternative to production costs would be to value these services by what an individual would have spent if similar services had been bought on the market or on the willingness of individuals to pay for them, but the information requirements of these approaches are demanding – and government services may have characteristics that differ from those purchased on the market. Despite these problems, the valuation of government output has a critical importance for all analyses of its distributive impact – underlining the importance of the ongoing discussion within the national accounts community of how best to measure government output (Atkinson, 2005). Most studies on the distributive impacts of government services value these at their production costs (e.g. Aaberge et al., 2006 ; Ruggles et al., 1981 ; Smeeding et al., 1993), thus neglecting differences across countries in the efficiency of service provision.²
- *How to distribute the aggregate value of government services among individuals?* The household surveys that are typically used to assess income distribution often provide only limited information on the actual use of different government services by each individual and household. This implies that most attempts to “individualise” these benefits rely on imputation techniques, and are therefore exposed to errors.³ While for some services this individualisation is relatively straightforward (e.g. use of public education is limited to those households with a child of the relevant school-age), for other types it requires more detailed information (e.g. on the number of medical and hospital visits in the case of public health). Most studies of the distributive impact of public health care services base the distribution of their aggregate value across individuals not on their actual use, but rather on the characteristics of individuals (e.g. age, gender, education or income) and households (e.g. presence of children, work status of other adults in the family) – i.e. on the assumption that the probability that a person will access these services is the same as that prevailing for other individuals with the same characteristics.⁴
- *Should the value of government services be attributed to individuals or to the household in which they live?* This methodological question is important for interpreting the results of different studies. Most studies of income distribution use the household (or, more rarely, the family) as the unit within which resources are pooled and (equally) shared by individuals (i.e. individuals are attributed the income of the household where they live, after an adjustment for different needs across households of different size, Canberra Group 2001). This approach raises, however, specific problems in the case of government

Box 1. Conceptual and methodological issues (cont.)

services, i.e. whether their benefits accrue to the individual user (for example, those who are attending university education) or extend to other household members (i.e. parents who may bear the costs of their children's university studies).⁵ While this second approach is the one used by most studies, its application raises specific problems in the case of students in tertiary education, many of whom may be counted as being part of an independent household with low reported income. While some studies try to overcome this problem by attaching students to their family of origin, this is not always feasible.

- *Redistribution over what period?* The benefits of government services to individual users may not be limited to the moment in which they are consumed but extend to the long term (e.g. education services enhance the future earnings of students). Accounting for these long-term benefits, however, requires life-cycle models whose assumptions (in terms of preferences and risk aversion) are often *ad hoc*. Because of these difficulties, most studies in this field take a more limited, but also less arbitrary, static view of these benefits.

Answers to many of the questions above are inevitably controversial. Some observers will question the possibility of assessing households' well-being by "adding" cash components that can be used by recipients to meet all their needs of daily living – and whose value is known with certainty – to other components that can only be used to meet some of these needs – and whose valuation is inevitably controversial. Even when accepting the usefulness of a broader concept than household income, the partial nature of this extension (e.g. including in-kind public services but excluding other components such as imputed rents or capital gains) can improve the ranking of some individuals (e.g. families with children) while an extension to all components could have the opposite effect (Verger, 2005). In other words, each additional item has the potential to affect the overall assessment of well-being and inequality.⁶ These considerations have obvious implications for the interpretation of results in this report.

1. Wolff *et al.* (2004) use a classification for the United States based on the national accounts nomenclature, which includes all services that directly benefit households but excludes general administration, national defence, justice and prisons.
2. Smeeding (1977), however, values government services based on how much households would have spent for a private service with similar characteristics, i.e. their cash-equivalent value. Because of differences in the characteristics of households who purchase public and private services, Smeeding relies on econometric methods (applied to households buying private services on the market) to estimate the price that households who use public services would have been ready to pay.
3. In addition, the benefits from these services may not be limited to the individual user but extend to society as a whole (i.e. each person may benefit from living in a community where the levels of education and health are high). However, accounting for these externalities is difficult: as a result, they are generally ignored by most empirical analysis.
4. This assumption effectively implies that all individuals derive a benefit from knowing that, in case of need, they would have access to these services.
5. In one approach, the equivalised income of the beneficiary is increased by the non-equivalised value of government services; while in the second, the non-equivalised income of the household is first raised by the amount of government services and then equivalised.
6. Both the size and the distributive effects of various income components will depend on the valuation used. For example, Mattila-Wirolahti (2004) estimates that household production (i.e. the production by household members of goods and services for their own use that could have been delegated to individuals outside the household), when valued at the earnings of a non-skilled worker, would lower the Gini coefficient of income inequality in Finland by around 30% and the headcount poverty rate by close to 60% in 1999-2000.

This article takes stock of the evidence and compares the methodologies adopted to take account of the distributive impacts of public services to households. The analysis ignores however other potentially important effects – such as those on labour supply and poverty – as well as those public services that cannot be attributed to individual users (e.g. transport infrastructure, police, defence). The next section summarises the main results of previous studies on this subject while the one that follows presents the results of a quantitative evaluation. This evaluation is based on two different approaches. The first approach relies on the micro-records from household surveys for 18 OECD countries and considers the impact on the distribution of households' economic resources of public health care, education and social housing. The second approach is based on grouped income data by deciles from the OECD questionnaire on income distribution and provides estimates for 26 OECD countries and for all spending categories included in the OECD Social Expenditure Database. The final section summarises the evidence and concludes.

Findings from previous research

Several studies have looked at the distributive implications of publicly provided services. This section summarises some of the main findings from this research in the fields of health care, education and social housing. Key results from these studies are summarised in Annex Table A.1. Results are however difficult to compare directly across studies, because of differences in the programmes covered and in the methodology used.

Health care

Research on the distributive effects of health care services has pursued two main approaches: the first considers the monetary value of public health care services as *adding* to household income; the second focuses on how individuals' out-of-pocket health care costs *lower* their economic resources.

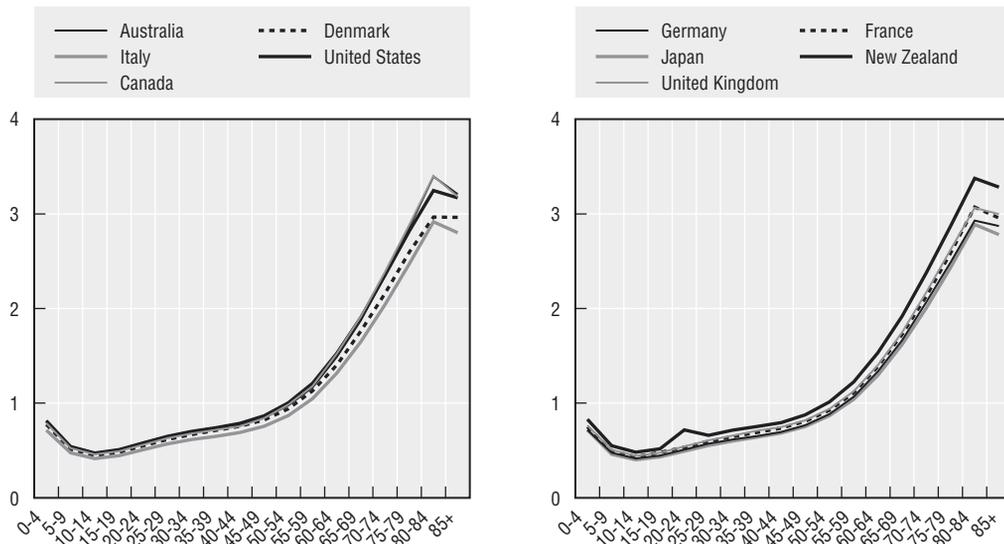
Approaches based on adding public outlays to household income

Studies on the impact of public health care expenditure on overall household resources have relied on two main approaches in attributing to individuals the benefits from these services. The first is based on the notion that each individual has the same probability of benefiting from these programmes as other people with similar characteristics (*insurance value*); the second is based on the *actual use* of these services. The first approach is by far the most dominant, and is the one that will be used for the empirical analysis presented in the next section. The dominance of this approach partly reflects the high concentration of health spending on the elderly. Indeed, the profile of public health expenditure by age is remarkably similar across OECD countries: following a slight fall after an early age, use of health care services remains broadly flat until the age of 40-44 before increasing exponentially in old age, and then declining marginally after age 85 (Figure 1).

Research that bases the imputation of public health care expenditure on people's age (extended, more rarely, to other characteristics) reports a significant effect in reducing inequality in the distribution of economic resources. This effect reflects two elements.

- The first is the heavy concentration of health spending on the elderly mentioned above, combined with the fact that most elderly, having withdrawn from the labour market, have low money income – which implies a strong redistributive effect in terms of the

Figure 1. **Public health care expenditures per capita for each age group, as a proportion of total per capita health expenditure**



Note: Values above 1 indicate that the per capita spending of a given age group is above the one for the population as a whole (e.g. health care spending going to people aged 80 and over is around three times higher than the average).

Source: Calculations based on OECD (2006), "Projecting OECD Health and Long-Term care Expenditures: What are the Main Drivers", OECD Economics Department Working Papers, No. 477, OECD, Paris.

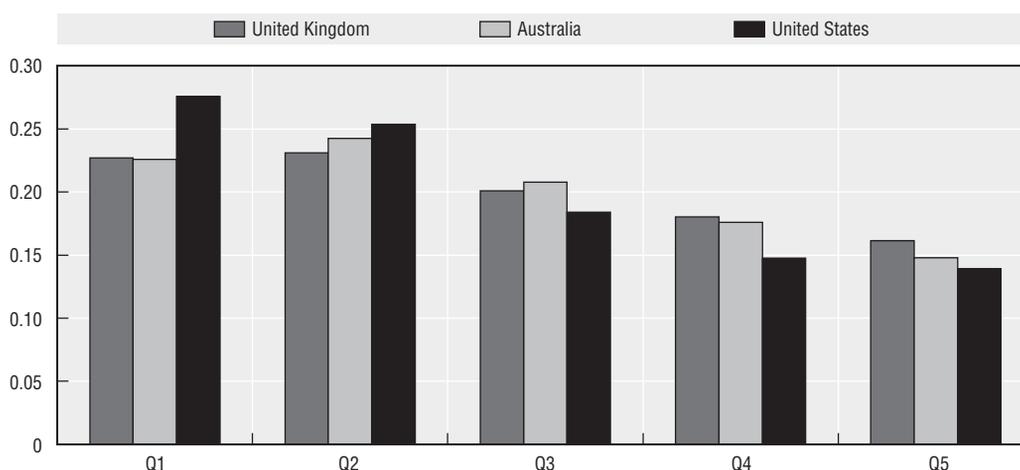
annual accounting period used here. Indeed, according to Gardiner *et al.* (1995), the greater concentration of health care spending in the lower quintiles mainly reflects the low income of most elderly people.

- The second is the amplification of this age-related redistributive impact by an additional equalising impact from the distribution of public health care spending within age groups.³ This reflects both the greater importance of health care services for those at the bottom of the income distribution, even when the absolute amount provided is the same for all individuals, and – in some countries – the higher value of the health care services provided to people in the lower quintiles of the income distribution.

These patterns hold both in countries with a universal health care system (e.g. the United Kingdom), and, to an even greater extent, in those where access to some public health care services is limited to elderly people or to those with fewer resources (e.g. the United States). Estimates from national studies of the distribution of public health care expenditure across income quintiles show that the decline is both steeper and more progressive in the United States, while in both the United Kingdom and Australia those in the second quintile receive the largest share (Figure 2). Indeed, according to Lakin (2004), the distribution of public health care spending in the United Kingdom is relatively uniform for non-retired households, while it favours those in the lower part of the distribution when the analysis is extended to all households.

Other studies have relied on *actual* consumption to assess the distributive effects of public health care. For example, both Evandrou *et al.* (1993) and Sefton (2002), who rely on detailed data on the effective use of health care services by individuals in the United Kingdom, conclude that public health care expenditure lowers inequality – with an even larger share of public health care spending accruing to people in the second quintile and a steeper fall in its distribution, relative to studies based on insurance values. Estimates

Figure 2. **Distribution of public health care expenditure across income quintiles, early 2000s**



Note: Estimates for the United States assume that outlays for public health and hospitals are available to all individuals (i.e. they are distributed on a per capita basis) while those for Medicare and Medicaid are only available to specific segments of the population. For each country, the five bars in the chart sum to unity.

Source: Harding *et al.* (2004) for Australia, Lakin (2004) for the United Kingdom, and Wolff (2004) for the United States.

based on actual health care use, however, are not immune to criticism. In effect, this approach implies that, for a given money income, sick people are better off than others simply because they receive more health-related services (Aaberge *et al.*, 2006). In addition, many health care interventions are both very costly and concentrated over a limited period of time: as a consequence, re-ranking individuals on the basis of “final” income (i.e. after allowing for the effect of the public health-care benefits received) may push those people who benefit more from these services into higher income groups, thus dampening the measured effect of health care services in equalising the income distribution.

Addressing these criticisms requires considering both the greater use of health care services by people affected by health problems and their greater health needs. Research on the links between individuals' income and health status suggests that poorer people have worse health conditions than others, and, as a consequence, greater needs for health care (Hernández-Quevedo *et al.*, 2006 ; Humphries *et al.*, 2000; Caussat *et al.*, 2005). Studies that try to control for both needs and use of health care services (based on respondents' self-assessment of their health status and their use of various types of health care services) suggests that most OECD countries have achieved “equity” in terms of number of physician visits and hospital nights across different income groups, while dental health services are invariably pro-rich (Van Doorslaer *et al.*, 2004).⁴ This conclusion is further strengthened when considering that poor people may opt to forgo health care as part of the coping strategies they adopt when confronted with illness.

