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Publicly-provided Services and the Distribution of Resources

François Marical, Marco Mira d'Ercole,
Maria Vaalavuo and Gerlinde Verbist

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EXECUTIVE SUMMARY

1.   This report looks at the effects on the distribution of household income of those government-provided services that confer a personal benefit to users. While most of the comparative evidence of the size and evolution of income inequalities in OECD countries relies on the concept of household disposable income, integrating the effects of these government services is important for both conceptual and practical reasons: first, as the tax burden levied on households represent a deduction from their disposable income, it is important to account for the services which governments provide to households through these taxes; and second, because of the large differences across countries in the share of cash transfers and in-kind services to households within government spending.

2.   After reviewing findings from previous research, the report presents estimates of the impact of government services on the static distribution of household income. These estimates rely on two different approaches; the first, based on micro records from household surveys for 18 OECD countries, considers the effect of government services for health, education and social housing; the second, based on grouped income data by deciles, extends this analysis – based on a set of simplifying assumptions – to 26 OECD countries and to a larger set of expenditure categories. While the two approaches lead to different numerical results, some consistent patterns are also evident:

- First, public expenditure for the provision of social services significantly narrows income inequality. While there are differences across programmes, this effect mainly results from a relatively uniform distribution of these services across the population rather than from their targeted nature.

- Second, cross-country differences in income inequality decline when looking at the inter-quintile share ratio, a measure that is more sensitive to the two extremes of the distribution, but much less when using the Gini coefficient, an indicator that is more sensitive to the middle of the distribution.

- Third, the consideration of public services does not lead to major changes in the ranking of different countries. In other words, OECD countries with a more unequal distribution of disposable income are also more unequal after considering public services.

3.   Overall, these results show that conventional income-based measures overstate levels of underlying inequality – although the data to hand do not allow one to assess how *changes* in the provision of government in-kind services have affected trends in income inequality over time. The results underscore the importance of accounting more systematically for the distributive effects of government services when assessing how policies in different domains affect social and economic goals, the possible trade-offs between them, and the overall degree of inequality within society.

RÉSUMÉ

4.   Le présent rapport examine les effets sur la distribution du revenu des services assurés par les administrations publiques qui confèrent des avantages directs aux ménages qui en sont bénéficiaires. Alors que l'essentiel des données comparatives sur l'ampleur et l'évolution des inégalités de revenu dans les pays de l'OCDE se fonde sur le concept de revenu disponible des ménages, il est important de prendre en compte les services assurés par les administrations publiques pour des raisons aussi bien conceptuelles que pratiques : premièrement, parce qu'il est important, étant donné que la charge fiscale imposée aux ménages vient en déduction de leur revenu imposable, de tenir compte des services que les administrations publiques fournissent au moyen de ces impôts, et deuxièmement, parce que la part des transferts monétaires et des services aux ménages dans les dépenses publiques varie fortement d'un pays à l'autre.

5.   Après avoir passé en revue les résultats de recherches antérieures, le rapport présente des estimations de l'impact des services publics sur la distribution statique du revenu des ménages. Ces estimations s'appuient sur deux approches différentes : la première, fondée sur des microdonnées provenant d'enquêtes auprès des ménages pour 18 pays de l'OCDE, examine les effets des services publics dans les domaines de la santé, de l'éducation et du logement social ; la seconde, utilisant des données sur les revenus groupés par décile, élargit cette analyse — en se fondant sur un ensemble d'hypothèses simplificatrices — à 26 pays de l'OCDE et prend en compte un plus large éventail de dépenses publiques. Bien que ces deux approches débouchent sur des résultats numériques différents, certaines tendances générales se dégagent :

- Premièrement, les dépenses publiques au titre de la fourniture de services sociaux réduisent sensiblement les inégalités de revenu. Au-delà des différences entre programmes, cette réduction tient essentiellement à une distribution relativement uniforme de ces services dans la population plus qu'à leur ciblage.

- Deuxièmement, la réduction des écarts entre pays en matière d'inégalité de revenu est forte lorsqu'on considère le rapport inter-quintiles, indicateur qui est plus sensible aux deux extrémités de la distribution du revenu, mais beaucoup plus faible lorsqu'on utilise le coefficient de Gini, indicateur qui est plus sensible à la partie centrale de la distribution.

- Troisièmement, le classement des pays n'est pas fondamentalement bouleversé par la prise en compte des services publics. En d'autres termes, les pays de l'OCDE où l'on observe une plus grande inégalité dans la distribution des revenus monétaires sont aussi ceux où l'inégalité est plus marquée une fois pris en compte les services publics.

6.   Globalement, ces résultats montrent que les indicateurs de revenu classiques surévaluent les niveaux d'inégalité effectifs — même si les données disponibles ne permettent pas d'évaluer comment l'*évolution* de la fourniture de services publics en nature a influé sur les tendances en matière d'inégalité de revenu dans le temps. Ces résultats soulignent la nécessité de considérer plus systématiquement les effets redistributifs des services publics lorsqu'on évalue la manière dont les politiques menées dans divers domaines contribuent à la réalisation d'objectifs sociaux et économiques, les arbitrages éventuels à opérer entre ces politiques et le degré général d'inégalités au sein de la société.

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1. INTRODUCTION

7.   The majority of 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 contribute to individuals' well-being and to leave them out changes the evaluation of both the average level of well-being and of its distribution. This report 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, under conventional approaches the services provided in return do not affect the monetary value of households' well-being. For example, households with children in state schools benefit from a tax-financed service which should improve their well-being compared with those who have to buy the same services in the market. A more accurate table of inequalities and standard of living should, in principle, include the value of the public services from which households benefit within their economic resources.

8.   The omission of this category of resources is due both to the difficulty of measuring it and to more profound conceptual problems. Indeed, the value to be allocated to these transfers is not immediate. If individuals value a cash transfer at its nominal value, what value do they attribute to a non-monetary service that is targeted to a specific use? Further, what criteria should be used to allocate these services to different individuals? More fundamentally, do these services raise the standard of living of the target population or do they offset certain handicaps (as in the case of health expenses)? There are no simple answers to these questions. Yet leaving such services out is unfortunate since, in the majority of OECD countries, their cost is of an order of magnitude 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 income distribution. Accounting for these public services is particularly important for comparative analysis of income inequality and of the redistributive effects of government policies because of the large differences across countries in the composition of public expenditures to households.

9.   This document takes stock of the evidence and compares the methodologies adopted to take account of the distributive impacts of public services to households, while ignoring other potentially important effects – such as those on the labour supply and on the opportunities for those with greater needs. After briefly considering the main conceptual and methodological problems raised in this type of analysis (Box 1), the second part of the report describes the categories of public services considered and their scale. The third part summarises the main results of previous studies on this subject while the fourth presents the results of a quantitative evaluation 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 income distribution 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 (as well as education). The final section draws some policy implications from this analysis.

Box 1. Conceptual and methodological issues

Considering the influence of government services on the distribution of household income requires broadening the definition of household 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) less direct taxes and social security contributions paid by households – to one that includes additional non-market elements, such as government-provided services, home production and other components that are usually omitted from conventional statistics. Integrating the value of government services in household income 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 benefits do government services provide?* Answering this question requires distinguishing along two dimensions. First, the benefits of government services to individual users are not limited to the moment in which they are consumed but may extend to the long term (e.g. education services enhance the future earnings of students, while preventive health care allows individuals to face the future with greater confidence and lower anxiety). 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 on the distributive implication of government services take a more limited, but also less arbitrary, *static* view of these benefits. Second, and as important, 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). Accounting for these externalities is, however, even more difficult than in the case of long-term effects; as a result, they are generally ignored by most empirical analyses of this issue. [i]

- *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 typically 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 equipments. While there are strong arguments in favour of this approach when the perspective is to value the demands placed by the government on economic resources, 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 individual willingness to pay for them, but the information requirements of these valuation 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 – underlying 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 [ii] (e.g. Aaberge et al. 2006 ; Ruggles et al. 1981 ; Smeeding et al. 1993) although this approach effectively neglects differences across countries in the quality and efficiency in the provision of these services.

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i.   One example of the indirect benefits of these government services is their effect on gender equity. Anttonen *et al.* (1996) – in their comparative study of social care – stress the importance of public services for child care and care of the elderly on women's decisions to enter the paid labour market, and on the distribution of income *within* households.

ii. One exception is represented by Smeeding (1977), where the valuation of government services is 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 (1997) 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.

- *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. While for some types of services this individualization 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 government health care services base the distribution of their aggregate value across individuals on their personal (e.g. age, gender, education or income) or household characteristics (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. [iii]

- *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, Canberra Group 2001). This approach raises, however, specific problems in the case of government 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). [iv] 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 which 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.

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 of household income, the partial nature of this extension may lead to a misleading assessment of both the direction of changes in the average well-being of society and of the relative position of its individual members. For example, accounting for government services while excluding other components whose valuation is similarly controversial – such as imputed rents, or the changes in capital income linked to changes in asset prices – can improve the ranking of some individuals (e.g. families with children) while an extension to all sources of well-being could have the opposite effect (Verger, 2005). In other words, each of these additional components has the potential to affect the overall assessment of well-being and inequality. [v] These considerations have obvious implications for the interpretation of results in this report.

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iii.   This assumption effectively implies that all individuals derive a benefit from knowing that, in case of need, they would have access to these services.

iv.   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. The empirical analysis in this report relies as a simple method to "equivalise" household income (the square root elasticity) which only controls for household size.

v.   Both the size and the distributive effects of various income components will depend on the valuation used. For example, Mattila-Wiro (2004) estimate 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.

2.   SIZE AND COMPOSITION OF PUBLIC SERVICES TO HOUSEHOLDS

10.   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 directly or indirectly benefits households, from spending on military equipment to operating costs of institutions. One can, however, attempt to 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, 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 (see, for example Ruggles *et al.* 1981). Others have relied on a more precise classification of public services according to their impact on households; for example, 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.[1] In practice, most studies in this field have focussed on more limited sectors of activity – notably education, health and certain other items of social expenditure – where services provided can be seen as conferring a personal benefit upon users.

11.   The amount of public expenditure that is allocated to the provision of services which can be attributed to households individually is considerable (Figure 2.1).[2] On average, this expenditure represents 21% of households' disposable income (according to national accounts data) even if there are large disparities from one country to another (from less than 10% of household income in Mexico to over 40% in the Nordic countries). Health is the biggest item (45% of total public expenditure on services), closely followed by education spending (41%) while "other social expenditure" accounts for 14% of the total.[3] Within the latter category, the biggest item is services to families (34% of all "other social expenditure") followed by services to the elderly and disabled persons (28 and 21% respectively) and housing and social assistance (16 and 13% respectively). Even these amounts under-estimate the size of public services to households; for example, public expenditure on housing services excludes both the investment in the building of social housing and the "subsidies" to households who benefit from social housing when their rent is below market rates.[4]

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1.   Wolff et al. (2004) assume that only half of public expenditure on security of property and persons (police, fire services) benefit households.