Approaches based on deducting out-of-pocket costs

Cross-country differences in the organisation of health care services have implications for income distribution that go beyond those implicit in the size of public expenditures. To address these, Gardiner *et al.* (1995) propose an alternative approach: rather than adding public health expenditures to personal income, their approach deducts from disposable income the out-of-pocket costs (including the costs of private health insurance) incurred by households.⁵ The importance of out-of-pocket health care

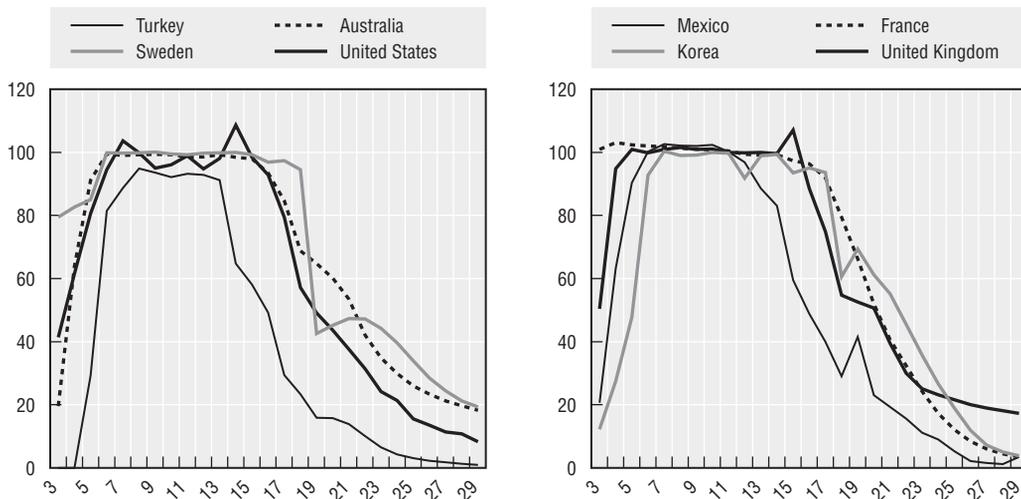
outlays for cross-country comparisons of income inequality is highlighted by the large differences across countries in both their average size and their distribution among income deciles (Gardiner *et al.*, 1995).

Out-of-pocket health care expenditures are a special concern in countries, such as the United States, without a universal health care system.⁶ Merlis (2002) observes that these payments are a major reason for income insecurity for people without health insurance in the United States (around 16% of the total population, De Navas-Walt *et al.*, 2006): and that out-of-pocket health care payments account for more than 5% of income for 16% of all US households, and for 23% for those below the official poverty line. Also, these out-of-pocket payments are especially large for households headed by an elderly or disabled person, because of a combination of greater needs, lower income and lower coverage by employer-based health insurance. Out-of-pocket payments are also important in other countries, especially when households confront “catastrophic” events.⁷ Overall, evidence suggests that out-of-pocket payments most affect the poorest families with the most serious health problems.⁸

Education

The utilisation of public education services varies from one individual to another, which *a priori* means significant distributive effects. An individual's age – at least up to upper secondary education – is the chief factor which determines the probability that any individual will benefit from such services (Figure 3). Indeed, the majority of studies of the distributive effects of public expenditure on education approach these services globally and base the imputation to individuals on the criterion of age (*e.g.* Garfinkel *et al.*, 2004), although others use information on actual participation in different types of educational institutions.

Figure 3. **School enrolment by age in selected OECD countries, 2003**



Note: Participation in public and private education both on a full- and part-time basis. In some countries, the rate of participation is higher than 100% because the estimates of the number of students and the number of people in each age group are based on different data sources.

Source: OECD (2005b).

However, individuals' age is not the only factor which affects the utilisation of public education services. Other factors, such as individuals' social background and income, are

also important. The role of these factors depends considerably on the category of education concerned. In this regard, the fundamental distinction is between compulsory education and non-compulsory education.

Compulsory education

Compulsory education, which includes primary and lower secondary education, accounts for between 30% and 60% of public education expenditure depending on the country. In principle, all individuals of school age benefit from this, although some households choose private education.⁹ While a small minority of children (most of them from poor backgrounds) do not attend school at this age,¹⁰ the allocation of public expenditure for compulsory education based solely on age seems *a priori* justifiable.

Studies adopting this approach to compulsory education have generally found evidence of significant reductions in inequalities in the distribution of economic resources. For example, in Greece primary and secondary education mainly benefit the three lowest quintiles of the distribution, the inclusion of each of these two categories of public spending leading to a one point reduction in the Gini coefficient (Antoninis *et al.*, 2001). Greater equality generally results from the combined effect of a higher value of universal services as a proportion of income for households at the bottom of the income scale, and from the concentration of children in lower income families (in some countries). In some countries, households in the bottom deciles of the income distribution also appear to receive a higher absolute amount (*e.g.* public spending for primary and secondary education in Norway, Steckmest, 1996).

Non-compulsory education

Social background is much more significant for attendance at other levels of education. This is the case of pre-primary education, where the probability of access is higher for children from households where both parents are in paid employment and who, as a consequence, are more likely to be in the highest deciles of the distribution (CERC, 2003; Hugounenq, 1998). This phenomenon is even more apparent at post-compulsory education levels (upper secondary school and university) which, in addition, account for a much higher share of public expenditure on education.¹¹

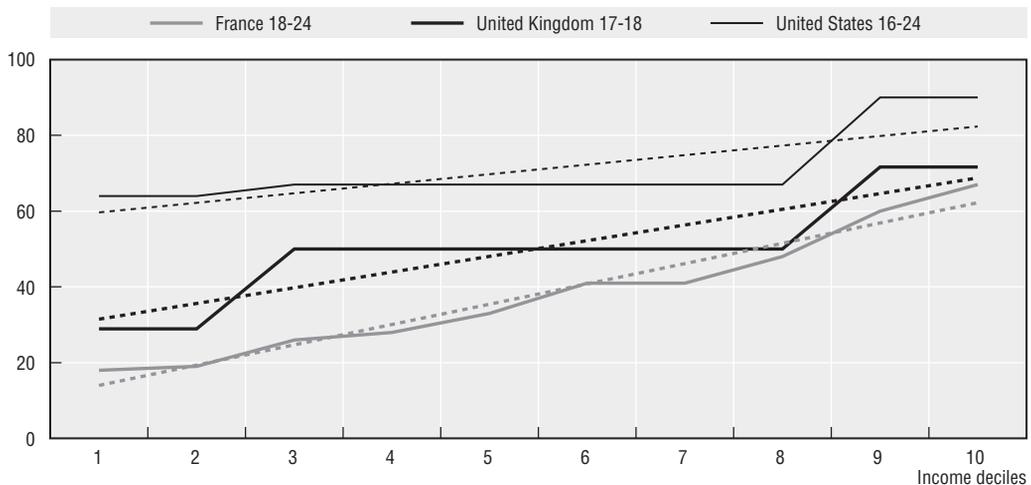
In all the OECD countries, attendance of tertiary education is associated with a more unequal distribution of resources, not least because it depends on parents' socio-economic characteristics.¹² Various factors combine to cause this.

- One factor relates to the parents' age. Parents of children aged 18 to 25 are generally at the time of their life where their salaries are highest, which helps to place them most often in the highest quintiles of the income distribution (Sefton 2002). By contrast, older people, whose incomes are generally lower than the population average, benefit less from this expenditure because fewer of them have children of that age.¹³
- A second factor relates to family incomes. Evaluating this factor, however, raises specific problems. A large proportion of students in tertiary education live away from their family of origin and could, based on conventional definitions of household income, be considered as having low income. To take account of this factor, individuals must be grouped in their households of origin. While only a few studies appear to have used such an approach, they do highlight clear inequalities in attendance. Thus, in France, individuals aged between 18 and 24 from households in the highest quintile of the

income distribution have a probability of access to university which is three times higher than that of the lowest quintile. (Albouy *et al.*, 2002). These inequalities are also evident in the United Kingdom (Evandrou *et al.*, 1993; Sefton, 2002) and, to a lesser extent, in the United States. Among these three countries, inequalities of access are greater in those where the enrolment rate in higher education is lower (Figure 4).¹⁴

Both of these elements make public expenditure for tertiary education regressive, *i.e.* most of their benefits accrue to individuals coming from richer families.

Figure 4. **Participation in tertiary education by income deciles of family of origin**
Share of individuals in each decile



Note: The rate of participation in higher education is the proportion of individuals of a given age who are students. The differences observed between countries partly reflect differences in age groups considered. The dotted lines represent linear interpolations obtained from these curves. For the United States, the data only cover young people aged 16 to 24 years who have completed their secondary education.

Source: Albouy *et al.* (2002) and Blanden *et al.* (2002).

Social housing

Housing costs are the largest item in the household budget, especially for households at the bottom of the income distribution (Ditch *et al.*, 2001). The institutional arrangements whereby governments help the poorest to meet housing expenditure vary from one country to another (Gardiner *et al.*, 1995). While housing aid in cash is generally included in household money income, this is not the case for social housing, even if households benefiting from this often pay a rent that is below market rates.¹⁵ The scale of social housing varies considerably from country to country. Thus, the proportion of households in social housing ranges from 6% or less in Australia, Canada, New Zealand and Sweden, up to around 20% or more in France (18%), the United Kingdom (22%) and the Netherlands (36%, Ditch *et al.*, 2001).

The impacts of social housing on income inequality depend on the characteristics of renters and on the size of the “implicit subsidy” provided. With respect to the first element, conditions of access to social housing vary considerably from one country to another. In Great Britain, the Netherlands, New Zealand and Sweden, access to social housing is not explicitly linked to individuals’ resources, while such means-testing does exist in the other six countries considered by Ditch *et al.* (2001). In France, social housing primarily benefit families on low or modest incomes, even if the majority of them are not poor.¹⁶

While comparative evidence of the impacts of social housing on income inequality is rare, more evidence is available from national studies.¹⁷ Both Sefton (2002) and Lakin (2004) argue that people in the two bottom quintiles of the income distribution in the United Kingdom benefit most (receiving 36% and 34%, respectively, of the total benefits associated with social housing). Other studies, which “augment” household income for both the implicit subsidy provided by social housing and for the imputed rent of owner occupation, show that the effects of these two factors on income inequality offset each other. For example, Saunders *et al.* (2005) conclude that the overall effect of rental income (for all types of tenure) is a small decline of income inequality in Australia,¹⁸ while Gardiner *et al.* (1995) report that allowing for housing subsidies and imputed rents slightly reduces income inequality and poverty in the United Kingdom and France. Overall, these studies suggest that social housing is probably the category of government services that benefit the poor most. However, its overall impact on income inequality is smaller than for health care and education because of the lower amounts of spending.

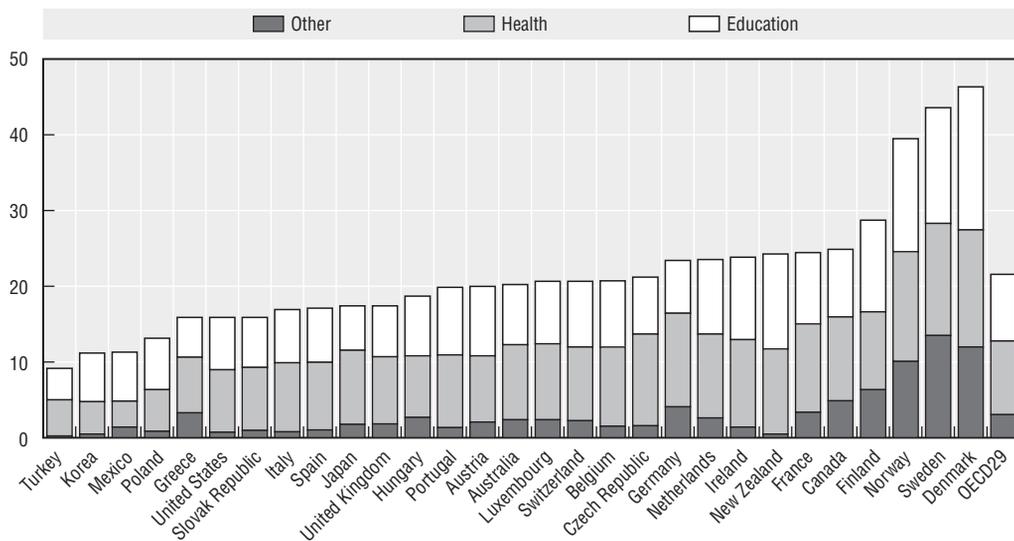
New empirical evidence

This section first describes the size of public spending on services to households, and then presents estimates of its impact on the static distribution of household income. These estimates are based on two different approaches, which use different methodologies to impute these expenditures to individual beneficiaries. The first approach – which is limited to a more narrow range of countries and social programmes – is based on individual records from household surveys: in this approach, household income is increased by the value of the public services received by individual beneficiaries and inequality measures allow for possible moves of individuals in the distribution (*i.e.* for “re-ranking” of individuals). The second approach – which is applied to 26 OECD countries and covers all public expenditures for the provision of social services to households – is based on income data grouped by deciles, as available from the OECD questionnaires on income distributions. In this approach, the average income of each decile is increased by the average value of services received by people in that decile, without “re-ranking” of individuals. Both sets of estimates rely on the concept of “equivalised” household disposable income based on an arbitrary (but commonly used) assumption of how household needs change with household size (the square root elasticity).¹⁹ The description of results presented in this section is mainly based on the inter-quintile share ratio (Q5/Q1) and refers to a single point in time, typically around 2000.