2.   This section – as well as the empirical analysis presented in Section 4 – relies on public expenditure data for 2001 (despite availability of more recent data) as the latest information on the distribution of household disposable income refers to the early 2000s.

3.   The category "other social expenditure" (in the SOCX nomenclature) includes services to the elderly, survivors, disabled persons, families and unemployed, as well as those in respect of housing, social assistance, and active labour market policies.

4.   For a few OECD countries, the data on housing expenditure within SOCX classify as in-kind services some quasi-cash rental-assistance programmes.

Figure 2.1. Public expenditure for in-kind transfers in OECD countries in 2000

Percentage of household income
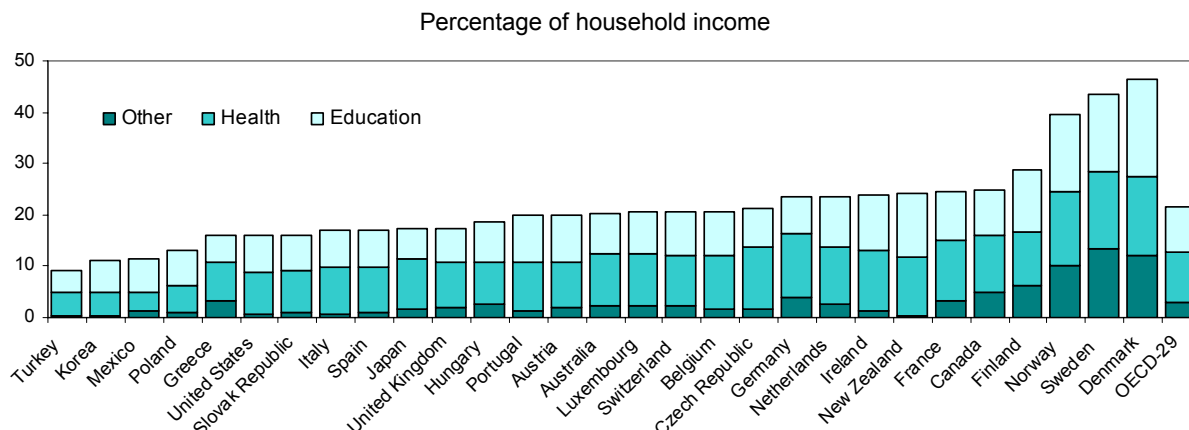
1. The category "other social expenditure" includes services to the elderly, survivors, disabled persons, families and unemployed, as well as those in respect of housing, social assistance, and active labour market policies.

Sources: Data 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 for which data are drawn from the OECD questionnaire on the distribution of household incomes.

12.　　　Publicly-provided services to households represent an amount comparable to cash transfers included in household disposable income (Figure 2.2). In 11 OECD countries, expenditure on non-cash transfers is even higher than cash transfers. It is also noteworthy that countries which spend a larger absolute amount on cash transfers generally spend an equally large amount on in-kind services to households (e.g. the Nordic countries).

Figure 2.2. Cash transfers and public services to in OECD countries in 2000

Share of public expenditure to households
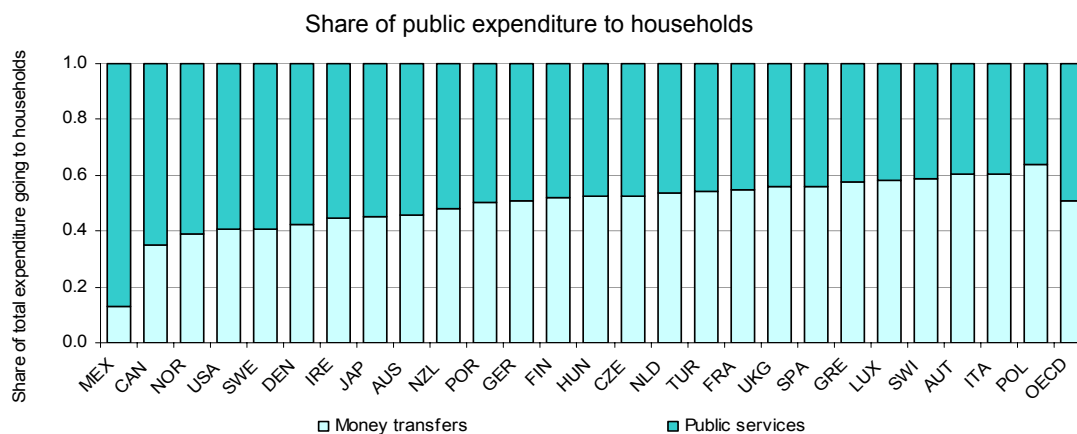
Source: SOCX and UNESCO-OECD-Eurostat (UOE) data collection on education statistics. For Turkey, the data are for 1999.

3. FINDINGS FROM PREVIOUS RESEARCH

3.1. *Introduction*

13.   Several studies have looked at the distributive implications of publicly provided services. While most of these studies are results of academic research, in some countries they have also involved government agencies. For example, the UK national statistical office publishes each year 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).[5] Most of these studies have a national focus, but 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 (Brady 2004; Garfinkel *et al.* 2004; Smeeding 2002; Smeeding and Rainwater 2002; Steckmest 1996). This section summarises some of the main findings from this research in the fields of health, education and social housing (Table 3.1). Results are however difficult to compare because of the differences in the range of public programmes covered and in the methodology used.

3.2. *Health*

14.   Research on the distributive effects of health care services has pursued three main approaches: the first considers the impact of public health care expenditure in increasing household income; the second focuses on how individuals' out-of-pocket health care costs reduce their economic resources; while the third looks at the distributive implications of the different types of financing, i.e. the cumulative effect of private and public spending, as well as of the taxes, contributions and out-of-pocket costs needed to finance health services.

3.2.1. *Approaches based on adding public outlays to household income*

15.   Studies on the impact of public health care expenditure in contributing to household income have relied on two main approaches in attributing to individuals the benefits from public health care 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. In all OECD countries, this probability depends strongly on individual characteristics, in particular age. 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 over the last years of people's life (Figure 3.1).

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5.   Studies for both countries exclude from their scope "indivisible" public benefits for which there is no clear conceptual basis for allocation, while including those indirect taxes that are incident on households (Harding *et al.,* 2006).

Table 3.1. 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 *et al.*, 1995	France and United Kingdom. Micro data from Family Budget Survey and Family Expenditure Survey referring to the 1980s.	**Health** **Social housing**	*How benefits are attributed to individuals?* 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) *Other income flows considered?* Housing: rental and capital values for owner-occupied housing	■ 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**	*How benefits are attributed to individuals?* Education: actual use Health: insurance principle (except the US) *Other income flows considered?* Indirect taxes, employer provided health benefits	■ Net social expenditure has a pro-poor bias in all countries, with differences in degree. ■ Changes in the 10/50th percentile 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 *et al.*, 2006	Australia, Canada, United Kingdom, United States, France, Belgium, Germany, Netherlands, Finland, Sweden. LIS data for 2002 (or earlier).	**Education** (excl. tertiary) **Health**	*How benefits are attributed to individuals?* Education: actual use Health: insurance principle *Other income flows considered?* Direct and indirect taxes.	■ 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.
Harding *et al.,* 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	■ 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)

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
O'Donoghue, 2003	EU-15 except Sweden. ECHP for 1994-98.	**Education** (incl. tertiary)	*How benefits are attributed to individuals?* Education: actual use (without relating students with their parental family)	■ 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 *et al.*, 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	■ 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.
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	■ Health and education services equalize 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	■ 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)	*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).	■ 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).
Australian Bureau of Statistics, 2001	Australia Data from 1998-99	**Education** (incl. tertiary) **Health** **Social housing**	*How benefits are attributed to individuals?* Education: allocated by presence of children of relevant age (tertiary education	■ 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.

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
	Household Expenditure Survey (HES). Previous studies based on 1984, 1988-89 and 1993-94 HES.	**Child and other social care Indirect taxes** About 50% of all government revenues and expenditures are allocated to households.	allocated to students in higher education institutions) Health: insurance premium value Housing: difference between actual and market rents for public housing tenants	■ 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 to 51% and 38%, respectively, for those in the highest quintile.
Caussat *et al.*, 2005	France Household surveys and administrative files referring to 2003	**Health** (both public and private spending, net of contributions)	*How benefits are attributed to individuals?* Health: insurance value	■ 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 to -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.e. people with lower income have worse health conditions)
CERC, 2003	France Household surveys and administrative files referring to 2001	**Education** (incl. tertiary)	*How benefits are attributed to individuals?* Education: actual use to family of origin	■ Access to higher education is highly unequal (less than ¼ of the students in first decile as compared to ½ for the top decile) ■ Students from richer families concentrate in more costly fields of education.
Evandrou *et al.*, 1993	United Kingdom General household survey referring to 1987.	**Education** (incl. tertiary) **Health** **Social housing**	*How benefits are attributed to individuals?* Education: actual use; tertiary education allocated to families of origin Health: actual use Housing : actual use (i.e. difference between actual and market rents)	■ 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 *et al.*, 2004	Australia. Household expenditure survey for 2001-2002.	**Education** (incl. tertiary) **Health** (incl. tax expenditures for private insurance) **Other social services** **Social housing**	*How benefits are attributed to individuals?* 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) *Other income flows considered?* Direct and indirect taxes.	■ 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)
Hugounenq, 1998	France. Family Budget Survey for 1994.	**Education** (incl. tertiary)	*How benefits are attributed to individuals?* Education: actual use(by family of origin taking also into account the age of household head)	■ 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.

Studies	Countries covered and data used	Spending categories considered	Methodological features	Main results
				■ The heterogeneity of the composition of family across deciles partly explain observed differences.
James *et al.,* 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)	*How benefits are attributed to individuals?* Education: actual use (with deduction for higher taxes paid in the future by more educated people)	■ 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.e. 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**	*How benefits are attributed to individuals?* Health: insurance value Education: actual use (family of origin, excl. students not living with their parents) Housing: actual use. *Other income flows considered?* Indirect taxes	■ 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.
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.	*How benefits are attributed to individuals?* Education: actual use (to students) Health: insurance value Other (non individualised) items: per capita, by total and capital income	■ 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.	*How benefits are attributed to individuals?* 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)	■ 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 *et al.,* 2005	United States Annual Demographic Supplement of the Current Population Survey (1987 and 2000)	**Public consumption expenditure to households** (around ½ of total). Nine main categories (gen. services, defence, public order, economic affairs, housing, health, recreation, education, inc. security)	*How benefits are attributed to individuals?* Education, income security: actual use. Health: potential use (insurance value) Economic, affairs, housing and community services: direct use and costs responsibility	■ 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: Secretariat complication.