Size and composition of public services to households

Public expenditure for the provision of services that can be attributed to individual households is considerable (Figure 5).²⁰ At a minimum, these publicly provided services include health care and education, as well as spending for the provision of what are labelled as “other social services” in the OECD Social Expenditure Database.²¹ On average, this expenditure represents 21% of household disposable income (according to national accounts data), with large disparities from one country to another (from less than 10% of household income in Mexico to over 40% in the Nordic countries). Health care is the biggest item (on average, 45% of total public expenditure on individualised services), closely followed by education (41%) while other social services account for 14% of the total. Within the latter category, the biggest item is services to families (34% of all “other social services”) followed by services to the elderly and disabled persons (28 and 21% respectively). Even

Figure 5. **Public expenditure for in-kind services in OECD countries in 2000**
Percentage of household disposable income



Note: The category “other social expenditure” includes services to the elderly, survivors, disabled persons, families and unemployed, as well as those related to housing, social assistance, and active labour-market policies.

Source: Data are taken from the OECD database on social expenditure for the “health” and “other social expenditure” categories, and from the UNESCO-OECD-Eurostat database for education expenditure. For Turkey, data refer to 1999. Household disposable income is taken from the national accounts for all the countries considered except Ireland and Luxembourg (where no national accounts data for the household sector exist), where data are drawn from the OECD questionnaire on income distribution.

these amounts under-estimate the size of public services to households; in particular, public spending for housing services only include quasi-cash rental-assistance programmes, while excluding both the investment for the building of social housing and the “implicit subsidies” to households renting social housing at a below market rate.²²

On average, publicly-provided services to individual households represent an amount comparable to public cash transfers (which are included in household disposable income) and a larger amount in 11 OECD countries. In general, however, countries that spend a larger absolute amount on cash transfers also spend a larger amount on in-kind services to households (e.g. the Nordic countries).

Estimates based on individual records

Estimates based on individual records from household surveys cover several European countries (based on the 2001 wave of the *European Community Household Panel*, ECHP) as well as the United States, Canada and Australia (based on national surveys).²³ All these surveys provide data on the income of private households as well as information on their socio-economic characteristics that can be used to impute public services to individuals. The analysis covers health and education services, using data on public expenditures from the OECD Social Expenditure database (SOCX) and from the UNESCO-OECD-EUROSTAT data collection on education statistics. In addition, this section provides estimates of the distributive impact of social housing, relying on simple multivariate estimates of the implicit subsidy that is associated with the provision of social housing at below-market rents. For education and social housing, the imputation of public services to individuals is based on actual use and relies on either direct information from surveys or on

“imputations” that attribute public spending to individuals based on those characteristics that most influence their use (*e.g.* age); for health care, it is based on the average costs of the services provided to individuals according to their age. For all categories of expenditures, changes in inequality relative to those based on the distribution of money disposable income depend on both the aggregate size of public expenditures and on the distribution of these services according to the income of the individuals receiving them. Estimates of the equalising impact of these services – expressed as point differences in the inter-quintile share ratio – are summarised in Table 1.

Table 1. Inter-quintile share ratio before and after inclusion of all types of public services to households

Estimates based on individual records, around 2000

	Money income	Income plus health		Income plus education		Income plus social housing		Income plus all public services	
	A.	B.	Difference (A-B)	C.	Difference (A-C)	D.	Difference (A-D)	E.	Difference (A-E)
Denmark	3.1	2.5	0.6	2.9	0.2	3.1	0.0	2.4	0.7
Finland	3.6	3.1	0.5	3.5	0.1	3.5	0.0	2.9	0.6
Sweden	3.6	3.1	0.5	3.1	0.5	...	...	2.6	0.9
Austria	3.6	3.1	0.5	3.3	0.4	3.6	0.0	2.8	0.9
Germany	3.7	3.1	0.6	3.4	0.3	3.7	0.0	2.9	0.8
Netherlands	3.7	3.3	0.5	3.2	0.5	3.7	0.0	2.8	0.9
Luxembourg	3.8	3.2	0.5	...	...	...	...	3.2	0.5
France	4.1	3.3	0.7	3.6	0.4	4.0	0.0	3.0	1.1
Belgium	4.1	3.4	0.7	4.0	0.2	4.1	0.1	3.2	0.9
Italy	4.9	3.8	1.0	3.9	0.9	4.8	0.0	3.2	1.7
Canada	4.9	4.2	0.7	4.2	0.6	...	...	3.7	1.2
Ireland	4.9	3.9	1.0	4.4	0.5	4.7	0.2	3.4	1.4
United Kingdom	5.0	4.1	0.9	4.3	0.7	4.8	0.2	3.5	1.6
Australia	5.2	4.1	1.1	4.7	0.5			3.7	1.5
Greece	5.7	4.4	1.3	5.2	0.4	...	...	4.1	1.6
Spain	6.0	4.8	1.2	5.0	1.0	6.0	0.0	4.1	1.9
Portugal	6.5	4.8	1.7	5.1	1.3	6.4	0.1	4.0	2.5
United States	7.1	5.5	1.6	5.6	1.5	...	...	4.6	2.6
<i>Average</i>	<i>4.6</i>	<i>3.8</i>	<i>0.9</i>	<i>4.1</i>	<i>0.6</i>	<i>4.4</i>	<i>0.1</i>	<i>3.3</i>	<i>1.3</i>

Note: The first column presents the inter-quintile share ratio (Q5/Q1) for the conventional measure of money (disposable) income, *e.g.* in Denmark, the fifth quintile receives a money income which is 3.1 times higher than that of the first quintile; in the second column, the same measure is applied to an income concept “augmented” for the value of public services: and, the third column presents the difference between the two, *i.e.* the *change* in the income distribution which follows from the consideration of publicly-provided services. Countries are ranked, from top to bottom, in increasing order of the inter-quintile ratio (Q5/Q1) for money income. Estimates for health care expenditure are based on insurance values; those for pre-primary education are based only on the age of the child. Data for Luxembourg exclude both education and social housing; those for Australia, Canada, the United States, Greece, Spain and Sweden exclude social housing.

Source: Authors' calculations based on ECHP for European countries and national survey data for non-European ones.

Health care

Estimates of the redistributive effects of health care are based on the insurance-value approach. This is based on the notion that what government provides is equivalent to funding an insurance policy where the value of the premium is the same for everybody sharing the same characteristics, such as age. In this section, these insurance values have been calculated on the basis of the distribution of public health care expenditures across the detailed age groups that underlie the latest set of OECD expenditure projections for health and long-term care (OECD, 2006) shown in Figure 1.²⁴ In practice, this approach

implies attributing to each individual of a given age the average per capita spending amount accruing to the corresponding age group. These per capita amounts are “added” to the household disposable income of the household to which the individual belongs, and then equivalised.²⁵

Based on this approach, the inter-quintile ratio declines, on average, by 0.9 points (from 4.6 for money disposable income to 3.8 after allowing for public health services, Table 1, second set of columns). The reduction affects all countries and ranges between over 1 point in Southern European countries, Australia and the United States to around 0.5 points in Sweden, Finland and the Netherlands.²⁶ In general, public health care services are distributed rather uniformly across quintiles (i.e. each quintile gets around 20% of public health care services), with marginally higher shares going to people in the lowest quintiles in Denmark, Greece and Belgium.²⁷ Estimates based on actual use – as available for a smaller number of countries – point to a more limited distributive impact of public health care spending (Box 2).

Box 2. Redistributive effects of health care based on actual use

The approach based on *actual* use of health care services can only be applied to a limited number of European countries. Several questions in ECHP relate to the use of health care services by individuals aged 15 or more (without distinguishing, however, between use of public and private facilities): questions relate to visits to a general practitioner, to a specialist and to a dentist in the year preceding the questionnaire, as well as to the number of nights spent in hospital. These data – available for eight European countries (France was excluded because of a low response rate) – have been combined with data on public health care expenditures grouped in two broad categories: hospital care, and consultations and medical examinations outside hospitals.¹

Based on this approach, the distributive effect of health care expenditures is, on average, significantly lower than for the insurance-value approach (an average reduction of 0.2 points, as compared with one of 0.8 based on insurance value for the same countries). Results vary considerably among countries. In Denmark, inequality rises, and the same occurs, to a smaller extent, in Italy, Finland and the Netherlands. Conversely, public health care reduces inequality in Spain, the United Kingdom, Austria and Ireland. In those countries where inequality rises, this reflects the effect of health care services provided inside a hospital (in five of the eight countries these services widen inequalities) while health care services outside hospitals have an equalising effect in all countries.

These opposite effects reflect the large differences in how inside and outside hospital care expenditures are distributed among individuals in different income quintiles. While both inside and outside hospital expenditures tend to benefit more the lowest quintiles (based on money income), the profile is especially steep for hospital care. For example, in Denmark, 35% of hospital care expenditures go to the lowest quintile. While this may seem surprising – in the light of evidence in the table below – the result that in-hospital expenditures *increases* inequality in several countries reflects the effect of “re-ranking” individuals: as in-hospital expenditures are concentrated among a small number of individuals² they lead more easily to re-ranking individual beneficiaries, which dampen (or even reverses) the equalising effects of these health services. These results underline the limits (described earlier) of this approach.

Box 2. Redistributive effects of health care based on actual use (cont.)

**Inter-quintile share ratio before and after inclusion
of public health expenditures based on actual use**

Estimates based on individual data, around 2000

	A. Money income	Total expenditure		In-hospital expenditures		Out-of-hospital expenditures	
		B. Income plus health care (consumption)	C. Difference (A-B)	B1. Income plus in-hospital health care	C1. Difference (A-B1)	B2. Income plus out- of-hospital health care	C2. Difference (A-B2)
Denmark	3.1	3.3	-0.2	3.4	-0.3	2.9	0.2
Finland	3.6	3.6	0.0	3.8	-0.2	3.4	0.2
Austria	3.6	3.4	0.3	3.6	0.1	3.4	0.3
Netherlands	3.7	3.8	0.0	4.0	-0.3	3.5	0.3
Italy	4.9	4.9	0.0	5.4	-0.6	4.3	0.6
Ireland	4.9	4.7	0.2	5.0	-0.1	4.5	0.4
United Kingdom	5.0	4.4	0.7	5.0	0.1	4.4	0.7
Spain	6.0	5.2	0.7	5.9	0.1	5.2	0.8
Average	4.3	4.1	0.2	4.5	-0.2	3.9	0.4
Memorandum item:							
Average for the same countries based on insurance approach	4.3	3.5	0.8	..	..	..	..

Note: Countries are ranked, from first to last, in increasing order of the inter-quintile share ratio for money income.

Source: Authors' calculations based on ECHP for European countries.

1. This breakdown of health care expenditures does not correspond exactly to the one used in ECHP (e.g. OECD data provide information on public health care expenditures for medical visits, without distinguishing – for most countries – between general practitioners and specialists). Imputations of in-hospital care expenditures to an individual j (DS^H_j) are based on the number of nights spent in hospital (n_j):

$$DS^H_j = n_j \times \frac{DS^H}{N \times \sum_{i \in N} n_i}$$

where N indicates the population (i.e. those older than 15) in the sample. For expenditures outside hospital (DS^{OH}_j) the criterion used is based on the number of visits to a general practitioner (v_j), i.e.:

$$DS^{OH}_j = v_j \times \frac{(DS - DS^H)}{N \times \sum_{i \in N} v_i}$$

2. In the survey data used here, around 5% of the population accounted for more than 90% of the nights spent in hospital; conversely, more than 50% of the population accounted for 90% of all medical visits.

Education

Imputation of public educational expenditures to individuals based on actual use requires, first, determining whether or not an individual is participating in different levels of the education system; and second, increasing the income of the households where they live by the average public spending per student at the relevant educational level.²⁸ The methodology followed for determining participation applies two different approaches for individuals aged below and those aged 16 and over.

- For children aged 16 and over, the survey data provide information on education participation for each individual filling out the questionnaire, although without distinguishing between public and private institutions.²⁹
- For children younger than 16, the surveys provide no information on education attended. For this age-group, the probability of participating in a specific education level

relies on data on net enrolment rates³⁰ by single year of age (*i.e.* the probability of attending school is assumed to be the same for each individual of that age in the survey, irrespectively of their household income).

Public educational expenditure refers to total direct government expenditures for educational institutions per education level, converted to a per student' basis through data on the number of students in each level.³¹ Overall, the combined effect of public spending on all categories of education is a reduction in the inter-quintile share ratio of 0.6 points on average (Table 1, third set of columns). The reduction is stronger (1 point or more) in Spain, Portugal and the United States, while it is low (less than 0.2 points) in Finland, Denmark and Belgium.

The impact of public services in education on income inequality depends crucially on the level considered.