Figure 3.1. Public health care expenditures per capita for each age group as a proportion of total per capita health expenditure
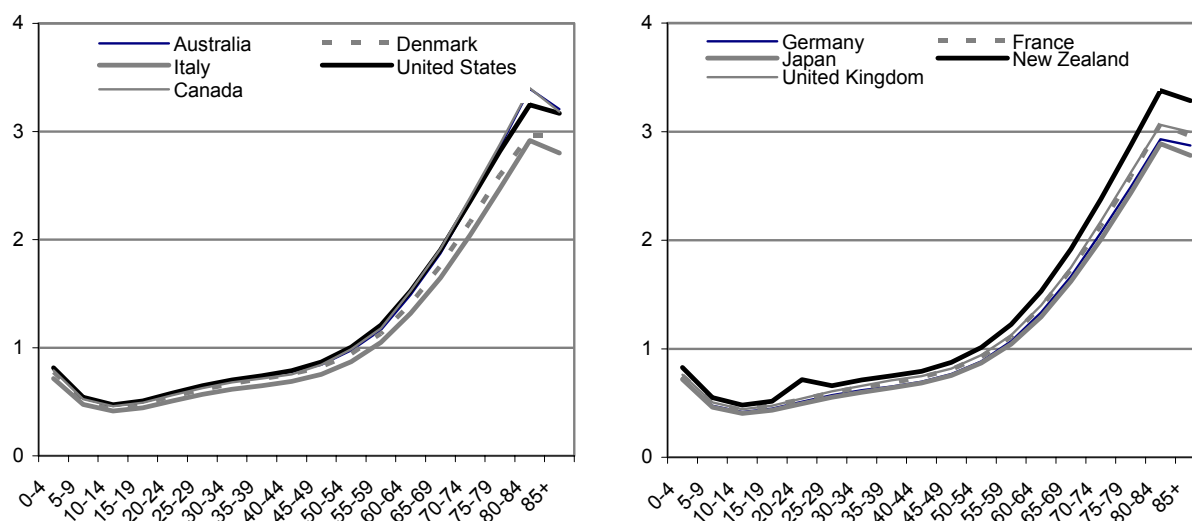
Note. Values above 1 indicate that the per capita spending of a given age group is above the one for the population as a whole (e.g. health care spending going to people aged 80 and over is around 3 times higher than the average).

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.

16.   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 income inequality. This effect reflects both the greater importance of health care services for those at the bottom of the income distribution (i.e. the ratio of health care benefits to disposable income declines across the distribution) and a distribution of public health care services that tends to benefit most those in the lower quintiles. This second pattern holds both in countries with a universal health care system (e.g. the United Kingdom), and, to a 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). Figure 3.2 – which presents estimates derived from national studies of the distribution of public health care expenditure across income quintiles– shows that the decline is both steeper and more progressive in the United States, while in the United Kingdom and Australia those in the second quintile receive the largest share. The greater concentration of health care spending in the lower quintiles partly reflects the low income of most elderly people (Gardiner *et al.* 1995). 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 extended to all households.

Figure 3.2. Distribution of public health care expenditure across income quintiles, early 2000s
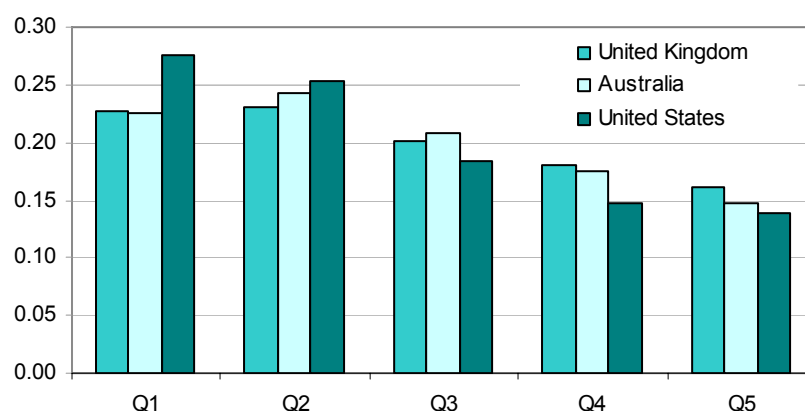
Note. Estimates for the United States assume that outlays for public health and hospitals are available to all individuals (i.e. they are distributed on a per capita basis) while those for Medicare and Medicaid are only available to specific segment of the population.

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

17.   The use of public health care facilities, however, does not only depend on people's age. In particular, income influences both the health needs of individuals and the opportunity to benefit from these services (De Graeve *et al.* 2003; Hernàndez-Quevado *et al.* 2006). Several studies have found evidence of significant differences in patterns of use by levels of household income even in countries with universal health care systems. For example, Goddard et al. (2001) report large inequities of access to some types of health care across different socio-economic groups in the United Kingdom.

18.   Some studies rely on *actual* consumption to assess the distributive effects of public health care. Both Evandrou *et al.* (1993) and Sefton (2002), who base their studies on detailed data on the effective use of health care services by individuals in the United Kingdom, conclude that public health care expenditure lowers income 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.

19.   Estimates based on actual health care use, however, are not immune to criticism either. Aaberge *et al.* (2006) argue that this approach implies that, for a given money income, sick people are better off than others simply because they receive more health-related services. 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.

20.   Addressing this problem 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, in general, worse health conditions and, as a consequence, greater needs for health care (Hernández-Quevedo *et al.*, 2006 ; Humphries *et al.*, 2000; Caussat *et al.* (2005)). However, most OECD countries appear to have achieved the goal of "equal care for equal needs" in the number of physician visits and hospital nights across different income groups –

after adjusting for need differences[6] – while use of dental health services is invariably pro-rich (Van Doorslaer et al., 2004).

3.2.2. *Approaches based on deducting out-of-pocket costs*

21.   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.[7] 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).

22.   Out-of-pocket health care expenditures are a special concern in countries, such as the United States, without a universal health care system.[8] 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 through employer-based health insurance. Out-of-pocket payments are also important in other countries, especially when households confront "catastrophic" events. 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. Overall, this evidence suggests that out-of-pocket payments affect most the poorest families with the most serious health problems.

23.   Out-of-pocket health expenditures have important distributive implications: first, they can deter poor people from using the health services they need; second, if the financing of public health care becomes more dependent on them, its burden is shifted towards those who use the services more – i.e. from rich to poor if health care needs are higher for the low income groups (Klavus *et al.*, 1996). However, the effect of out-of-pocket expenditures on comparisons of income inequality across countries is, *a priori*, ambiguous. On one side, they may lower inequality when access to public health care is targeted to the poor while all others pay for these services through private outlays (Gardiner *et al.*, 1995); on the other, they may overestimate their effect in narrowing inequalities when the poor lower their purchase of health care as part of the coping strategies they adopt when confronted by adverse circumstances.

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6.   Exceptions include the United States, Portugal and Finland, in the case of consultations with doctors; and Mexico in the case of hospital nights. Measures of "equity" in access to health services are based on respondents' self-assessment of their health status and their use of various types of health care services.

7.   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.

8.   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). Others have underscored the importance of better accounting for employer-provided health insurance for a better measure of household income (Weinberg, 2006).

3.2.3.   Distributive implications of health care financing

24.   Private out-of-pocket health expenditures are only one of the sources of health care financing. Several studies have focused on the effects of all financing sources for assessing the distributive implications of health care system. 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) as well as on various factors which shape horizontal equity (e.g. differences in contribution rates across insurance funds or in health-related tax rates across municipalities, Wagstaff *et al.*, 1999).

25.   There are, in general, significant differences in the financing mix of health care systems across OECD countries (Figure 3.3). De Graeve *et al.* (2003) examine the impact of different financing sources (direct and indirect taxes, contributions to social security and private insurance as well as out-of-pocket payments) on income distribution in 23 European countries. In general, direct taxes are found to be progressive in all countries, indirect taxes and out-of-pocket payments to be regressive, while there are more differences in results for contributions to social security and private insurance.[9] While in all European countries, except Switzerland, households pay about the same proportion of their income towards health care, the shift towards private financing – which, in a context of higher health spending, is occurring in many OECD countries – increases the burden on higher-risk groups that have predominantly lower income. 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 only moderately reduced the progressivity of the overall system without compromising its equity features, mainly because of the continuous importance of direct income taxes.

Figure 3.3. Differences in health care financing across selected OECD countries

Shares of five categories in the total financing, 2004
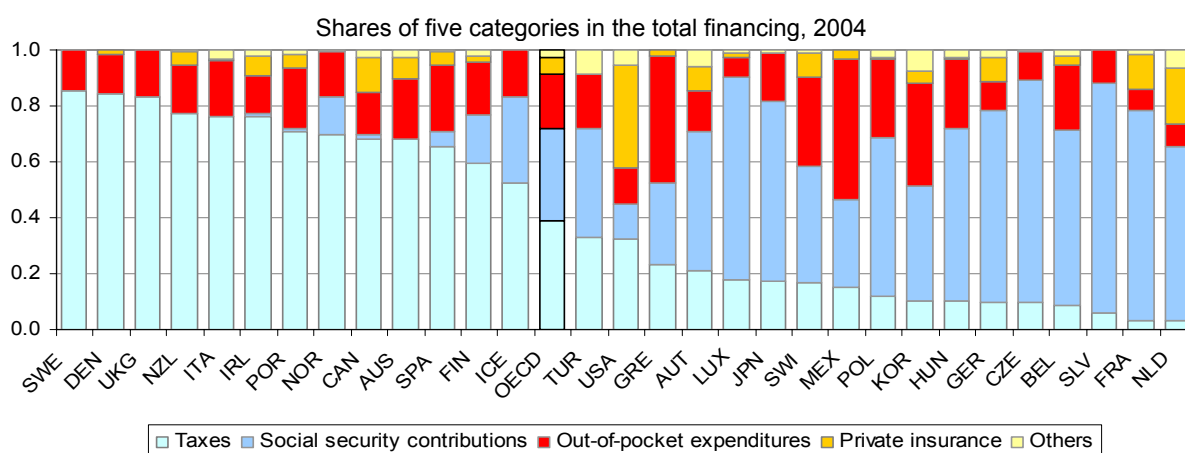
Note: For Sweden and the United Kingdom, out-of-pocket costs include all types of private financing.

Source: OECD Health Data.

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9.   For example, in Germany and the Netherlands, the existence of ceilings on the amount of contributions and the possibility for high income groups to opt out from health-related social insurance imply that social security contributions are regressive. In the case of private insurance, where contribution rates depend on the health circumstances of each individual, effects will depend on whether it is a complement or a substitute for public health care: for example, private insurance against co-payments will benefit poor people more while – if private insurance makes up an important financing source – its distribution is generally regressive, as health risks are negatively correlated to gross income.

26.   These studies provide a broader perspective compared to those that focus more narrowly on expenditure flows. Given the diversity of funding arrangements for health-care across OECD countries – and differences in value judgements about how such funding should be distributed among users – these studies underscore the importance of more detailed research to understand the equity implications (i.e. whether these funding arrangements are regressive, progressive or proportional to income) of health-care reforms introduced to curb the risk of excess demand.

3.3.   *Education*

27.   The utilisation of public education services varies from one individual to another, which *a priori* means significant distributive effects. An individual's age, clearly, is the chief factor which determines the probability that any individual will benefit from such services (Figure 3.4). 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), while others use information on actual participation in different types of educational institutions.

Figure 3.4. School enrolment by age in selected OECD countries, 2003
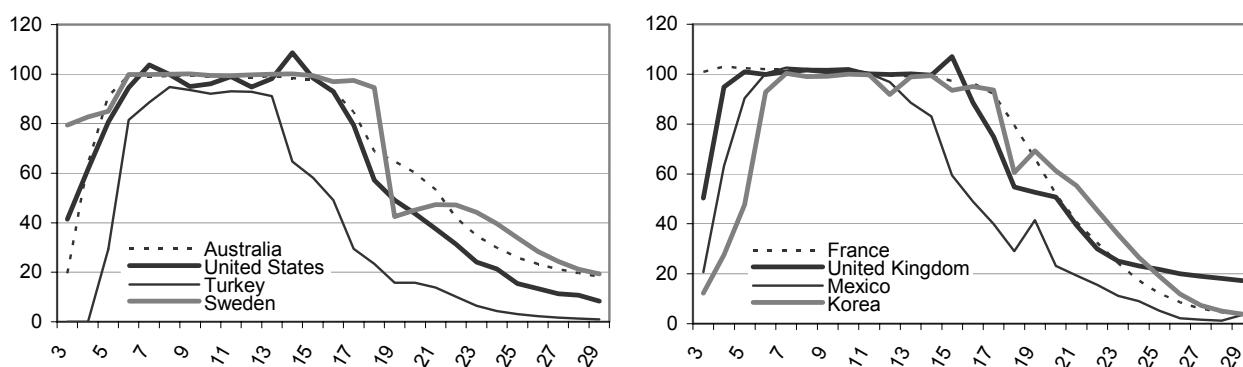
Note. Participation in public and private education both on a full- and part-time basis. In some countries, the rate of participation is higher than 100% because of differences between the data on the number of students and the number of people in each age group.

Source: OECD (2005b), *Education at a glance – OECD Indicators*, OECD, Paris.

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

3.3.1.   *Compulsory education*

29.   Compulsory education, which includes primary and lower secondary education, accounts for between 30% and 60% of total education expenditure depending on the country. In principle, all individuals of school age benefit from them, although some households choose private education (especially children from better off backgrounds).[10] Even if a small minority of children (the majority of

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10.   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% of the total in primary and secondary education (lower and upper. For further details, see OECD (2005), *Education at a glance – OECD Indicators*, OECD, Paris.

them from poor backgrounds) do not attend school at this age,[11] the allocation of public expenditure for this category of education based solely on age seems *a priori* quite justifiable.

30.   Studies adopting this approach to compulsory education have generally found evidence of significant reductions in inequalities of income distribution. For example, in Greece primary and secondary education combined mainly benefit the three lowest quintiles of the distribution, which leads to a one point reduction in the Gini coefficient for each of the two categories of public education spending (Antoninis *et al.,* 2001). Similarly, in Norway the benefits from education seem to be inversely related to income, i.e. households in the bottom deciles receive a larger absolute amount of public spending for primary and secondary education (Steckmest, 1996).

3.3.2.   *Non-compulsory education*

31.   The importance of social background is much more significant at the 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.[12]

32.   In all the OECD countries, inequalities of access to tertiary education are considerable and depend on parents' socio-economic characteristics.[13] Various factors combine to cause this.

- One factor relates to the parents' age. Older people, whose incomes are generally lower than the average for the population, benefit less from this expenditure because fewer of them have children of that age.[14] Furthermore, parents of children aged 18 to 25 years 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).

- 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 low income. To take account of this factor, individuals must be grouped in their households of origin (or "dynastic" households). When such an approach is used, the inequalities of access become clear. Thus, in France, individuals aged between 18 and 24 years from households in the highest quintile of the income distribution have a probability of access to university which is three times

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11.   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 the highest in New Zealand (16%), Portugal (29%), Mexico (33%) and Turkey (47%).

12.   Public expenditure on higher education accounts for almost half of educational spending (48%) while the share of pre-primary education is only 7%.

13.   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 differences. 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 among young blacks, even though these differences have declined since 1994.

14.   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.

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. Of these three countries, inequalities of access are greatest in those where the enrolment rate in higher education is lower (Figure 3.5).[15]

33.   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 3.5. Participation in tertiary education by income deciles of family of origin

Share of individuals in each decile
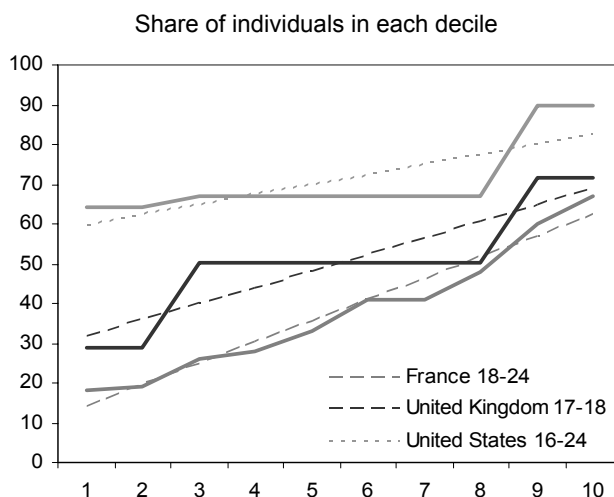
Note. The rate of participation in higher education is the proportion of individuals of a given age who are students. The differences observed between countries partly reflect differences in age groups considered. The dotted lines represent linear interpolations obtained from these curves. For the United 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).

3.4.   Social housing

34.   Housing costs are the largest item in the household budget and, for the poorest people, they can be an unbearable pressure without public assistance (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 cash income, this is not the case for social housing, even if households who benefit from it often pay a rent which is lower than market rates. The scale of social housing varies considerably from country to country. Thus, the proportion of households housed in social housing is 14% for all the countries considered in Table 3.2, but much higher in the Netherlands (36%), Sweden and the United Kingdom (22%) as well as France (18%).

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15.   Inequalities in the distribution of expenditure on tertiary education do not reflect 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 course (Albouy and Wanecq, 2003).

Table 3.2. Distribution of households by tenure type in selected OECD countries

Percentage of all households

		Owner occupied	Private renters	Social housing	Others
Australia	1996	71	20	6	1
Canada	1996	64	30	6	..
France	1996	54	21	18	8
Germany	1994	38	43	15	4
Great Britain	1997/98	67	10	22	..
Ireland	1999	80	10	10	..
Netherlands	1998	51	11	36	2
New Zealand	1996	71	19	5	6
Sweden	1998	42	35	22	1
United States	2000	64	31	2	3

Source: Ditch *et al.* (2001).

35.   The impacts of social housing on income inequality will depend on the characteristics of renters. In this respect, too, 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 (Ditch *et al*. 2001). In France, access to social housing primarily benefits families on low or modest incomes, even if the majority of the people benefiting from social housing are not poor.[16]

36.   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 to social housing). Other studies, which account for *both* social housing and owner occupation, tend to agree 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 income (for all tenure types) slightly reduces income inequality and poverty in the United Kingdom and France.

3.5.   *Conclusions*

37.   Overall, most of the studies of the distributive implication of publicly-provided services to households conclude that they significantly contribute to narrow income inequalities, although with differences across programmes:

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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 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 focussed 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).

- Public health care expenditure narrows income inequality when imputation is based on both insurance values and actual use – and the same pattern seems to hold, to a lesser extent, after adjusting for need differences across income groups. It is more difficult to generalise across studies after accounting for different financing arrangements, as some funding sources (e.g. out-of-pocket expenditures, indirect taxation) weigh more heavily on low-income groups.

- Expenditure on education, taken as a whole, has the effect of reducing inequalities in the distribution of incomes, as it allows children from poorer backgrounds better access to education. This overall effect derives from compulsory education while non-compulsory education, which accounts for just under half of public expenditure on education for the OECD as a whole, often has the opposite effect (the wealthiest households benefit most).

- Social housing is probably the category of government services that benefit the poor most but its overall impact on income inequalities is smaller than for health-care and education because of the lower amounts of spending.

4.   NEW EMPIRICAL EVIDENCE

4.1.   Introduction

38.   This chapter presents some estimates of the distributive implications of public services based on two approaches. While they both take as starting point the aggregate public expenditure for social services to households (derived from different OECD sources), they differ in the methodology used for imputing 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 grouped data by deciles, as available from the OECD questionnaires on income distributions: in this approach, the average income of each decile is increased by the 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). The description of results presented in this section is mainly based on the inter-quintile share ratio (S80/S20) and refers to a point in time, typically around 2000.

4.2.   Estimates based on individual records

39.   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 national surveys).[19] 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 (e.g. age) that most influence their use. In the case of health, estimates are based on both the "insurance value" and (limited to European countries) on actual use. For all categories of expenditures, changes in inequality measures relative to those based on the distribution of money 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.

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19.   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.

4.2.1.   Health

40.   The insurance-value approach 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 the analysis that follows, these insurance values have been calculated on the basis of the distribution of public health care expenditures across the detailed age groups that underline the latest set of OECD expenditure projections for health and long-term care (OECD, 2006a) shown in Figure 3.1.[20] 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.

41.   Based on this approach, the inter-quintile ratio declines, on average, by around 1 point (from 4.6 for money income to 3.7 after allowing for public health services, Table 4.1). 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.[21] In general, public health care services are distributed 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.[22]

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20.   These projections refer to per-capita amounts of public heath care services for 5-year age groups in 2003. This age-profile has been applied to public expenditure data referring to 2001.

21.   In most countries, public health care services make up a considerable share of disposable household income (around 13% on average, Annex Table A.1), ranging between 11% in Finland, the United Kingdom and the United States and 16% in Germany and Italy.

22.   The approach used here, which only accounts 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). Estimates of the equalising impact of Medicaid and Medicare from the U.S. 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), i.e. lower than the estimates (a decline of 1.63 and 0.37 points, respectively) shown in Annex Table A.4.

Table 4.1. Inter-quintile share ratio before and after inclusion of public health expenditures

Insurance-value approach

	A. Money income	B. Income plus health care (insurance)	C. Difference (A-B)
Denmark	3.10	2.52	0.58
Finland	3.56	3.06	0.49
Sweden	3.58	3.07	0.51
Austria	3.65	3.10	0.55
Germany	3.71	3.12	0.59
Netherlands	3.73	3.26	0.48
Luxembourg	3.76	3.21	0.54
France	4.06	3.33	0.73
Belgium	4.14	3.41	0.74
Italy	4.85	3.81	1.05
Canada	4.88	4.20	0.68
Ireland	4.88	3.91	0.98
United Kingdom	5.02	4.09	0.93
Australia	5.17	4.06	1.11
Greece	5.67	4.38	1.29
Spain	5.99	4.83	1.16
Portugal	6.47	4.81	1.66
United States	7.14	5.51	1.63
Average	*4.63*	*3.76*	*0.87*

Note: The first column presents the inter-quintile share ratio (S80/S20) 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 one 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 (S80/S20) for money income.

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

42.   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 on the number of nights spent in hospital. These data – available for 8 European countries[23] – have been combined with data on public health care expenditures grouped in two broad categories: hospital care, and consultations and medical examinations outside hospitals.[24]

43.   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

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23.   France has not been included because of a low response rate.