- *Pre-primary education* generally narrows inequalities. The effect is small because of the modest amount of expenditures for pre-primary education (in all countries below 2% of household disposable income). Different assumptions for imputing participation rates have only small effects. When the imputation is based only on the age of the child (Table 2, left-hand panel) the average reduction in the quintile-share ratio is 0.1 point

Table 2. Inter-quintile share ratio before and after inclusion of pre-primary education expenditures

Estimates based on individual data, around 2000

	A. Money income	Imputation based on the age of the child		Imputation based on the age of the child and the employment status of parents	
		B1. Income plus pre-primary education	Difference (A-B1)	B2. Income plus pre-primary education	Difference (A-B2)
Denmark	3.1	3.1	0.0	3.1	0.0
Finland	3.6	3.5	0.0	3.5	0.0
Sweden	3.6	3.5	0.1	3.5	0.1
Austria	3.6	3.5	0.1	3.6	0.1
Germany	3.7	3.7	0.0	3.7	0.0
Netherlands	3.7	3.7	0.1	3.7	0.1
France	4.1	4.0	0.1	..	..
Belgium	4.1	4.1	0.1	..	..
Italy	4.9	4.7	0.2	..	..
United Kingdom	5.0	4.9	0.1	4.9	0.1
Australia	5.2	5.2	0.0	..	..
Greece	5.7	5.6	0.0	5.6	0.0
Spain	6.0	5.9	0.1	..	..
Portugal	6.5	6.2	0.2	6.1	0.3
United States	7.1	6.9	0.2	..	..
<i>Average</i>	<i>4.7</i>	<i>4.6</i>	<i>0.1</i>	..	..
<i>Average across the countries included in right-hand panel</i>	<i>4.3</i>	<i>4.2</i>	<i>0.1</i>	<i>4.2</i>	<i>0.1</i>

Note: Countries are ranked, from top to bottom, in increasing order of the Q5/Q1 ratio for money income. Ireland is excluded because of the very small number of children aged 3 to 6 in pre-primary education in the survey. Estimates in the left-hand panel assume that the probability of attending pre-primary education is the same for each child, and independent of household income. Estimates on the right-hand panel assume, for countries where the participation rate of children in this age group is *below* the share of children in households where both parents work, that all children belonging to this household type have the same probability of attending and that all other children are not attending; and, for countries where the participation rate is *above* the share of children in households where both parents work, that all children in this household type are in pre-primary and that all other children have the same probability of attending. Estimates on the right-hand panel have been limited to countries where participation in pre-primary education is 80% or less in the age groups under consideration.

Source: Authors' calculations based on ECHP for European countries and national survey data for non-European ones.

(but twice as high in Portugal and the United States); when the imputation is based on both the age of the child and the employment status of the parents (i.e. allowing for the possibility that households where both parents work make more use of pre-primary education) the fall in inequality is marginally smaller.

- For *primary and secondary education*, public expenditures have a stronger effect in reducing inequalities, with an average decline of around 0.5 points (Table 3, middle panel).³² The decline of the inter-quintile share ratio is largest in the countries with the most unequal distribution of money income (Spain, Portugal and the United States) while it is negligible in Denmark and Finland. The first outcome mainly reflects the size of public expenditures for this level of education: in most countries, primary and secondary education make-up about 10% of household disposable income. On average, the distribution of this category of public expenditure is uniform across quintiles, with a marginally lower share for people in the upper part of the distribution. The share of public expenditure for primary and secondary education going to people in the bottom quintile is low in Finland and Denmark, reflecting the greater concentration of children in the middle of the income distribution in these countries.³³
- For *tertiary education*, patterns are radically different – on average, the decline in the inter-quintile share ratio is negligible. In around one-third of the countries included in Table 3 (right panel) this ratio increases slightly, a pattern suggesting that students in higher education predominantly live in better-off households. Even for countries where tertiary education lowers inequalities, such as Denmark and Sweden, this effect may predominantly reflect the large proportion of tertiary students living away from the

Table 3. Inter-quintile share ratio before and after inclusion of public expenditures on primary, secondary and tertiary education

Estimates based on individual data, around 2000

	A. Money income	Primary and secondary education		Tertiary education	
		B1. Income plus primary and secondary education	Difference (A-B1)	B2. Income plus tertiary education	Difference (A-B2)
Denmark	3.1	3.1	0.0	2.9	0.2
Finland	3.6	3.6	-0.1	3.5	0.1
Sweden	3.6	3.4	0.2	3.4	0.2
Austria	3.6	3.4	0.3	3.7	0.0
Germany	3.7	3.5	0.2	3.7	0.0
Netherlands	3.7	3.3	0.4	3.7	0.0
France	4.1	3.8	0.3	4.0	0.1
Belgium	4.1	4.0	0.2	4.2	-0.1
Italy	4.9	4.1	0.7	4.8	0.1
Canada	4.9	4.3	0.6	4.8	0.1
Ireland	4.9	4.2	0.7	5.1	-0.2
United Kingdom	5.0	4.4	0.6	5.0	0.1
Australia	5.2	4.8	0.4	5.1	0.1
Greece	5.7	5.3	0.4	5.6	0.0
Spain	6.0	5.0	1.0	6.1	-0.1
Portugal	6.5	5.2	1.3	6.5	-0.1
United States	7.1	5.8	1.3	7.0	0.1
<i>Average</i>	<i>4.7</i>	<i>4.2</i>	<i>0.5</i>	<i>4.7</i>	<i>0.0</i>

Note: Countries are ranked, from top to bottom, in increasing order of the Q5/Q1 ratio for money income.

Source: Authors' calculations based on ECHP for European countries and national survey data for non-European ones.

parental home, who are classified by surveys as separate households with low reported income. Because of the earnings premium of higher education, many of these individuals will be high-income earners in the future. The share of public expenditure in tertiary education accruing to people in the top quintile of the distribution is close to 30% on average, and above 40% in Belgium, Spain and Portugal (Marical *et al.*, 2006).

Social housing

Estimating the distributive effect of social housing is more difficult than for other social services, as it requires quantifying the aggregate size of the implicit benefits provided. This section presents estimates for some European countries based on information on housing tenure (*i.e.* whether different households own or rent their residence, and whether they rent from the public or private sector)³⁴ as well as on their actual rents.

OECD countries differ not only with respect to the relative importance of various types of housing, but also in how their prevalence varies with household income. The share of individuals who are renting their main residence is close to 40% in the lowest quintile and only 13% in the top one (Marical *et al.*, 2006), with the exceptions only of Greece and Austria, where the share of renters is rather uniform across quintiles. The importance of public sector rentals also declines when moving up the income distribution.³⁵ Overall, the share of renters living in social housing is low in Greece and Spain (less than 10%) but more important in Ireland, the Netherlands and the United Kingdom.

To evaluate the implicit subsidy associated with the provision of social housing at below market rents, each beneficiary is attributed an amount equal to the difference between the rent effectively paid and the one they would have paid on the market for a dwelling with similar characteristics (Box 3). The distributive effects of social housing are in general quite limited (Table 1, fourth set of columns). This small equalising effect reflects the small size of the aggregate subsidy implicit in the provision of social housing (0.6% of household disposable income, on average), even though – when compared with health and education – it mainly benefits individuals in the lowest quintiles of the distribution.

Summing up

When considering the combined effect of the three categories of public services discussed above, the inter-quintile share ratio falls, on average, by around 1.3 points (*i.e.* from 4.6 for money disposable income to 3.3), with a reduction that is largest in the United States and Portugal (almost twice the average) and smallest in Finland and Denmark (Table 1, rightmost columns).³⁶ In general, patterns are little affected by the specific inequality measure used. Figure 6, which presents estimates of the effects of government services for both the inter-quintile share ratio and the Gini coefficient, suggests that:

- Both the Gini coefficient and the inter-quintile share ratio decline significantly when the income concept is broadened to include all public services considered here.
- With both measures, the ranking of countries does not change significantly when moving from money (disposable) income to a measure that includes public services (the rank correlation coefficients for both the Gini and the inter-quintile share ratio, among the 17 countries considered, is above 0.95).

Box 3. Estimates of the implicit subsidy provided to renters in the public sector

Estimates are based on a simple model, which is applied separately to renters in the public and in the private sectors:

$$\text{rent} = \alpha \times \text{rooms} + \beta \times \text{income} + c.$$

where *rent* is the monthly rent paid by households, *rooms* the number of rooms in the dwelling, and *income* is the (non equivalised) household income – a variable used to capture the neighbourhood in which households live, as individuals with the same income tend to cluster in areas with similar house prices. Coefficients (shown below) have the expected sign and are statistically significant (i.e. private rents are higher for households with higher income and for accommodations with a higher number of rooms), although there are exceptions and a significant fraction of the variance remains unexplained. The coefficients for private rentals are used to calculate, for households renting in the public sector, what they would have paid on the market for an accommodation with similar characteristics.

Estimates from a linear model for private rents

	Private rentals				Private rentals		
	Income	Rooms	Adjusted R ²		Income	Rooms	adjusted R ²
Denmark	0.0040 *	337.3 *	0.21	Portugal	0.0024 *	2 229.8 *	0.10
	7.55	6.53			12.37	5.47	
Netherlands	0.0058 *	19.3 *	0.22	Austria	0.0002	671.2 *	0.04
	9.54	2.08			0.28	6.12	
Belgium	0.0036 *	1 136.7 *	0.21	Finland	0.0041 *	565.5 *	0.27
	10.38	6.68			4.33	8.79	
France	0.0093 *	-13.2 *	0.39	Germany	0.0049 *	120.8 *	0.34
	31.27	-0.51			22.56	22.82	
Ireland	0.0099 *	38.3 *	0.32	United Kingdom	0.0048 *	14.1 *	0.09
	7.27	2.34			6.62	2.34	
Italy	0.0055 *	66.5 *	0.22				
	18.77	9.20					

Note: T statistics are reported below the estimated coefficients.

* denotes significance at the 5% level.

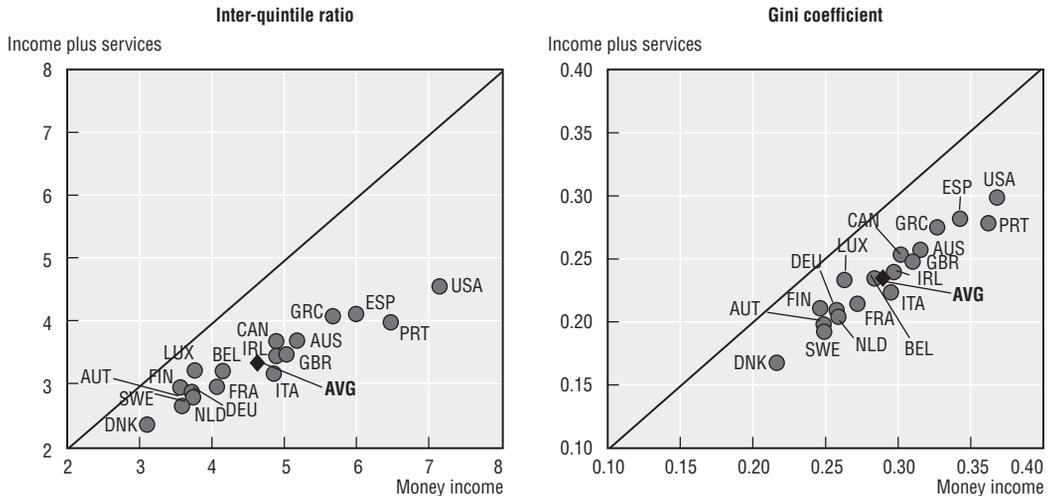
- There are significant differences across countries in the size of the reduction in inequality depending on the measure used. Based on the inter-quintile share ratio, the (point) reduction is larger for countries with higher inequality in money income (United States, Portugal and Spain); conversely, declines are more uniform for the Gini coefficient, with a smaller change in the dispersion across countries.³⁷

Estimates based on grouped data

The analysis of the distributive effects of government services based on individual records can be complemented by estimates based on income data for different deciles of the distribution. This grouped-data approach rests on attributing to different income deciles the monetary value of public expenditure for the provision of different types of social services, and on comparing various inequality measures before and after this imputation (i.e. with no re-ranking of individuals).³⁸ This approach is less accurate than

Figure 6. **Income inequality before and after inclusion of expenditures on public services in OECD countries**

Estimates based on individual data, around 2000



Source: Authors' calculations based on ECHP for European countries and national survey data for non-European ones.

that based on individual records, but allows the analysis to be extended to a broader range of OECD countries and public services.

The imputation of the value of the different public services to each decile of the income distribution relies on information about the average equivalised disposable income of each decile and the distribution of (nine) age groups across them.³⁹ The imputation of government expenditures for these services to different income deciles relies on different rules according to the type of service considered:

- *Health care.* The imputation is based on the age of individuals and on the distribution of different age groups across income deciles. Information on the latter is drawn from OECD questionnaires on income distribution. The data on the distribution of public health expenditures by age of recipients are those shown in Figure 1. For most countries, these age-expenditure profiles are based on national data; for countries where no national data are available,⁴⁰ the imputation relies on the “average” profile prevailing in other OECD countries.
- *Education.* The imputation of education expenditure is based on individuals' age and the distribution of different age groups across income deciles. The procedure involves three steps. The first requires determining the enrolment rates of individuals of a given age (from 3 to 29 years) in different levels of education and grouping them into the three age groups available in the OECD income distribution questionnaire (0-17, 18-25 and 26-40);⁴¹ the second step involves calculating total education expenditure by age group; and the last step computes education spending in each decile based on the educational expenditure for each age group and the distribution of each age group across deciles. Expenditure data refer to the direct educational outlays of the general government, i.e. excluding cash transfers to private entities such as student grants and loans.⁴²
- *Other social services.* This category of spending includes (in the SOCX classification) a heterogeneous set of programmes. Because of their diversity, the individualization of public spending is based on the assumption that these services are distributed across

income deciles in the same way as the corresponding cash transfers (based on information included in the OECD questionnaire on income distribution). This assumption reflects the notion that, for each type of programme, services and cash transfers typically complement each other.