24.   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 spent for medical visits, without distinguishing – for most countries – between general practitioners and specialists. Imputations of in-hospital care expenditures to an individual j (DSH_j) are based on the number of nights spent in hospital (n_j):

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

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:

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

to one of 0.8 based on insurance value for the same countries, Table 4.2). 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 in Ireland. In those countries where inequality rises, this reflects the effect of health care services provided inside a hospital (in 5 of the 8 countries these services widen inequalities) while health care services outside hospitals have an equalizing effect in all countries.

44.   These opposite effects reflect the large differences in how inside and outside hospital care expenditures are distributed among quintiles of the population (Figure 4.1). 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 Table 4.2, that in-hospital expenditures *increase* inequality in several countries – it reflects the effect of "re-ranking": as in-hospital expenditures are concentrated among a small number of individuals,[25] they lead more easily to re-ranking of individual beneficiaries, which dampen (or even reverse) the equalizing effects of these health services.

Table 4.2. Inter-quintile share ratio (S80/S20) before and after inclusion of public health expenditures

Actual consumption approach

		Total expenditure		In-hospital expenditures		Out-of-hospital expenditures	
	A. Money income	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-B.2)
Denmark	3.10	3.25	-0.16	3.39	-0.29	2.90	0.19
Finland	3.56	3.60	-0.04	3.77	-0.21	3.36	0.20
Austria	3.65	3.39	0.26	3.56	0.09	3.39	0.26
Netherlands	3.73	3.76	-0.02	3.99	-0.26	3.48	0.26
Italy	4.85	4.86	-0.01	5.41	-0.56	4.30	0.55
Ireland	4.88	4.69	0.20	5.01	-0.12	4.47	0.41
United Kingdom	5.02	4.37	0.66	4.97	0.06	4.35	0.67
Spain	5.99	5.24	0.75	5.90	0.09	5.23	0.76
Average	*4.35*	*4.14*	*0.20*	*4.50*	*-0.15*	*3.93*	*0.41*
Memorandum item:							
Average for the same countries							
based on insurance approach	*4.31*	*3.52*	*0.79*	*..*	*..*	*..*	*..*

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

Source: Secretariat calculations based on ECHP for European countries.

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25.   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 accounts for 90% of all medical visits.

Figure 4.1. Distribution of health care services across quintiles

Health care in hospitals

Health care outside hospitals
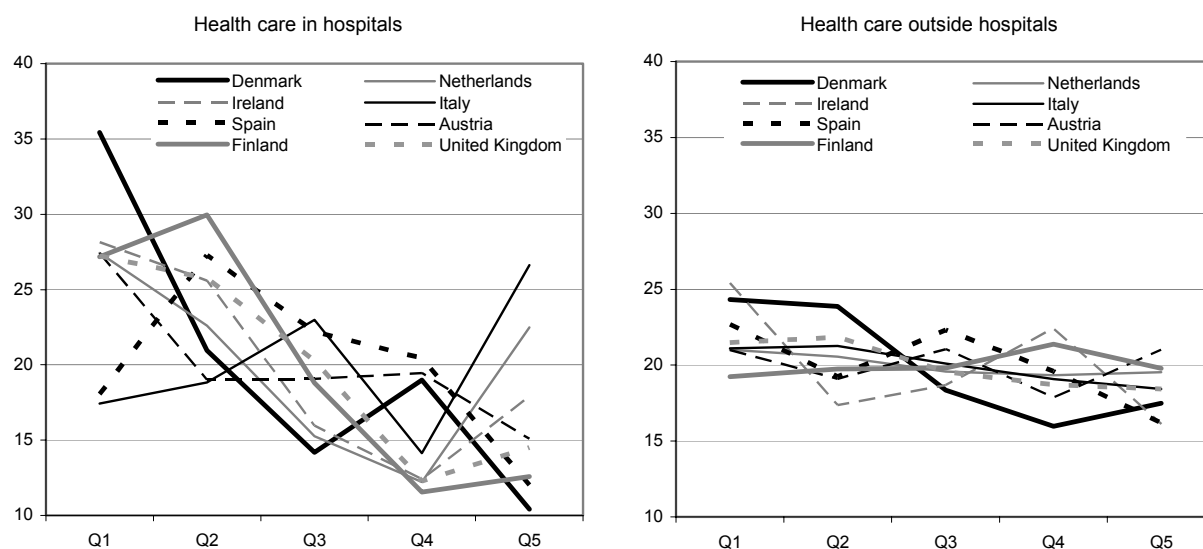
Note. Quintiles are based on money income, i.e. before consideration of health care services.

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

4.2.2. *Education*

45. 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 education level.[26] The methodology followed for determining participation applies two different approaches for individuals aged below and over 16.

- For children aged 16 and over, the survey data provide information on education participation for each individual filling the questionnaire, although without distinguishing between public and private institutions.[27]

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26. The expenditures on education attributed to individual *j* attending the education level *c* (DE^c_j) are determined on the basis of whether or not they are attending these institution (t^c_j =1 if an individual follows education in category *c*, otherwise it is zero) based on the following identity:

$$DE^c_j = t^c_j \times \frac{DE^c}{N^c}$$

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.

27. 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 education, and less than lower secondary education), 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 and more; for European countries, this refers to people aged 17 or more).

- 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 rates[28] by single year of age (i.e. for each individual in the survey, a variable is constructed to indicate whether he/she is participating in education and in which category).

46.   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 education level.[29]

47.   The impact of public educational expenditure on income inequality depends crucially on the level considered. [30]

- *Pre-primary education* generally narrows income inequalities. The effect is however small because of the modest amount of expenditures for pre-primary education (in all countries below 2% of household disposable income, Annex Table A.1). Different assumptions for imputing participation rates have only small effects. When the imputation is based only on the age of the child (left-hand panel of Table 4.3), the average reduction in the quintile-share ratio is 0.1 point (but twice as high in Portugal and the United States) whereas, 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 reduction in inequality is marginally smaller, and inequality increases slightly in Denmark and Germany.

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28.   Data on net enrolment by single year of age, from *Education at a Glance 2005,* refer to 2003 and 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).

29.   Because of lack of data, Luxembourg is not included in the analysis.

30.   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 extends to this level (or, at least, part of it).

Table 4.3. Inter-quintile share ratio before and after inclusion of pre-primary education expenditures

		Imputation based on the age of the child		Imputation based on the age of the child and the employment status of parents	
	A. Money income	B1. Income plus pre-primary education	C1. Difference (A-B1)	B2. Income plus pre-primary education	C2. Difference (A-B2)
Denmark	3.10	3.09	0.00	3.12	-0.02
Finland	3.56	3.51	0.04	3.55	0.01
Sweden	3.58	3.49	0.09	3.50	0.08
Austria	3.65	3.55	0.10	3.59	0.06
Germany	3.71	3.67	0.04	3.72	-0.01
Netherlands	3.73	3.66	0.08	3.66	0.07
France	4.06	3.97	0.10	..	..
Belgium	4.14	4.09	0.05	..	..
Italy	4.85	4.69	0.16	..	..
United Kingdom	5.02	4.91	0.11	4.95	0.08
Australia	5.17	5.16	0.02	..	..
Greece	5.67	5.64	0.03	5.65	0.02
Spain	5.99	5.89	0.10	..	..
Portugal	6.47	6.22	0.24	6.13	0.33
United States	7.14	6.93	0.21	..	..
Average	*4.66*	*4.56*	*0.09*	..	..
Average across the countries included in right-hand panel	*4.28*	*4.19*	*0.08*	*4.21*	*0.07*

Note: Countries are ranked, from top to bottom, in increasing order of the S80/S20 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 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: Secretariat calculations based on ECHP for European countries and national survey data for non-European ones.

- For *primary and secondary education,* public expenditures have a stronger effect in reducing income inequalities, with an average decline of around 0.5 points (Table 4.4, left-panel). The decline of the inter-quintile share ratio is the largest in Spain, Portugal and the United States, while it is negligible in Denmark and Sweden. This 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, although the share is marginally lower for people in the higher part of the distribution (Annex Table A.1). The share of public expenditure for primary and secondary education accruing 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.[31]

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31.   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.

- For *tertiary education,* patterns are radically different – on average, the decline in the inter-quintile share ratio is negligible. In around ⅓ of the countries included in Table 4.4 (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 parental home who are classified by surveys as separate households and are often concentrated in the lowest quintile of the distribution. 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 (Annex Table A.2).

Table 4.4. Inter-quintile share ratio before and after inclusion of public expenditures on primary, secondary and tertiary education

	A. Money income	Primary and secondary education		Tertiary education	
		B1. Income plus primary and secondary education	C1. Difference (A-B1)	B2. Income plus tertiary education	C2. Difference (A-B2)
Denmark	3.10	3.09	0.00	2.91	0.18
Finland	3.56	3.65	-0.09	3.49	0.07
Sweden	3.58	3.38	0.20	3.36	0.22
Austria	3.65	3.37	0.28	3.67	-0.02
Germany	3.71	3.47	0.24	3.73	-0.01
Netherlands	3.73	3.32	0.41	3.70	0.03
France	4.06	3.75	0.31	3.96	0.10
Belgium	4.14	3.95	0.19	4.23	-0.08
Italy	4.85	4.10	0.75	4.80	0.05
Canada	4.88	4.31	0.58	4.80	0.08
Ireland	4.88	4.20	0.69	5.10	-0.21
United Kingdom	5.02	4.44	0.58	4.97	0.06
Australia	5.17	4.77	0.41	5.07	0.10
Greece	5.67	5.29	0.38	5.62	0.05
Spain	5.99	4.96	1.03	6.10	-0.11
Portugal	6.47	5.20	1.26	6.54	-0.08
United States	7.14	5.84	1.30	7.02	0.12
Average	*4.68*	*4.18*	*0.50*	*4.65*	*0.03*

Note: Countries are ranked, from top to bottom, in increasing order of the S80/S20 ratio for money income

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

48.   Overall, the combined effect of public spending on all various categories of education is a reduction in the inter-quintile share ratio of 0.6 points on average. 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 (Table 4.5).

Table 4.5. Inter-quintile share ratio before and after inclusion of all public expenditures on education

	A. Money income	B. Income plus education	C. Difference (A-B)
Denmark	3.10	2.93	0.17
Finland	3.56	3.49	0.07
Sweden	3.58	3.12	0.46
Austria	3.65	3.26	0.39
Germany	3.71	3.44	0.27
Netherlands	3.73	3.22	0.51
France	4.06	3.62	0.44
Belgium	4.14	3.96	0.18
Italy	4.85	3.93	0.92
Canada	4.88	4.24	0.65
Ireland	4.88	4.35	0.53
United Kingdom	5.02	4.33	0.69
Australia	5.17	4.66	0.51
Greece	5.67	5.23	0.43
Spain	5.99	4.96	1.03
Portugal	6.47	5.13	1.34
United States	7.14	5.63	1.52
Average	*4.68*	*4.09*	*0.60*

Note: Countries are ranked, from top to bottom, in increasing order of the S80/S20 ratio for money income

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

4.2.3.   Social housing

49.   Estimating the distributive effect of social housing is more difficult that 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 (provided by ECHP) on housing tenure (i.e. whether different households own or rent their residence, and whether they rent from the public sector or on the market),[32] as well as on their actual rents and mortgage repayments.

50.   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. Among the countries considered in Annex Table A.2, 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 (left-hand panel); this pattern holds in most countries, with the exceptions 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 (right-hand panel).[33] 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.

51.   To evaluate the implicit subsidy associated to 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

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32.   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.

33.   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.

the one they would have paid on the market for a dwelling with similar characteristics[34] The distributive effects of social housing are in general quite limited (Table 4.6). This small equalizing 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 to health and education – they mainly benefit individuals in the lowest quintiles of the distribution (Annex Table A.1).

Table 4.6. Inter-quintile share ratio before and after inclusion of expenditures on social housing

	A. Money income	B. Income plus social housing	C. Difference (A-B)
Denmark	3.10	3.08	0.01
Finland	3.56	3.52	0.03
Austria	3.65	3.61	0.04
Germany	3.71	3.68	0.03
Netherlands	3.73	3.68	0.05
France	4.06	4.04	0.03
Belgium	4.14	4.08	0.06
Italy	4.85	4.80	0.05
Ireland	4.88	4.65	0.23
United Kingdom	5.02	4.82	0.21
Spain	5.99	5.99	0.00
Portugal	6.47	6.37	0.10
Average	*4.43*	*4.36*	*0.07*

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

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

4.2.4. *Summing up*

52. Table 4.7 summarizes the combined effect of the three categories of public services discussed above. On average, the inter-quintile share ratio falls by around 1.3 points (i.e. from 4.6 for money income to a value of 3.3) with a reduction that is largest in the United States and Portugal (almost twice the average) and smallest in Finland and Denmark.[35]

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34. Estimates are based on the following model, which is applied separately to renters in the public and in the private sectors:

    rent = α × rooms + β × income + c.

    where *rent* denotes the monthly rent paid by the household, *rooms* the number of rooms in the dwelling, and *income* is the (non equivalised) household income – a variable used to capture the neighborhood in which households live, as individuals with the same income tend to cluster in areas with similar house prices. Coefficients (shown in Annex Table A.3) have generally the expected sign and are statistically significant (i.e. 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. These coefficients 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.

35. The lowest reduction is recorded by Luxembourg, but for this country results only refers to health care.

Table 4.7. Inter-quintile share ratio before and after inclusion of all types of public services to households

	A. Money income	B. Plus all categories	C. Difference (A-B)
Denmark	3.10	2.35	0.75
Finland	3.56	2.94	0.61
Sweden	3.58	2.65	0.93
Austria	3.65	2.78	0.87
Germany	3.71	2.87	0.84
Netherlands	3.73	2.79	0.95
Luxembourg	3.76	3.21	0.54
France	4.06	2.96	1.10
Belgium	4.14	3.21	0.94
Italy	4.85	3.16	1.69
Canada	4.88	3.68	1.20
Ireland	4.88	3.45	1.44
United Kingdom	5.02	3.47	1.56
Australia	5.17	3.69	1.48
Greece	5.67	4.08	1.59
Spain	5.99	4.12	1.87
Portugal	6.47	3.98	2.49
United States	7.14	4.55	2.59
Average	*4.63*	*3.33*	*1.30*

Notes. Countries are ranked in increasing order of S80/S20 for money income. Estimates for health care expenditure are those based on insurance values. Data for Luxembourg exclude both education and social housing; those for Australia, Canada, the United States, Greece, Spain and Sweden exclude social housing.

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

53.   To test the sensitivity of the results for the inequality measure used, Figure 4.2 presents estimates of the effects of government services for both the inter-quintile share ratio and the Gini coefficient. In general, patterns are little affected by the specific inequality measure used.

- 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 a larger percentage decline for the latter than for the former measure).

- With both measures, the ranking of countries does not change significantly when moving from 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 here, is above 0.95).

- There are, however, significant differences across countries in the size of the reduction in inequality depending on the measure used. Based on the inter-quintile ratio, the 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.[36]

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36.   The larger reduction in the inter-quintile share ratio – an inequality measure that is more sensitive to what happens are 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.

Figure 4.2. Income inequality before and after inclusion of expenditures on public services in OECD countries

Estimates based on individual data
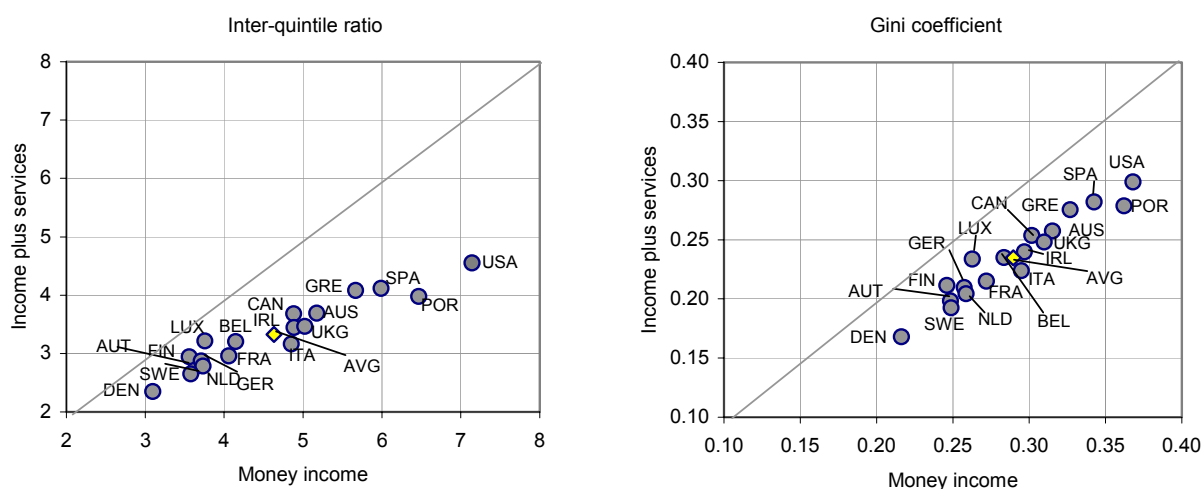
Source: Secretariat calculations based on ECHP for European countries and national survey data for non-European ones.

4.3. *Estimates based on grouped data*

54. 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 (simpler) approach rests on attributing to different income deciles the monetary value of public expenditure for the provision of different types of social services, and in comparing various inequality measures before and after this imputation (i.e. with no re-ranking of individuals).[37] This approach allows extending the analysis to a broader range of OECD countries and public services.

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37. 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 estimates of the equalizing effect of government services relative to approaches that allow for such re-ranking (Atkinson, 1980; Plotnick, 1981).

Box 2. Methodology used based on grouped data

The imputation of the value of the different public services to each decile of the income distribution relies on information on the average equivalised disposable income of each decile and on the distribution of (nine) age groups across them.* 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 underlying the latest set of OECD expenditure projections for health and long-term care shown in Figure 3.1; for most countries, these age-expenditure profiles are based on national data; for countries where no national data are available **, 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 two stages. The first requires determining the enrolment rates of individuals of a given age (from 3 to 29 years) to different levels of education (public and private) and then grouping them into the three age groups available in the OECD income distribution questionnaire (0-17, 18-25 et 26-40).*** The second involves calculating total education expenditure by age group and by decile. Expenditure data refer to the direct educational outlays of the general government, i.e. excluding cash transfers to private entities such as students' grants and loans. To test the sensitivity of the results to the assumption of equal access to education, an alternative scenario (presented in the Annex) assumes that enrolment rates for poorer people are lower than those in the upper ones, based on an arbitrary inequality coefficient that is common across countries.

- *Other social services.* This category (in the SOCX classification) includes public services provided to elderly people, survivors, disabled, unemployed, as well as to families with children, housing (excluding the subsidies implicit in the provision of social housing), social assistance and active labour market policies. Because of the diversity of programmes, their individualization 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 micro-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 public 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.

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*.   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.

**.   The countries are the Czech Republic, Hungary, Iceland, Japan, Korea, Mexico, New Zealand, Norway, Poland, the Slovak Republic, Switzerland and Turkey.

***.   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.

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

- *Health.* Health expenditure reduces inequalities in all the 26 OECD countries considered, even if these effects do not fundamentally alter their classification. The Nordic countries and the Czech Republic are the most egalitarian countries before and after taking health services into account. However, the greatest changes in the inter-quartile ratio affect countries such as Portugal, the United States and Mexico, where the distribution of disposable income is the most unequal. This leads to a convergence of income inequalities among countries.[38]

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38.   For example, the gap in the inter-quintile ratio between Denmark and the United States falls from 3.75, based on money income, to 2.65 after taking health services into account. The inter-quintile ratio falls, on average, by 1.1 points (from 5.2 to 4.1, Table 4.8)

- *Education*. The redistributive impact of public expenditure on education is comparable to that for health (the inter-quintile ratio falls from 5.2, for disposable income, to 4.2 after taking education services into account). In general, education expenditure especially benefits the three lowest quintiles of the income distribution (Annex Table A.6) even if the differences between countries are considerable. Sensitivity analysis shows that inequalities of access to education across income deciles have a fairly marginal impact on the results and are limited to the 18-25 age group (see Annex Tables A.10 and A.11).

- *Other social services*. While often significant, the effects of these services in narrowing income inequality (a decline of the inter-quintile share ratio of 0.35 points, on average) are significantly lower than those associated to health and education, as the effect of their more targeted nature is offset by the lower amount of expenditure.

56.   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 4.8). The differences between countries in the degree of this fall are marked, with a greater fall in countries where the inequalities in the distribution of disposable income are greatest.[39] 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).

Table 4.8. Inter-quintile share ratio before and after inclusion of expenditure on all public services

	Inter quintile ratio (S80/S20)					
	A. Money income	B. Income after health	C. Income after education	D. Income after other social services	E. Income after all public services	F. Difference (A-E)
Denmark	3.14	2.49	2.71	2.48	1.94	1.20
Sweden	3.41	2.65	2.87	2.66	2.03	1.38
Netherlands	3.58	3.09	3.08	3.39	2.64	0.94
Czech Republic	3.61	2.87	3.04	3.31	2.40	1.20
Luxembourg	3.69	3.15	3.08	3.42	2.59	1.10
Finland	3.72	3.06	3.16	3.25	2.48	1.23
Norway	3.72	2.85	3.23	2.97	2.25	1.47
Austria	3.88	3.25	3.06	3.76	2.66	1.22
Switzerland	3.90	3.20	3.35	3.74	2.78	1.13
France	4.04	3.16	3.28	3.67	2.59	1.45
Germany	4.26	3.29	3.61	3.94	2.81	1.45
Hungary	4.40	3.52	3.66	4.06	2.94	1.46
Canada	4.78	3.90	3.90	4.37	3.19	1.59
Australia	4.87	3.45	4.14	4.13	2.83	2.04
Ireland	5.01	3.72	4.27	4.66	3.20	1.81
United Kingdom	5.17	4.14	4.33	4.77	3.44	1.73
New Zealand	5.38	4.22	4.08	5.14	3.34	2.04
Spain	5.59	4.31	4.44	5.43	3.59	2.00
Japan	5.69	4.26	4.79	5.36	3.66	2.02
Greece	6.02	4.78	5.33	5.70	4.25	1.78
Poland	6.07	5.22	4.73	5.77	4.11	1.96
Italy	6.16	4.51	4.76	6.03	3.73	2.43
Portugal	6.23	4.42	4.93	6.02	3.73	2.50
United States	6.88	5.14	5.13	6.40	4.00	2.89
Turkey	9.31	7.85	7.41	9.27	6.48	2.82
Mexico	12.59	10.89	9.93	12.32	8.78	3.81
Average	*5.20*	*4.13*	*4.24*	*4.85*	*3.40*	*1.79*

Source: Secretariat calculation based on OECD data.