While less accurate than the estimates based on individual records described above, this approach can be applied to 26 countries included in the OECD database on income distribution and to the full range of public services to households included in OECD data on social expenditure. These results can be considered as providing a “first-order” approximation of the distributive effects of public services for countries where micro records are not available.

Distributive effects, based on this approach, vary with the category of services considered:

- *Health care.* Health expenditure reduces inequalities in all the 26 OECD countries considered (by 1.1 point, on average, Table 4, second set of columns). Changes in country-rankings are, however, small: the Nordic countries and the Czech Republic are the most egalitarian countries both before and after taking health services into account.

Table 4. Inter-quintile share ratio before and after inclusion of expenditure on all public services
Estimates based on grouped data, around 2000

Money income A.	Income plus health		Income plus education		Income plus other social services		Income plus all public services		
	B.	Difference (A-B)	C.	Difference (A-C)	D.	Difference (A-D)	E.	Difference (A-E)	
Denmark	3.1	2.5	0.6	2.7	0.4	2.5	0.7	1.9	1.2
Sweden	3.4	2.7	0.8	2.9	0.5	2.7	0.8	2.0	1.4
Netherlands	3.6	3.1	0.5	3.1	0.5	3.4	0.2	2.6	0.9
Czech Republic	3.6	2.9	0.7	3.0	0.6	3.3	0.3	2.4	1.2
Luxembourg	3.7	3.1	0.5	3.1	0.6	3.4	0.3	2.6	1.1
Finland	3.7	3.1	0.7	3.2	0.6	3.2	0.5	2.5	1.2
Norway	3.7	2.9	0.9	3.2	0.5	3.0	0.8	2.2	1.5
Austria	3.9	3.3	0.6	3.1	0.8	3.8	0.1	2.7	1.2
Switzerland	3.9	3.2	0.7	3.4	0.6	3.7	0.2	2.8	1.1
France	4.0	3.2	0.9	3.3	0.8	3.7	0.4	2.6	1.4
Germany	4.3	3.3	1.0	3.6	0.6	3.9	0.3	2.8	1.4
Hungary	4.4	3.5	0.9	3.7	0.7	4.1	0.3	2.9	1.5
Canada	4.8	3.9	0.9	3.9	0.9	4.4	0.4	3.2	1.6
Australia	4.9	3.5	1.4	4.1	0.7	4.1	0.7	2.8	2.0
Ireland	5.0	3.7	1.3	4.3	0.7	4.7	0.4	3.2	1.8
United Kingdom	5.2	4.1	1.0	4.3	0.8	4.8	0.4	3.4	1.7
New Zealand	5.4	4.2	1.2	4.1	1.3	5.1	0.2	3.3	2.0
Spain	5.6	4.3	1.3	4.4	1.2	5.4	0.2	3.6	2.0
Japan	5.7	4.3	1.4	4.8	0.9	5.4	0.3	3.7	2.0
Greece	6.0	4.8	1.2	5.3	0.7	5.7	0.3	4.2	1.8
Poland	6.1	5.2	0.9	4.7	1.3	5.8	0.3	4.1	2.0
Italy	6.2	4.5	1.7	4.8	1.4	6.0	0.1	3.7	2.4
Portugal	6.2	4.4	1.8	4.9	1.3	6.0	0.2	3.7	2.5
United States	6.9	5.1	1.7	5.1	1.8	6.4	0.5	4.0	2.9
Turkey	9.3	7.8	1.5	7.4	1.9	9.3	0.0	6.5	2.8
Mexico	12.6	10.9	1.7	9.9	2.7	12.3	0.3	8.8	3.8
<i>Average</i>	<i>5.2</i>	<i>4.1</i>	<i>1.1</i>	<i>4.2</i>	<i>1.0</i>	<i>4.8</i>	<i>0.3</i>	<i>3.4</i>	<i>1.8</i>

Source: Authors' calculation based on OECD data.

The greatest changes in the inter-quintile ratio affect countries such as Portugal, the United States and Mexico, where the distribution of disposable income is the most unequal. Hence, overall there is a convergence of income inequalities among countries (as measured by the range of variation).⁴³

- *Education.* The redistributive impact of public expenditure on education is only marginally smaller than that for health (the average inter-quintile ratio falls from 5.2, for money disposable income, to 4.2 after taking education services into account, Table 4, third set of columns). In general, education expenditure especially benefits the three lowest quintiles of the income distribution, even if the differences between countries are considerable. Sensitivity analysis shows that inequalities in attendance to education across income deciles have a fairly marginal impact on the results and are limited to the 18-25 age group (Marical *et al.*, 2007).⁴⁴
- *Other social services.* While often significant, the effects of these services in narrowing income inequality (a decline of the inter-quintile share ratio of 0.3 points, on average, Table 4, fourth set of columns) are significantly lower than those associated with health and education, as the effect of their more targeted nature is offset by the lower amount of expenditure.

Overall, the effects of all public services on income inequalities are considerable in most countries. Thus the inter-quintile ratio falls on average from 5.2, on a cash basis, to 3.4 after taking public services into account – a fall of 1.8 points (Table 4, rightmost columns). The differences between countries in the size of this fall are marked, with a largest (point) fall in countries where the inequalities in the distribution of disposable income are greatest.⁴⁵ The reduction in the disparities between countries narrows without fundamentally altering their ranking, even though some countries improve their position (*e.g.* France and Australia), while that of others worsens (especially the Netherlands, Austria and Greece).

Not surprisingly, the approach based on grouped-data lead, in general, to different numerical estimates of the reduction in inequality due to public services than those based on individual records. A comparison of these estimates – across the countries and programmes (education and health) that are covered by both approaches – shows the fall in inequality based on grouped data exceeds that based on individual records (as the first approach does not allow for individuals' re-ranking), although the difference is much lower for the Gini coefficient than for the inter-decile ratio; further the reduction in inequality based on the two approaches are highly correlated with each other (above 0.90) across countries, and this for both inequality measures.

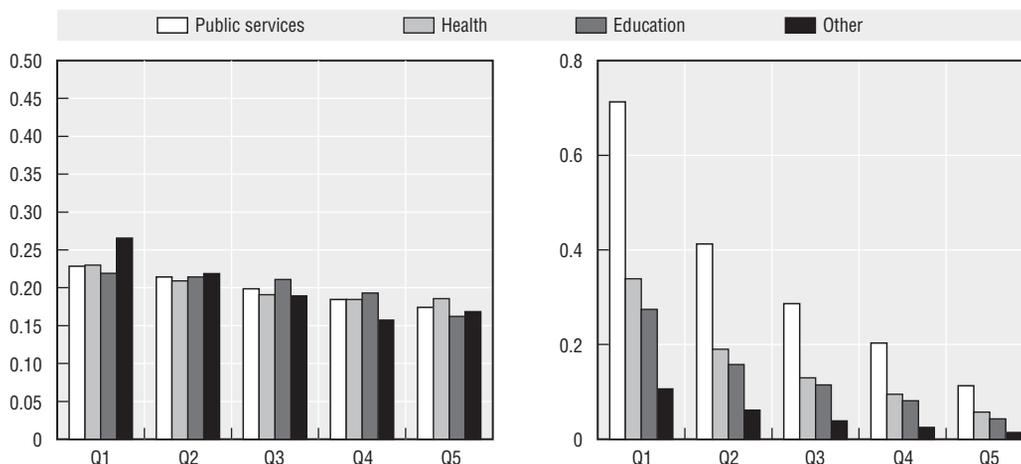
This analysis also suggests that public services are distributed quite uniformly among the different quintiles and, in consequence, in a less inegalitarian way than money incomes. Figure 7 shows this result for the average of OECD countries. For all public services to households, the lowest quintile receives a share of 23% and the highest quintile 17% (left-hand panel). Similar values are recorded for health services and education, while the share of the lowest quintile is the highest for "other" public services. However, due to the different levels of cash income in the different quintiles, public services represent a much larger share of the income of those at the bottom of the distribution (around 70% of disposable income on average) than for those at the top of the distribution (11%, right-hand panel).⁴⁶ These patterns mirror closely those obtained based on individual records.

Figure 7. **Importance of public services in household income across the distribution, OECD average**

Estimates based on grouped data, around 2000

Distribution of public services across quintiles

Ratio between public services and money income

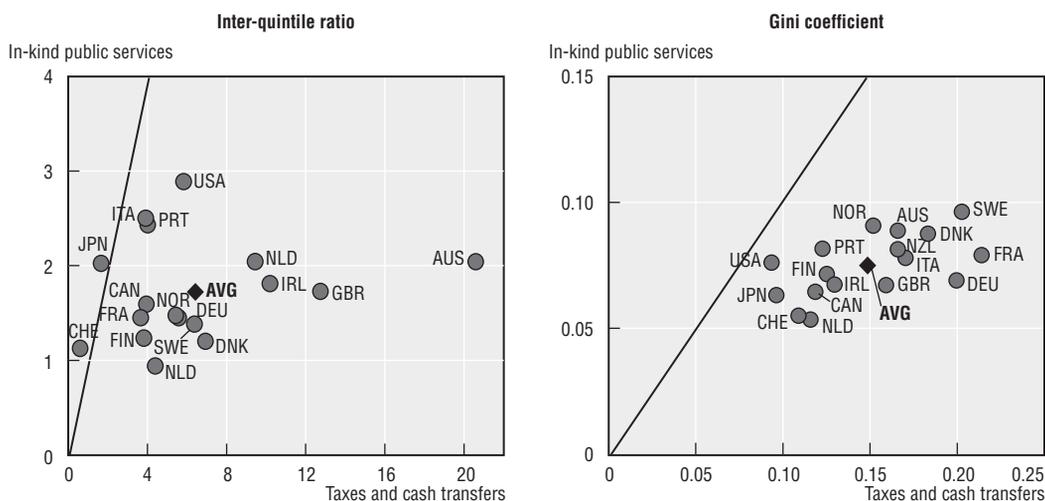


Source: Authors' computation based on different OECD databases.

A further issue is how the redistributive effect of in-kind government services compares with that of household taxes and public cash transfers. Figure 8 shows the point reduction of both the inter-quintile share ratio and the Gini coefficient achieved by in-kind

Figure 8. **Redistributive impact of in-kind public services compared with that of household taxes and cash benefits**

Point differences in the inter-quintile ratio and Gini coefficient, estimates based on grouped data, around 2000



Note: The reduction in inequality due to in-kind public transfers (on the vertical axis) is measured as the absolute difference between the inequality measures (the inter-quintile ratio, in the left-hand panel; the Gini coefficient in the right-hand panel) for disposable household income and that for income plus in-kind public services. The reduction in inequality due to household taxes and public cash transfers is the absolute difference between the inequality measures for market income and for disposable income. Points below the line denote countries where the reduction in inequality due to household taxes and public cash benefits exceeds that due to in-kind public services.

Source: Authors' computation based on different OECD databases.

government services (on the vertical axis) and by household taxes and public cash benefit (on the horizontal axis).⁴⁷ Three patterns stand out.

- First, the equalising impact of public in-kind services is, on average, around $\frac{1}{4}$ of that achieved by household taxes and cash transfers when looking at the inter-quintile share ratio, and around $\frac{1}{2}$ in the case of the Gini coefficient – although, for some countries, the reduction in inequality achieved through the two sets of policies is broadly similar.⁴⁸
- Second, the redistributive effect of household taxes and government cash transfers varies much more across countries than that of public services in-kind – around 50% more when looking at the coefficient of variation, for both inequality measures used.
- Finally, countries with a lower inequality of money disposable income also record a lower inequality after including in-kind public services (with a correlation above 95% for both inequality measures); there is conversely no correlation across countries when considering the (absolute) redistribution achieved by the two policy levers.

Conclusions

Overall, both the approach based on individual records and that based on grouped data highlight some consistent patterns that mirror, with few exceptions, those identified by previous research on the subject.

- Public expenditure for the provision of social services to households significantly narrows income inequality, although for some countries – when the imputation is based on individual data – this effect is negligible for non-compulsory education. The overall effect of publicly-provided in-kind services in narrowing inequalities in the distribution of households' economic resources results mainly from a relatively uniform distribution of these services across income quintiles, which translates into a larger increase in the income share at the bottom of the distribution than at the top.
- Changes in inequality measures prompted by the consideration of public services do not lead to major changes in country rankings. The dispersion of inequality across countries narrows considerably for the inter-quintile share ratio but by much less in terms of the Gini coefficient.
- The inequality reduction due to government in-kind services is, on average, lower than that achieved by the combined effect of household taxes and public cash transfers, although this is not true in all countries.

The way various government services are distributed among the population has some important policy implications. First, because of the significant effect of the publicly-provided services considered in this chapter on the distribution of economic resources among households and individuals, it is important to take account of this redistributive impact when making policy choices about these programmes. Second, and despite economists' presumption in favour of cash transfers, provision of public services may be justified on a variety of reasons (e.g. when the consumption choices of the parents do not take into full account the utility of their children, to improve the targeting of programmes, to increase investment in people's health and skills – and hence productivity in the long run, Currie and Gahvari, 2007); this raises the question of how best to mix cash transfers and in-kind public services to meet any particular redistributive goal. Finally, public services may also effect the labour-supply decisions of beneficiaries, in particular for those at the bottom of the distribution; it follows that reform should consider how provision of

in-kind services (e.g. childcare) might augment the labour supply and thus ease the trade-off between equity and efficiency goals. These considerations underscore the importance of accounting more systematically for the contribution of government services to household well-being and its distribution.