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39.   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.

57.   This analysis also suggests that public services are distributed more or less uniformly among the different quintiles and, in consequence, in a less inegalitarian way than money incomes. Figure 4.3 shows this result for the average of OECD countries. For all public services to households, the share benefiting the lowest quintile is 23% and that of the highest quintile, 17% (left-hand panel). Similar values are recorded for health services and education, while for other public services the share of the lowest quintile is the highest. However, due to the different levels of cash income in the different quintiles, public services represent a much larger income-share for individuals at the bottom of the distribution (equivalent to 70% of disposable income on average) than for those at the top of the distribution (11%, right-hand panel).[40]

Figure 4.3. Importance of public services in the household income, OECD average
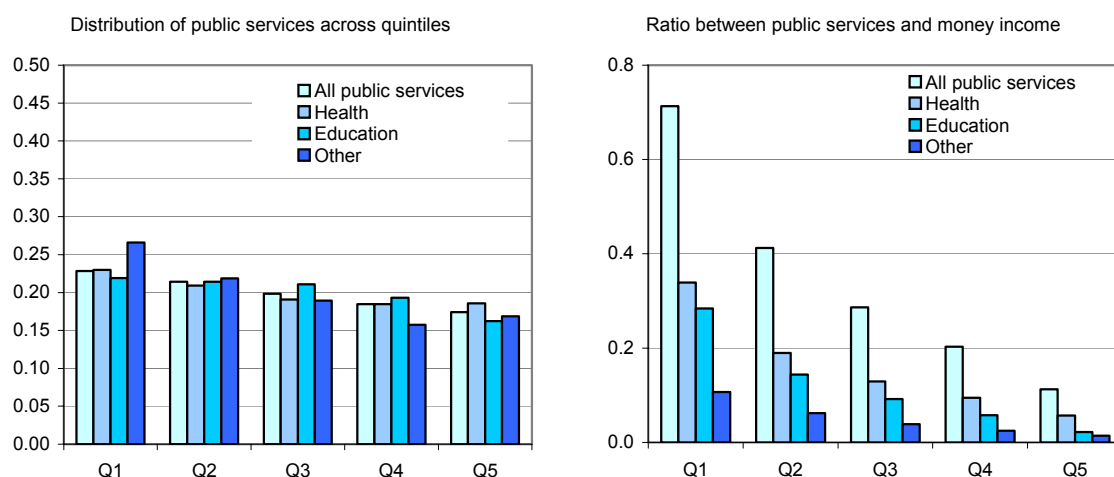
Source: Secretariat computation based on different OECD databases.

4.4.   Conclusions

58.   Overall, both approaches used in this chapter highlight some consistent patterns that mirror (with few exceptions) those identified by previous research on the subject:

- First, 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 and for heath-care services (based on actual use). The overall effect of publicly-provided in-kind services in narrowing income inequalities results mainly from a relatively uniform distribution of these services across income quintiles, which translates into a larger income-share at the bottom of the distribution than at the top.

- Second, cross-country differences in inequality – relative to measures referring to the distribution of money disposable income – are smaller when assessed using the inter-quintile share ratio but significantly less when using the Gini coefficient (a measure that is more sensitive to the middle of the distribution).

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40.   A comparison of results based on two different inequality measures (the inter-quintile ratio and the Gini coefficient) highlights patterns that mirror quite closely those described earlier (for a smaller number of OECD countries and social programmes) based on individual data. Both inequality measures show a reduction in inequality following the consideration of public spending for social services. Also, the decline in the inter-quintile share ratio is larger for countries with more unequal distribution of money income but broadly similar across countries for the Gini coefficient.

- Third, changes in inequality measures prompted by the consideration of public services do not generally lead to major changes in country rankings.

59.   The two approaches used in this chapter lead, in general, to different numerical estimates of the reduction in inequality associated to publicly-provided services. Comparing estimates for the countries and programmes (education and health) that are covered by both approaches shows that, on average, the fall in the inter-quintile share ratio based on grouped data exceeds that based on individual records by 45% while the difference is only 17% for the Gini coefficient. There is however a high correlation across countries (above 0.90) in the reduction in inequality based on the two approaches, and this irrespectively of the inequality measure used.

5.   POLICY IMPLICATIONS

60.   The analysis presented in this paper shows that broadening the concept of economic resources to account for government-provided services to households lowers estimates of income inequality and narrows cross-country dispersion more for some measures (inter-quintile share ratio) than for others (Gini coefficient). These results underscore the importance of accounting for the contribution of government services to household well-being more systematically: as (part of) the taxes levied on households are deducted from conventional measures of disposable income, all benefits that government provide to households thought these taxes should be accounted for. The OECD national accounts already provide information on the "actual" consumption of households, i.e. a concept that includes both the goods and services bought on the market and those are provided by governments free of charge or at subsidised prices. A logical next step is to integrate these government services into a measure of the economic resources of each individual household.

61.   The way various government services are distributed among the population may also impact more directly on the design of policies in different sectors.

- First, individuals may react differently to various policies depending on who are its immediate beneficiaries. For example, families with young children may regard part of the tax burden levied on them as effectively "paying" for the subsidised education they receive as a counterpart; when this is the case, higher tax rates may not discourage paid work as when their taxes finance benefits that accrue to others.

- Second, the distributive impact of various government services may matter for the level of provision in different fields: for example, some countries may regard an increase in public health and education services for disadvantaged families as the most effective way of fighting social exclusion within societies, either because of their long-term effects or because they may provide a better way of reaching the poor than cash payments.[41]

- Third, the large contribution of several types of public services to the economic well-being of lower income groups has implications for reforms aimed at attaining other goals (beyond redistributing income). These reforms need to be assessed *ex ante* for their effects on the living conditions of the worse-off and, in the case of adverse effects, governments may need to find ways for mitigating them.

- Fourth, public programmes taking the form of either cash transfers or of in-kind services can have the same redistributive effects (e.g. housing allowance to low-income people and social housing). Because of this, an overall assessment of the effects of government policies on income inequality needs to account for the full range of support provided.

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41.   Conversely, publicly provided in-kind services may be desirable when they contribute to remove market failures (e.g. those leading to under-provision) even if they disproportionately benefit better-off families.