Notes

1. For example, households with children in state schools benefit from a tax-financed service that improves their well-being compared with those who have to buy the same service in the market. It should be noted, in this respect, that the OECD national accounts combine information on both the goods and services bought by households on the market and those are provided by governments free of charge or at subsidised prices within the concept of the "actual" consumption of households.
2. For example, every year the UK national statistical office publishes a report on the distribution of household income which also considers the effect of public spending in health and education (e.g. Jones, 2006); and similar reports exist for Australia (ABS, 2001). While most of studies have a national focus, a few provide information extending to several countries – and their number has increased following the availability of the Luxembourg Income Study, a database providing access (within a uniform data environment) to the micro-records of household income surveys for several OECD countries (e.g. Brady, 2004; Garfinkel et al., 2004; Smeeding, 2002; Smeeding and Rainwater, 2002; Steckmest, 1996).
3. Differences in the use of health care services according to individuals' income and socio-economic status are reported even in countries with universal health care systems (e.g. Goddard et al., 2001, for the United Kingdom).
4. Exceptions include the United States, Portugal and Finland, in the case of consultations with doctors; and Mexico in the case of hospital nights.
5. Both approaches will lead to the same quantitative results when considering two countries with identical (pre-tax) money income and health care needs, and where these needs are met, in one country, through tax-financed public health care and, in the other, through private out-of-pocket health expenditures.
6. The Committee on National Statistics of the US National Academy of Sciences recommended that, for the purpose of measuring poverty, "family resources" should exclude both out-of-pocket medical care expenditures and health insurance premiums (Citro and Michael, 1995). Weinberg (2006) underscores the importance of employer-provided health insurance for a better measure of household income.
7. According to Xu et al. (2003), the share of households with out-of-pocket payment exceeding 40% of their income is almost nil in France but close to 3% in Portugal. This proportion tends to be higher in low- and middle-income countries, as well as in economies in transition.
8. Private out-of-pocket costs are only one among the different sources of health care financing. Some studies have focused on the distributive implications of all types of health care financing, i.e. taxes, contributions and out-of-pocket costs. In general, these effects will depend on the relative importance of each source, on their "progressivity" (i.e. the extent to which they weigh more heavily on higher income groups) and on various factors that shape horizontal equity (e.g. differences in contribution rates across insurance funds or in health-related tax rates across municipalities, Wagstaff et al., 1999). De Graeve et al. (2003), who examine the impact of different financing sources on income distribution in 23 European countries, find that direct taxes are progressive in all countries, and indirect taxes and out-of-pocket payments regressive, while there are more differences in results for contributions to social security and private insurance. Similar results are reported by van Doorslaer et al. (1999) for 12 OECD countries including the United States. Klavus et al. (1998), who apply a similar methodology for Finland, argue that reforms to health care financing introduced following the recession of the early 1990s have moderately reduced the progressivity of the overall system without compromising its equity features, mainly because of the continuous importance of direct income taxes.
9. Private expenditure on education in OECD countries accounts on average for 18% of total expenditure at the pre-primary stage and 22% in tertiary education, but only 7% in primary and secondary education (OECD, 2005b).

10. The proportion of young people aged 20 to 24 years who, in 2001, had not completed lower secondary school was less than 5% in 14 OECD countries, but highest in New Zealand (16%), Portugal (29%), Mexico (33%) and Turkey (47%).
11. Public expenditure on higher education accounts, on average, for almost half of educational spending (48%) while the share of pre-primary education is only 7%.
12. For example, the probability of access to tertiary education is three times higher for young people whose parents have a university degree than for those from less well-educated households (Machin, 2006). Differences in access to university education are also evident with regard to ethnic background. Thus, in the United States, the percentage of white students who, upon finishing high school, enrol in university is 10 points higher than for young people of Hispanic origin and 20 points higher than for young blacks, even though these differences have declined since 1994.
13. This phenomenon is well documented by Evandrou (1993) for the United Kingdom. This study shows that the distribution of public expenditure on tertiary education is more unequal when pensioners' households are included, as compared to results obtained when limiting the analyses to households of non-pensioners.
14. Inequalities in the distribution of expenditure on tertiary education reflect not only differences in access but also differences in costs per student depending on the subject chosen. Thus, in France, students from the wealthiest families choose more expensive courses (Albouy and Wanecq, 2003).
15. Governments also intervene through rent controls applied to private housing: these measures are not covered in this article.
16. Access to social housing generally means less expenditure on housing for the households concerned. In France, tenants in private accommodation pay 22% of their income on housing, compared with 18% for tenants of public housing. These differences may under-estimate the benefit, if people who live in social housing can afford a bigger or more comfortable home than if they rented in the private sector; but they may also over-estimate them, if social housing units are mainly located in disadvantaged neighbourhoods.
17. The approach used in the majority of the studies that focused on the distributive effects of social housing is to "gross up" the households' cash income by an amount equal to the difference between the market rent for a home with the same characteristic as the one occupied and the rent actually paid for it.
18. The same pattern is reported by Harding *et al.* (2004), who argue that social housing accounts for 13% of the disposable income of people in the first quintile of the income distribution in Australia, as compared to 3% for those in the second.
19. The "square root elasticity" implies that the needs of a household composed of four people are twice as large as those of a single (1.4 and 1.7 times those of a single in the case of a childless couple and of a couple with one child).
20. These data – as well as the estimates presented later – refer to public expenditures in 2001 (despite availability of more recent data) as the latest information on the distribution of household disposable income available at the time of writing referred to the early 2000s.
21. The category "other social expenditure" (in the SOCX nomenclature) includes services to the elderly, survivors, disabled persons, families and unemployed, as well as those related to housing, social assistance, and active labour market policies.
22. As some of these quasi-cash housing benefits may be included in household income as measured in surveys, the estimates based on "grouped" income data in this article may imply some double counting.
23. The 2001 wave of ECHP provides information on income earned in 2000. Data for non-European countries are based on the *Household Income and Labour Dynamics* for Australia (HILDA); the *Survey of Income and Labour Dynamics* (SLID) for Canada, and the *Annual Social and Economic Supplement* (ASEC) to the *Current Population Survey* for the United States. For Canada and the United States, data are drawn from the Luxembourg Income Study database and refer to income earned in 2000. Data for Australia refer to 2004: computations were provided courtesy of Mark Pearson.
24. These projections refer to per-capita amounts of public health care services for 5-year age groups in 2003. This age-profile has been applied to public expenditure data referring to 2001.
25. In most countries, public health care services make up a considerable share of disposable household income (around 13% on average), ranging between 11% (in Finland, the United Kingdom and the United States) and 16% (in Germany and Italy).

26. The larger absolute fall in the inter-quintile share ratio in countries with a wider distribution of money income implies much smaller cross-country differences in terms of percentage reduction (e.g. from 19% in Denmark to 23% in the United States).
27. In theory, the approach used here, which accounts only for differences in use by age, may underestimate the equalising effect of public health care services in countries where these are targeted to low-income households (e.g. Medicaid in the United States). In practice, estimates of the equalising impact of Medicaid and Medicare from the US Census Bureau point to a reduction of the inter-quintile share ratio and of the Gini coefficient (for non-equivalised household income) of, respectively, 0.75 and 0.15 points (Cleveland 2005), as compared with a decline of 1.63 and 0.37 points, respectively, reported by Marical *et al.* (2006).
28. The expenditures on education attributed to individual j attending education level c (DE_j^c) are determined on the basis of whether or not they are attending these institution ($t_j^c = 1$ if an individual follows education in category c , otherwise it is zero) based on the following identity:

$$DE_j^c = t_j^c \times \frac{DE^c}{N^c}$$

where N^c denotes the number of students enrolled in that education category and DE^c the public expenditures on education for that education level.

29. Enrolment in private schools will affect results if these students are mainly from better-off families and if public subsidies to private schools are lower than the costs of public schools; in these conditions, the approach used here will underestimate the distributive effect of public education services. As the survey data for European countries distinguish among four levels of education (tertiary, upper secondary, lower secondary, and less than lower secondary), data for other countries have been re-coded to these four levels. The survey data used for various countries differ in the information they provide on school attendance for individuals of different ages (e.g. for the United States and Canada, this information refers to all individuals aged 15 or older; for European countries, this refers to people aged 17 or older).
30. Data on net enrolment by single year of age, from OECD (2005b), refer to 2003 and to individuals aged 3 to 29. For Canada, where data on enrolment by age are not available, all individuals aged between 6 and 15 are assumed to be in school (in line with the enrolment rates prevailing in other OECD countries); children aged 3 to 5 are assumed not to attend education (as no data on public expenditure on pre-primary education are available for Canada).
31. Because of lack of data, Luxembourg is not included in the analysis.
32. Primary and lower secondary education are grouped together as, for all countries considered here, they correspond to "compulsory education"; upper secondary education is also combined with these two categories as, in several countries, compulsory education, or at least part of it, extends to this level.
33. These results overestimate the equalising effect of primary and secondary education as they do not allow for the possibility that most school drop-outs are concentrated in the lower end of the income distribution; this may affect cross-country comparisons, when drop out rates differ across countries.
34. The definition of social housing used in the ECHP includes all accommodations provided by central and local public administrations, as well as those provided by voluntary and non-profit agencies.
35. There are, however, some exceptions. In half of the countries, the proportion of renters in the public sector is higher for the second quintile than in the first; while in Austria and the Netherlands the share of renters from the public sector is relatively uniform across quintiles.
36. The lowest reduction is recorded by Luxembourg, but for this country results only refer to health care.
37. The larger reduction in the inter-quintile share ratio – an inequality measure that is more sensitive to what happens at the two extremes of the distribution – than for the Gini coefficient – a measure that is more sensitive to changes around its middle – suggests that accounting for public services is likely to have major impacts on estimates of relative-income poverty.
38. The consequences of this assumption are especially important for services whose unit costs are large and actual use is concentrated over a short time-span (e.g. health-care). In these circumstances, not allowing individuals to change their rank position will increase the equalising effect of government services relative to approaches that allow for such re-ranking (Atkinson, 1980; Plotnick, 1981).

39. The values of equivalised income by deciles are converted into a non-equivalised equivalent based on estimates of the average household size for the entire population.
40. These countries are the Czech Republic, Hungary, Iceland, Japan, Korea, Mexico, New Zealand, Norway, Poland, the Slovak Republic, Switzerland and Turkey.
41. Data on school enrolment by single year of age were not available for some types of educational institutions in the case of Canada, Japan and Luxembourg. For these countries, the distribution of students aged above 17 between the aged groups 18-25 and 26-29 is based on the share of the two age groups prevailing in the United States.
42. To test the sensitivity of the results to the assumption of equal access to education, an alternative scenario (presented in Marical *et al.*, 2006) assumes that enrolment rates for poorer people are lower than those for better-off people, based on an arbitrary inequality coefficient that is common across countries.
43. For example, the gap in the inter-quintile ratio between Denmark and the United States falls from 3.8, based on money income, to 2.6 after taking health services into account.
44. Marical *et al.* (2006) show estimates of the equalising impact of education based on estimates of enrolment rates by income deciles; these are based on country-specific enrolment rates by age and common coefficients for inequality in attendance (implying that disparities in attendance by household income will be higher the lower the average enrolment for educational level).
45. Thus the inter-quintile ratio falls from 6.9 to 4.0 in the United States, from 12.6 to 8.8 in Mexico and from 9.3 to 6.5 in Turkey, while it falls from 3.1 to 2.0 in Denmark.
46. A comparison of results for the inter-quintile ratio and the Gini coefficient highlights patterns that mirror quite closely those described in Figure 5, based on individual data, for a smaller number of OECD countries and social programmes. Both inequality measures decline after considering public spending for social services; the decline in the inter-quintile share ratio is larger for countries with more unequal distribution of disposable income but broadly similar across countries for the Gini coefficient.
47. The comparison is made with the *combined* effect of the taxes paid by households and the cash public transfers they receive, as the information available on Gini coefficients does not allow separating the effects of the two components of disposable income.
48. The larger equalising effect of household taxes and public cash transfers, relative to that achieved by public in-kind services, reflects both differences in their distributive profile and in their size (the three items accounting for 29%, 20% and 27%, respectively, of household disposable income among the countries included in Figure 7).

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Annex Table A.1. Main findings from selected studies on the distributive impact of public services

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Comparative studies				
Gardiner <i>et al.</i> , 1995	France and United Kingdom. Micro data from Family Budget Survey and Family Expenditure Survey referring to the 1980s.	Health social housing	<p><i>How benefits are attributed to individuals?</i> Health: Both insurance values (based on income for the United Kingdom) and deduction of out-of-pocket costs Housing: Actual use (difference between actual and market rents) <i>Other income flows considered?</i> Housing: Rental and capital values for owner-occupied housing</p>	<ul style="list-style-type: none"> Health and housing services lower poverty rates (from 17% to 12% in the United Kingdom; from 12% to 9% in France). Health services lower the number of individuals with low incomes (especially in the United Kingdom) because of their higher use of these services. The distributive effects of imputed rents and subsidised housing offset each other (while slightly reducing the number of poor in both countries).
Garfinkel, 2004	Australia, United Kingdom, Canada, United States, Finland, France, Sweden, Belgium, Germany. LIS and OECD data (most recent data refer to 2004).	Education (excl. tertiary) Health	<p><i>How benefits are attributed to individuals?</i> Education: Actual use Health: insurance principle (except the US) <i>Other income flows considered?</i> Indirect taxes, employer provided health benefits</p>	<ul style="list-style-type: none"> Net social expenditure has a pro-poor bias in all countries, with differences in degree. Changes in the 10/50th per centile ratios are largest in English-speaking countries. In-kind services increase the most the income of people in the bottom quintile (primarily of elderly and single mothers); people in the middle quintile are net gainers in all countries. Families with children are net payers in France and Belgium, net gainers in Finland, United Kingdom and United States; the elderly are net beneficiaries in all countries (especially in France).
Garfinkel <i>et al.</i> , 2006	Australia, Canada, United Kingdom, United States, France, Belgium, Germany, Netherlands, Finland, Sweden. LIS data for 2002 (or earlier).	Education (excl. tertiary) Health	<p><i>How benefits are attributed to individuals?</i> Education: Actual use Health: Insurance principle <i>Other income flows considered?</i> Direct and indirect taxes.</p>	<ul style="list-style-type: none"> The mix between cash transfers and services varies across countries. Health and education services substitute cash transfers in English-speaking countries. Countries with larger welfare states rely more heavily on indirect taxes and taxes on cash benefits.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Harding <i>et al.</i> , 2006	Australia and the United Kingdom National survey data for 2001-2002	Education Health Social housing Indirect taxes	How benefits are attributed to individuals? Education: Actual use Social Housing: actual use Health: Insurance principle	<ul style="list-style-type: none"> Public in-kind services are larger in Australia than in the United Kingdom (23% and 17% of average disposable income, respectively). These in-kind services benefit most lower-income households, though by less than in the case of cash-transfers. Consideration of in-kind services lowers the inter quintile share ratio from 5.8 to 3.8 in the United Kingdom; and from 6.0 to 2.3 in Australia. Indirect taxes are regressive (accounting for 23% and 12% of disposable income of the bottom and top quintiles in Australia; and for 22% and 9% in the United Kingdom).
O'Donoghue, 2003	EU15 except Sweden. EHP for 1994-98.	Education (incl. tertiary)	How benefits are attributed to individuals? Education: Actual use (without relating students with their parental family)	<ul style="list-style-type: none"> While less targeted, the redistributive effect of education services exceeds that of most cash transfer programmes due to their large size. Education spending does not eliminate intergenerational inequality (students from richer families are more likely to attend university). Expected lifetime earnings for men with upper secondary and university education are 50% higher than for less educated men.
Smeeding <i>et al.</i> , 1993	Australia, Canada, Netherlands, Sweden, United Kingdom, United states, West Germany. LIS data referring to the beginning of the 1980s.	Education (excl. tertiary) Health	How benefits are attributed to individuals? Education: Actual use Health: Insurance principle Other income flows considered? Housing: Rental value for owner-occupiers	<ul style="list-style-type: none"> Non-cash income reinforces the redistributive effect of cash transfers. Little change in country rankings for poverty and income inequality when non-cash income is included. Non-cash income is largest for single parents, families with children and the elderly, smaller for young families without children and those approaching retirement. The distribution of housing benefits is very different from the distribution of the other types of benefits.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Steckmest, 1996	Norway, Sweden, United Kingdom and United States LIS data referring to 1986/1987.	Education (excl. tertiary) Health	How benefits are attributed to individuals? Education: All school aged children in primary and secondary education (no difference made between these two) Health: Insurance approach	<ul style="list-style-type: none"> Health and education services equalise income distribution; effect largest in Sweden and United States, smallest in Norway and United Kingdom. In-kind services increase household income the most in Nordic countries. Families with children received the largest benefits. Use of health services is highest for middle deciles.
Whiteford and Kennedy (1995)	Australia, Canada, West Germany, Netherlands, Sweden, United Kingdom, United States LIS data for the mid-1980s	Education (incl. tertiary) Health Social housing Employer-provided health care (United States) Imputed income from owner-occupied housing in 5 countries Liquid wealth	How benefits are attributed to individuals? Education: Allocated by presence of children of relevant age (with tertiary education allocated to students in higher education institutions) Health: Insurance premium value Social Housing: Difference between actual and market rents for public housing tenants Imputed income from owner-occupation: imputed income stream from net housing equity	<ul style="list-style-type: none"> Poverty rates for population between 40 and 70% lower after taking account of health and education expenditures. Gini coefficients reduced by between 0.04 and 0.07 (e.g. from 0.21 to 0.17 for Sweden and from 0.31 to 0.24 for Australia).
Aaberge et al., 2006	Norway Various data sources referring to 1998.	Municipal services: Education (excl. secondary and tertiary), Health care, Child care, Social services, Care for elderly and disabled, Other services (Infrastructure, administration, culture)	How benefits are attributed to individuals? Education: Actual use Health, care for the elderly and disabled: insurance value Child care: Age of child, family type and education of the mother Social services: Based on the distribution of social assistance (cash benefits).	<ul style="list-style-type: none"> Municipal services have little effects on inequality. People in the middle deciles receive the highest amount of municipal services but pay more user fees than others. Most municipal services benefit the elderly and children (little benefits for people aged 16 to 66). Small differences in provision across municipalities (after adjusting for differences in unit costs).

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Australian Bureau of Statistics, 2001	Australia Data from 1998-99 Household Expenditure Survey (HES). Previous studies based on 1984, 1988-89 and 1993-94 HES.	Education (incl. tertiary) Health Social housing Child and other social care Indirect taxes About 50% of all government revenues and expenditures are allocated to households.	<i>How benefits are attributed to individuals?</i> Education: Allocated by presence of children of relevant age (tertiary education allocated to students in higher education institutions) Health: insurance premium value Housing: Difference between actual and market rents for public housing tenants	<ul style="list-style-type: none"> In-kind benefits are spread evenly across quintiles. The receipt of such benefits varies in relation to other household characteristics such as the numbers and ages of household members. The net effect of benefits and taxes is to increase average income of households in the three lower quintiles and lower that of households in the two higher quintiles. The share of all income received by households in the lowest quintile was 0.4% for private income and 6.4% for final income, as compared with 51% and 38%, respectively, for those in the highest quintile.
Caussat <i>et al.</i> , 2005	France Household surveys and administrative files referring to 2003	Health (both public and private spending, net of contributions)	<i>How benefits are attributed to individuals?</i> Health: insurance value	<ul style="list-style-type: none"> Health spending, net of contributions, benefit most people with lower income (accounting for around 50% of the income of people in the first decile, as compared with -2% for those in the top one). Out-of-pocket health expenditures decline with income (from around 5% for people in the first decile to less than 1% for those in the top one). Redistributive effects of the health system are smaller when controlling for health status (<i>i.e.</i> people with lower income have worse health conditions).
CERC, 2003	France Household surveys and administrative files referring to 2001	Education (incl. tertiary)	<i>How benefits are attributed to individuals?</i> Education: Actual use to family of origin	<ul style="list-style-type: none"> Access to higher education is highly unequal (less than ¼ of the students in first decile as compared with ½ for the top decile). Students from richer families concentrate in more costly fields of education.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Evandrou <i>et al.</i> , 1993	United Kingdom General household survey referring to 1987.	Education (incl. tertiary) Health Social housing	<i>How benefits are attributed to individuals?</i> Education: Actual use, tertiary education allocated to families of origin Health: Actual use Housing: Actual use (<i>i.e.</i> difference between actual and market rents)	<ul style="list-style-type: none"> In-kind services benefit most the middle quintile and the least the top quintile (in the case of education: The benefits for the top quintile exceed those for the bottom). Bottom quintile receives around 60% more health services than the top. In kind services to the non-retired households benefit the poor most: uniform distribution for those to retired households. Demographic differences between deciles partly explain patterns of receipt of in kind services. Overall in-kind services lower inequality because of greater amounts received by retired households (mostly at the bottom of the distribution).
Harding <i>et al.</i> , 2004	Australia. Household expenditure survey for 2001-2002.	Education (incl. tertiary) Health (incl. tax expenditures for private insurance) Other social services Social housing	<i>How benefits are attributed to individuals?</i> Education: Actual use Health: Insurance value (based on gender, age, income and whether the household has private insurance) Housing: Actual use (difference between actual and market rents) <i>Other income flows considered?</i> Direct and indirect taxes.	<ul style="list-style-type: none"> Cash transfers are more progressive than in-kind services. The overall impact of cash transfers and in-kind services is strongly redistributive towards lower income households. The bottom 60% of Australians are gainers from the tax and benefit programmes, with gains financed by the top 40%. Final income of bottom quintile is 10 times higher than private income. The impact of cash and in-kind services varies by household type (older people and sole parents are the biggest gainers). Housing benefits are the most progressive but spending is much lower than for other services. The tax system is, overall, pro-poor (regressive impact of indirect taxes partially offsets the progressive direct taxes).

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Hugounenq, 1998	France. Family Budget Survey for 1994.	Education (incl. tertiary)	<i>How benefits are attributed to individuals?</i> Education: Actual use (by family of origin taking also into account the age of household head)	<ul style="list-style-type: none"> In the long run, education lowers income inequalities by reducing wage differences and by favouring social mobility and integration. The progressive character of education is due to primary and secondary education; non-compulsory education benefits most those with higher socio-economic status. The heterogeneity of the composition of family across deciles partly explain observed differences.
James <i>et al.</i> , 1987	Japan. Different datasets collected by ministries from the late-1970s.	Education (public spending for public and private schools in upper secondary and tertiary education)	<i>How benefits are attributed to individuals?</i> Education: Actual use (with deduction for higher taxes paid in the future by more educated people)	<ul style="list-style-type: none"> Higher income groups are more likely to attend upper secondary and tertiary education but will also pay higher taxes in the future (implying net payments by the rich). Similar patterns for public and private schools (with the latter receiving about 30% of government subsidies). The distribution of students by family income is similar those attending public and private schools (<i>i.e.</i> spending to either sector has the same redistributive effect).
Lakin, 2004	United Kingdom. Expenditure and food survey for 2002-03.	Education (incl. tertiary) Health Housing subsidy Travel subsidies School meals and welfare milk	<i>How benefits are attributed to individuals?</i> Health: Insurance value Education: Actual use (family of origin, excl. students not living with their parents) Housing: actual use. <i>Other income flows considered?</i> Indirect taxes	<ul style="list-style-type: none"> Absolute value of in-kind services declines as income rises; redistributive effects are smaller for non-retired households. Tax system has a smaller impact in reducing inequality than cash benefits (indirect taxes weight more heavily on people with lower incomes). Taxes and benefits have different effects on households (partly depending on the number and ages of people within each.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Ruggles and O'Higgins, 1981	United States Household survey for 1970.	Total public expenditure (local and federal expenditures including national defence, local administration, highways etc.)	<i>How benefits are attributed to individuals?</i> Education: Actual use (to students) Health: Insurance value Other (non individualised) items: Per capita, by total and capital income	<ul style="list-style-type: none"> Total public expenditure redistributes towards the bottom five deciles, and away from the top three (despite higher amounts received by higher deciles). Benefits rise with household size; households headed by non-whites and women pay more taxes but receive substantially more benefits. Other household features beyond income (e.g. size) help explain the distribution of in-kind services. Patterns of use for other (non individualised) services depend on rules used to allocate them.
Sefton, 2002	United Kingdom Data from several household surveys referring to 1996-1997 and 2000-2001.	Education (incl. tertiary) Health Social housing Social care Excl. spending for central administration: for health and education around 85% of total spending is allocated.	<i>How benefits are attributed to individuals?</i> Education: Actual use (with tertiary education allocated to families of origin) Health: Actual use Social care: Insurance principle Housing: Actual use (difference between actual and market rents)	<ul style="list-style-type: none"> Significant difference in the use of services across income deciles (the bottom two receive twice as much as the top one), partly explained by demographic factors. The pro-poor bias of in-kind services has risen over time without preventing higher inequality. In-kind services benefit most children, the elderly, single parents and renters from the public sector. Differences in distributive effects among services (social housing favours most the poor; tertiary education the rich).
Wolff <i>et al.</i> , 2005	United States Annual Demographic Supplement of the Current Population Survey (1987 and 2000)	Public consumption expenditure to households (around 1/2 of total). Nine main categories (gen. services, defence, public order, economic affairs, housing, health, recreation, education, inc. security)	<i>How benefits are attributed to individuals?</i> Education, income security: actual use. Health: Potential use (insurance value) Economic, affairs, housing and community services: Direct use and costs responsibility	<ul style="list-style-type: none"> Public consumption narrows inequality (Gini coefficient falls by 0.31 points in 2000). Mean level of public consumption rises across income deciles, its ratio to income falls steadily (97% for the bottom, 6% for the top decile). Value of public consumption for education and economic affairs increase with income, while it declines for health and income security.

Note: Articles are listed in alphabetic order within each section.
Source: Authors compilation.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Comparative studies				
Gardiner <i>et al.</i> , 1995	France and United Kingdom. Micro data from Family Budget Survey and Family Expenditure Survey referring to the 1980s.	Health social housing	<p><i>How benefits are attributed to individuals?</i> Health: Both insurance values (based on income for the United Kingdom) and deduction of out-of-pocket costs Housing: Actual use (difference between actual and market rents) <i>Other income flows considered?</i> Housing: Rental and capital values for owner-occupied housing</p>	<ul style="list-style-type: none"> Health and housing services lower poverty rates (from 17% to 12% in the United Kingdom; from 12% to 9% in France). Health services lower the number of individuals with low incomes (especially in the United Kingdom) because of their higher use of these services. The distributive effects of imputed rents and subsidised housing offset each other (while slightly reducing the number of poor in both countries).
Garfinkel, 2004	Australia, United Kingdom, Canada, United States, Finland, France, Sweden, Belgium, Germany. LIS and OECD data (most recent data refer to 2004).	Education (excl. tertiary) Health	<p><i>How benefits are attributed to individuals?</i> Education: Actual use Health: insurance principle (except the US) <i>Other income flows considered?</i> Indirect taxes, employer provided health benefits</p>	<ul style="list-style-type: none"> Net social expenditure has a pro-poor bias in all countries, with differences in degree. Changes in the 10/50th per centile ratios are largest in English-speaking countries. In-kind services increase the most the income of people in the bottom quintile (primarily of elderly and single mothers); people in the middle quintile are net gainers in all countries. Families with children are net payers in France and Belgium, net gainers in Finland, United Kingdom and United States; the elderly are net beneficiaries in all countries (especially in France).
Garfinkel <i>et al.</i> , 2006	Australia, Canada, United Kingdom, United States, France, Belgium, Germany, Netherlands, Finland, Sweden. LIS data for 2002 (or earlier).	Education (excl. tertiary) Health	<p><i>How benefits are attributed to individuals?</i> Education: Actual use Health: Insurance principle <i>Other income flows considered?</i> Direct and indirect taxes.</p>	<ul style="list-style-type: none"> The mix between cash transfers and services varies across countries. Health and education services substitute cash transfers in English-speaking countries. Countries with larger welfare states rely more heavily on indirect taxes and taxes on cash benefits.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Harding <i>et al.</i> , 2006	Australia and the United Kingdom National survey data for 2001-2002	Education Health Social housing Indirect taxes	How benefits are attributed to individuals? Education: Actual use Social Housing: actual use Health: Insurance principle	<ul style="list-style-type: none"> Public in-kind services are larger in Australia than in the United Kingdom (23% and 17% of average disposable income, respectively). These in-kind services benefit most lower-income households, though by less than in the case of cash-transfers. Consideration of in-kind services lowers the inter quintile share ratio from 5.8 to 3.8 in the United Kingdom; and from 6.0 to 2.3 in Australia. Indirect taxes are regressive (accounting for 23% and 12% of disposable income of the bottom and top quintiles in Australia; and for 22% and 9% in the United Kingdom).
O'Donoghue, 2003	EU15 except Sweden. EHP for 1994-98.	Education (incl. tertiary)	How benefits are attributed to individuals? Education: Actual use (without relating students with their parental family)	<ul style="list-style-type: none"> While less targeted, the redistributive effect of education services exceeds that of most cash transfer programmes due to their large size. Education spending does not eliminate intergenerational inequality (students from richer families are more likely to attend university). Expected lifetime earnings for men with upper secondary and university education are 50% higher than for less educated men.
Smeeding <i>et al.</i> , 1993	Australia, Canada, Netherlands, Sweden, United Kingdom, United states, West Germany. LIS data referring to the beginning of the 1980s.	Education (excl. tertiary) Health	How benefits are attributed to individuals? Education: Actual use Health: Insurance principle Other income flows considered? Housing: Rental value for owner-occupiers	<ul style="list-style-type: none"> Non-cash income reinforces the redistributive effect of cash transfers. Little change in country rankings for poverty and income inequality when non-cash income is included. Non-cash income is largest for single parents, families with children and the elderly, smaller for young families without children and those approaching retirement. The distribution of housing benefits is very different from the distribution of the other types of benefits.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Steckmest, 1996	Norway, Sweden, United Kingdom and United States LIS data referring to 1986/1987.	Education (excl. tertiary) Health	<i>How benefits are attributed to individuals?</i> Education: All school aged children in primary and secondary education (no difference made between these two) Health: Insurance approach	<ul style="list-style-type: none"> Health and education services equalise income distribution; effect largest in Sweden and United States, smallest in Norway and United Kingdom. In-kind services increase household income the most in Nordic countries. Families with children received the largest benefits. Use of health services is highest for middle deciles.
Whiteford and Kennedy (1995)	Australia, Canada, West Germany, Netherlands, Sweden, United Kingdom, United States LIS data for the mid-1980s	Education (incl. tertiary) Social housing Employer-provided health care (United States) Imputed income from owner-occupied housing in 5 countries Liquid wealth	<i>How benefits are attributed to individuals?</i> Education: Allocated by presence of children of relevant age (with tertiary education allocated to students in higher education institutions) Health: Insurance premium value Social Housing: Difference between actual and market rents for public housing tenants Imputed income from owner-occupation: imputed income stream from net housing equity	<ul style="list-style-type: none"> Poverty rates for population between 40 and 70% lower after taking account of health and education expenditures. Gini coefficients reduced by between 0.04 and 0.07 (e.g. from 0.21 to 0.17 for Sweden and from 0.31 to 0.24 for Australia).
National studies				
Aaberge et al., 2006	Norway Various data sources referring to 1998.	Municipal services: Education (excl. secondary and tertiary), Health care, Child care, Social services, Care for elderly and disabled, Other services (infrastructure, administration, culture)	<i>How benefits are attributed to individuals?</i> Education: Actual use Health, care for the elderly and disabled: insurance value Child care: Age of child, family type and education of the mother Social services: Based on the distribution of social assistance (cash benefits).	<ul style="list-style-type: none"> Municipal services have little effects on inequality. People in the middle deciles receive the highest amount of municipal services but pay more user fees than others. Most municipal services benefit the elderly and children (little benefits for people aged 16 to 66). Small differences in provision across municipalities (after adjusting for differences in unit costs).

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Australian Bureau of Statistics, 2001	Australia Data from 1998-99 Household Expenditure Survey (HES). Previous studies based on 1984, 1988-89 and 1993-94 HES.	Education (incl. tertiary) Health Social housing Child and other social care Indirect taxes	<i>How benefits are attributed to individuals?</i> Education: Allocated by presence of children of relevant age (tertiary education allocated to students in higher education institutions) Health: insurance premium value Housing: Difference between actual and market rents for public housing tenants	<ul style="list-style-type: none"> In-kind benefits are spread evenly across quintiles. The receipt of such benefits varies in relation to other household characteristics such as the numbers and ages of household members. The net effect of benefits and taxes is to increase average income of households in the three lower quintiles and lower that of households in the two higher quintiles. The share of all income received by households in the lowest quintile was 0.4% for private income and 6.4% for final income, as compared with 51% and 38%, respectively, for those in the highest quintile.
Caussat <i>et al.</i> , 2005	France Household surveys and administrative files referring to 2003	Health (both public and private spending, net of contributions)	<i>How benefits are attributed to individuals?</i> Health: insurance value	<ul style="list-style-type: none"> Health spending, net of contributions, benefit most people with lower income (accounting for around 50% of the income of people in the first decile, as compared with -2% for those in the top one). Out-of-pocket health expenditures decline with income (from around 5% for people in the first decile to less than 1% for those in the top one). Redistributive effects of the health system are smaller when controlling for health status (<i>i.e.</i> people with lower income have worse health conditions).
CERC, 2003	France Household surveys and administrative files referring to 2001	Education (incl. tertiary)	<i>How benefits are attributed to individuals?</i> Education: Actual use to family of origin	<ul style="list-style-type: none"> Access to higher education is highly unequal (less than ¼ of the students in first decile as compared with ½ for the top decile). Students from richer families concentrate in more costly fields of education.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Evandrou <i>et al.</i> , 1993	United Kingdom General household survey referring to 1987.	Education (incl. tertiary) Health Social housing	<i>How benefits are attributed to individuals?</i> Education: Actual use, tertiary education allocated to families of origin Health: Actual use Housing: Actual use (<i>i.e.</i> difference between actual and market rents)	<ul style="list-style-type: none"> In-kind services benefit most the middle quintile and the least the top quintile (in the case of education: The benefits for the top quintile exceed those for the bottom). Bottom quintile receives around 60% more health services than the top. In kind services to the non-retired households benefit the poor most: uniform distribution for those to retired households. Demographic differences between deciles partly explain patterns of receipt of in kind services. Overall in-kind services lower inequality because of greater amounts received by retired households (mostly at the bottom of the distribution).
Harding <i>et al.</i> , 2004	Australia. Household expenditure survey for 2001-2002.	Education (incl. tertiary) Health (incl. tax expenditures for private insurance) Other social services Social housing	<i>How benefits are attributed to individuals?</i> Education: Actual use Health: Insurance value (based on gender, age, income and whether the household has private insurance) Housing: Actual use (difference between actual and market rents) <i>Other income flows considered?</i> Direct and indirect taxes.	<ul style="list-style-type: none"> Cash transfers are more progressive than in-kind services. The overall impact of cash transfers and in-kind services is strongly redistributive towards lower income households. The bottom 60% of Australians are gainers from the tax and benefit programmes, with gains financed by the top 40%. Final income of bottom quintile is 10 times higher than private income. The impact of cash and in-kind services varies by household type (older people and sole parents are the biggest gainers). Housing benefits are the most progressive but spending is much lower than for other services. The tax system is, overall, pro-poor (regressive impact of indirect taxes partially offsets the progressive direct taxes).

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Hugounenq, 1998	France. Family Budget Survey for 1994.	Education (incl. tertiary)	<i>How benefits are attributed to individuals?</i> Education: Actual use (by family of origin taking also into account the age of household head)	<ul style="list-style-type: none"> In the long run, education lowers income inequalities by reducing wage differences and by favouring social mobility and integration. The progressive character of education is due to primary and secondary education; non-compulsory education benefits most those with higher socio-economic status. The heterogeneity of the composition of family across deciles partly explain observed differences.
James <i>et al.</i> , 1987	Japan. Different datasets collected by ministries from the late-1970s.	Education (public spending for public and private schools in upper secondary and tertiary education)	<i>How benefits are attributed to individuals?</i> Education: Actual use (with deduction for higher taxes paid in the future by more educated people)	<ul style="list-style-type: none"> Higher income groups are more likely to attend upper secondary and tertiary education but will also pay higher taxes in the future (implying net payments by the rich). Similar patterns for public and private schools (with the latter receiving about 30% of government subsidies). The distribution of students by family income is similar those attending public and private schools (<i>i.e.</i> spending to either sector has the same redistributive effect).
Lakin, 2004	United Kingdom. Expenditure and food survey for 2002-03.	Education (incl. tertiary) Health Housing subsidy Travel subsidies School meals and welfare milk	<i>How benefits are attributed to individuals?</i> Health: Insurance value Education: Actual use (family of origin, excl. students not living with their parents) Housing: actual use. <i>Other income flows considered?</i> Indirect taxes	<ul style="list-style-type: none"> Absolute value of in-kind services declines as income rises; redistributive effects are smaller for non-retired households. Tax system has a smaller impact in reducing inequality than cash benefits (indirect taxes weight more heavily on people with lower incomes). Taxes and benefits have different effects on households (partly depending on the number and ages of people within each.

Annex Table A.1. Main findings from selected studies on the distributive impact of public services (cont.)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
Ruggles and O'Higgins, 1981	United States Household survey for 1970.	Total public expenditure (local and federal expenditures including national defence, local administration, highways etc.	<i>How benefits are attributed to individuals?</i> Education: Actual use (to students) Health: Insurance value Other (non individualised) items: Per capita, by total and capital income	<ul style="list-style-type: none"> Total public expenditure redistributes towards the bottom five deciles, and away from the top three (despite higher amounts received by higher deciles). Benefits rise with household size; households headed by non-whites and women pay more taxes but receive substantially more benefits. Other household features beyond income (e.g. size) help explain the distribution of in-kind services. Patterns of use for other (non individualised) services depend on rules used to allocate them.
Sefton, 2002	United Kingdom Data from several household surveys referring to 1996-1997 and 2000-2001.	Education (incl. tertiary) Health Social housing Social care Excl. spending for central administration: for health and education around 85% of total spending is allocated.	<i>How benefits are attributed to individuals?</i> Education: Actual use (with tertiary education allocated to families of origin) Health: Actual use Social care: Insurance principle Housing: Actual use (difference between actual and market rents)	<ul style="list-style-type: none"> Significant difference in the use of services across income deciles (the bottom two receive twice as much as the top one), partly explained by demographic factors. The pro-poor bias of in-kind services has risen over time without preventing higher inequality. In-kind services benefit most children, the elderly, single parents and renters from the public sector. Differences in distributive effects among services (social housing favours most the poor; tertiary education the rich).
Wolff <i>et al.</i> , 2005	United States Annual Demographic Supplement of the Current Population Survey (1987 and 2000)	Public consumption expenditure to households (around 1/2 of total). Nine main categories (gen. services, defence, public order, economic affairs, housing, health, recreation, education, inc. security)	<i>How benefits are attributed to individuals?</i> Education, income security: actual use. Health: Potential use (insurance value) Economic, affairs, housing and community services: Direct use and costs responsibility	<ul style="list-style-type: none"> Public consumption narrows inequality (Gini coefficient falls by 0.31 points in 2000). Mean level of public consumption rises across income deciles, its ratio to income falls steadily (97% for the bottom, 6% for the top decile). Value of public consumption for education and economic affairs increase with income, while it declines for health and income security.

Note: Articles are listed in alphabetic order within each section.
Source: Authors compilation.