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ANNEX. ADDITIONAL EVIDENCE FROM EMPIRICAL ANALYSIS

Annex Table A.1. Distribution of public services across income quintiles

Imputation based on individual data

		Public services as % of disposable income	Distribution of public services over quintiles				
			1	2	3	4	5
Australia	*Total*	*0.21*	*21.0*	*21.9*	*20.7*	*19.2*	*17.2*
	Health	*0.13*	22.7	20.6	19.3	18.4	19.1
	Education	*0.08*	18.4	24.0	22.7	20.5	14.4
	Pre-primary	*0.00*	18.8	26.8	23.8	20.1	10.6
	Primary and secondary	*0.06*	18.9	26.7	25.0	19.3	10.1
	Tertiary	*0.02*	16.9	16.2	16.3	24.0	26.7
	Housing	*..*	..	..	..	..	..
Austria	*Total*	*0.31*	*21.1*	*21.3*	*21.6*	*18.8*	*17.3*
	Health	0.12	21.1	19.5	20.4	18.9	20.1
	Education	0.18	20.9	22.3	22.6	18.8	15.5
	Pre-primary	*0.01*	33.0	27.7	14.9	16.2	8.2
	Primary and secondary	*0.13*	19.5	24.7	25.0	18.3	12.4
	Tertiary	*0.03*	21.5	9.7	15.6	21.6	31.5
	Housing	0.01	25.0	28.8	14.8	20.2	11.3
Belgium	*Total*	*0.25*	*19.5*	*20.9*	*19.7*	*20.6*	*19.3*
	Health	0.12	23.3	21.0	19.0	18.5	18.2
	Education	0.12	14.8	20.7	20.7	23.1	20.7
	Pre-primary	*0.01*	19.4	17.5	30.8	16.5	15.7
	Primary and secondary	*0.09*	16.0	22.8	21.1	22.6	17.4
	Tertiary	*0.02*	4.7	10.3	11.2	30.3	43.5
	Housing	0.00	64.7	29.6	3.8	0.4	1.6
Canada	*Total*	*0.22*	*21.1*	*20.9*	*20.1*	*19.5*	*18.4*
	Health	0.10	18.8	21.3	20.2	19.7	20.0
	Education	0.11	23.1	20.5	20.0	19.3	17.1
	Pre-primary	*..*	..	..	..	..	..
	Primary and secondary	*0.08*	25.0	22.4	21.5	17.9	13.3
	Tertiary	*0.04*	19.0	16.6	16.9	22.3	25.2
	Housing	0.00	..	..	..	..	..
Denmark	*Total*	*0.34*	*23.8*	*21.3*	*19.3*	*18.4*	*17.1*
	Health	0.15	25.6	20.2	18.5	17.7	18.0
	Education	0.19	22.2	22.2	20.0	19.0	16.5
	Pre-primary	*0.02*	11.0	27.3	25.6	24.1	12.0
	Primary and secondary	*0.12*	14.1	25.2	22.9	19.8	18.0
	Tertiary	*0.06*	42.3	14.5	12.4	15.8	15.0
	Housing	0.00	40.3	19.9	21.8	12.2	5.8
Finland	*Total*	*0.27*	*18.2*	*22.3*	*20.0*	*20.4*	*19.2*
	Health	0.11	21.6	21.7	18.8	19.3	18.5
	Education	0.15	15.2	22.6	20.8	21.3	20.1
	Pre-primary	*0.01*	20.5	33.8	19.5	16.4	9.9
	Primary and secondary	*0.09*	9.8	23.4	24.6	21.8	20.3
	Tertiary	*0.05*	24.0	18.0	13.9	21.6	22.4
	Housing	0.00	37.1	24.5	20.2	12.9	5.3
France	*Total*	*0.31*	*21.7*	*20.0*	*19.6*	*19.8*	*19.0*
	Health	0.15	21.0	20.4	19.5	19.2	19.9
	Education	0.15	22.6	19.2	19.6	20.2	18.4
	Pre-primary	*0.02*	22.1	22.8	18.6	22.1	14.5
	Primary and secondary	*0.08*	24.6	21.7	19.8	18.2	15.6
	Tertiary	*0.05*	19.6	14.3	19.5	22.8	23.8
	Housing	0.00	17.1	28.7	23.1	24.4	6.7
Germany	*Total*	*0.27*	*20.2*	*20.3*	*20.6*	*20.4*	*18.5*
	Health	0.16	19.9	19.8	19.7	20.0	20.6
	Education	0.10	20.4	21.0	22.1	21.1	15.4
	Pre-primary	*0.01*	23.1	25.9	27.1	14.2	9.7
	Primary and secondary	*0.07*	20.4	23.7	23.4	20.9	11.5
	Tertiary	*0.02*	19.3	9.9	16.0	24.1	30.7
	Housing	0.00	27.8	22.4	19.1	15.5	15.1
Greece	*Total*	*0.20*	*20.4*	*21.0*	*19.3*	*19.4*	*20.0*
	Health	0.11	23.3	20.7	19.3	18.1	18.6
	Education	0.09	16.5	21.4	19.3	21.1	21.7
	Pre-primary	*0.00*	12.7	34.1	12.1	21.0	20.0
	Primary and secondary	*0.05*	18.6	23.8	19.6	21.5	16.6
	Tertiary	*0.03*	12.9	14.1	20.1	20.5	32.4
	Housing	0.00	..	..	..	..	..
Ireland	*Total*	*0.29*	*19.1*	*20.8*	*19.9*	*21.1*	*19.1*
	Health	0.13	21.7	19.8	19.2	19.4	20.0
	Education	0.15	15.7	21.4	21.4	21.6	19.9
	Pre-primary	*0.00*	95.8	0.0	0.0	0.0	4.2
	Primary and secondary	*0.10*	20.2	28.2	19.9	17.5	14.2
	Tertiary	*0.05*	5.8	6.8	24.6	30.4	32.4
	Housing	0.02	29.1	23.4	13.1	30.2	4.2
Italy	*Total*	*0.33*	*22.3*	*21.2*	*19.7*	*19.2*	*17.6*
	Health	0.16	19.6	20.3	20.0	19.8	20.2
	Education	0.16	24.8	22.0	19.6	18.5	15.1
	Pre-primary	*0.01*	26.9	21.7	19.2	21.4	10.8
	Primary and secondary	*0.12*	26.8	22.8	19.7	16.8	13.9
	Tertiary	*0.03*	15.6	18.8	19.4	24.0	22.1
	Housing	0.00	29.9	22.1	13.9	20.0	14.1
Luxembourg	*Total*	*0.13*	*19.3*	*20.4*	*21.3*	*19.9*	*19.0*
	Health	0.13	19.3	20.4	21.3	19.9	19.0
	Education	0.00	..	..	..	..	..
	Pre-primary	*0.00*	..	..	..	..	..
	Primary and secondary	*0.00*	..	..	..	..	..
	Tertiary	*0.00*	..	..	..	..	..
	Housing	0.00	..	..	..	..	..
Netherlands	*Total*	*0.25*	*23.1*	*21.3*	*21.0*	*18.4*	*16.2*
	Health	0.12	19.3	21.4	20.0	19.2	20.1
	Education	0.12	26.6	21.1	22.4	17.5	12.4
	Pre-primary	*0.01*	30.8	27.7	19.5	15.2	6.6
	Primary and secondary	*0.09*	27.2	23.8	24.1	16.1	8.8
	Tertiary	*0.03*	23.1	9.5	17.6	23.3	26.5
	Housing	0.01	31.2	24.0	11.6	18.0	15.3
Portugal	*Total*	*0.31*	*21.8*	*22.7*	*19.1*	*17.5*	*18.9*
	Health	0.14	21.8	20.3	19.9	19.8	18.3
	Education	0.16	21.4	24.8	18.6	15.4	19.8
	Pre-primary	*0.01*	32.0	23.5	19.6	11.0	13.9
	Primary and secondary	*0.12*	23.6	29.0	17.9	15.6	14.0
	Tertiary	*0.03*	9.6	8.4	20.8	16.3	44.9
	Housing	0.00	37.9	24.1	16.1	20.6	1.3
Spain	*Total*	*0.25*	*21.0*	*19.8*	*19.2*	*18.0*	*22.0*
	Health	0.12	19.4	19.6	20.3	20.2	20.5
	Education	0.13	22.5	20.1	18.1	16.0	23.3
	Pre-primary	*0.01*	24.6	28.9	16.6	18.2	11.7
	Primary and secondary	*0.09*	27.7	22.5	19.4	14.9	15.5
	Tertiary	*0.03*	7.4	11.4	14.9	18.5	47.8
	Housing	0.00	..	..	..	..	..
Sweden	*Total*	*0.32*	*23.1*	*21.2*	*21.0*	*18.3*	*16.5*
	Health	0.16	19.3	21.5	20.3	19.4	19.5
	Education	0.16	26.7	20.9	21.6	17.3	13.6
	Pre-primary	*0.02*	22.7	25.1	24.6	16.3	11.3
	Primary and secondary	*0.11*	22.0	22.7	23.8	18.3	13.1
	Tertiary	*0.04*	43.1	13.1	13.1	14.6	16.0
	Housing	0.00	..	..	..	..	..
United Kingdom	*Total*	*0.20*	*24.0*	*22.2*	*20.3*	*18.0*	*15.4*
	Health	0.11	21.5	21.8	19.7	18.8	18.2
	Education	0.07	25.9	21.3	21.9	18.4	12.6
	Pre-primary	*0.01*	30.4	28.0	17.3	15.2	9.0
	Primary and secondary	*0.06*	25.6	21.0	22.7	18.8	11.8
	Tertiary	*0.01*	22.7	16.0	19.9	17.7	23.7
	Housing	0.01	38.1	32.3	15.7	7.7	6.2
United States	*Total*	*0.22*	*22.9*	*21.5*	*20.3*	*18.7*	*16.6*
	Health	0.11	20.7	20.7	20.0	19.1	19.5
	Education	0.10	25.3	22.4	20.5	18.3	13.5
	Pre-primary	*0.01*	26.4	24.9	21.4	16.2	11.1
	Primary and secondary	*0.09*	25.0	22.1	20.8	18.6	13.6
	Tertiary	*0.01*	28.0	23.9	14.8	17.8	15.5
	Housing	0.00	..	..	..	..	..
Average	*Total*	*0.26*	*21.3*	*21.1*	*20.1*	*19.2*	*18.2*
	Health	0.13	21.0	20.6	19.8	19.2	19.4
	Education	0.13	21.5	21.5	20.6	19.2	17.2
	Pre-primary	*0.01*	28.8	24.6	19.1	16.3	11.2
	Primary and secondary	*0.09*	21.6	23.7	21.6	18.6	14.4
	Tertiary	*0.03*	19.9	13.5	16.9	21.4	28.3
	Housing	0.01	34.4	25.4	15.7	16.6	7.9

Notes. Income quintiles are constructed on the basis of monetary income (i.e. before inclusion of public services). Estimates for health are based on insurance values. The average for public housing refers to countries for which information is available in the survey used.

Annex Table A.2. Share of individuals in each quintile renting and renting in the public sector

	Share of renters in each income quintile					Total	Shares of renters in each quintile renting in the public sector					Total
	Q1	Q2	Q3	Q4	Q5		Q1	Q2	Q3	Q4	Q5	
Austria	32.0	38.1	25.2	29.7	18.3	28.7	47.6	48.1	41.9	50.9	55.6	48.4
Belgium	36.5	22.4	11.4	13.9	9.4	18.7	44.6	35.8	25.0	4.9	6.3	30.4
Denmark	53.8	29.1	17.6	14.9	9.3	25.0	53.9	70.2	68.0	36.8	39.6	56.6
Finland	42.5	23.9	17.5	17.5	8.7	22.0	51.5	62.1	44.8	42.2	48.5	51.0
France	48.7	36.4	28.7	20.2	13.1	29.4	55.4	55.3	48.1	46.3	15.1	49.1
Germany	63.9	51.5	41.7	34.7	25.4	43.5	37.3	33.9	28.8	27.9	17.0	31.0
Greece	7.6	10.2	9.6	12.7	10.9	10.2	5.3	4.4	0.0	2.1	5.3	3.3
Ireland	36.1	17.7	11.8	14.6	3.4	16.7	86.5	91.3	70.2	89.5	39.5	83.8
Italy	24.9	19.7	14.4	14.5	12.5	17.2	32.1	33.9	26.8	30.8	27.3	30.7
Luxembourg	44.5	26.5	19.7	16.3	20.3	25.5	46.2	46.4	38.0	36.3	24.8	41.0
Netherlands	62.8	45.4	29.9	26.0	16.4	36.1	88.3	93.8	91.2	86.8	83.2	89.5
Portugal	31.4	26.0	24.6	18.3	14.3	22.9	49.5	41.5	20.8	32.6	3.7	33.1
Spain	11.9	7.5	9.1	7.3	5.5	8.3	1.8	4.7	20.8	9.6	22.3	10.6
Sweden	56.7	41.8	27.2	21.9	16.8	32.9	…	…	…	…	…	…
United Kingdom	46.7	32.1	18.4	9.2	6.1	22.5	77.3	83.9	75.2	62.4	47.3	76.0
Average	*39.3*	*29.0*	*21.3*	*18.3*	*13.1*	*24.2*	*46.2*	*46.4*	*38.0*	*36.3*	*24.8*	*41.0*

Source: Own calculations on the basis of ECHP.

Annex Table A.3. Estimates from liner model for rents

	PUBLIC			PRIVATE		
	Income	Rooms	adjusted R2	Income	Rooms	adjusted R2
Denmark	0.0022 *	588.2 *	0.37	0.0040 *	337.3	0.21
	5.64	14.39		7.55	6.53	
Netherlands	0.0039 *	26.8 *	0.14	0.0058 *	19.3	0.22
	20.64	7.59		9.54	2.08	
Belgium	0.0045 *	1.9	0.12	0.0036 *	1136.7	0.21
	5.96	0.01		10.38	6.68	
France	0.0039 *	156.7 *	0.19	0.0093 *	-13.2	0.39
	15.33	9.04		31.27	-0.51	
Ireland	0.0004 *	4.1	0.02	0.0099 *	38.3	0.32
	2.70	1.73		7.27	2.34	
Italy	0.0040 *	21.1 *	0.16	0.0055 *	66.5	0.22
	11.87	2.13		18.77	9.20	
Greece	-0.0009	9490.7	-0.01	0.0054 *	10303.3	0.40
	-0.80	1.27		19.28	8.94	
Spain	0.0042 *	-2139.8	0.23	0.0034 *	532.4	0.06
	6.37	-2.02		7.63	0.59	
Portugal	0.0022 *	1647.8 *	0.09	0.0024 *	2229.8	0.10
	8.42	5.32		12.37	5.47	
Austria	0.0014	680.4 *	0.02	0.0002	671.2	0.04
	1.61	3.69		0.28	6.12	
Finland	0.0058 *	333.4 *	0.50	0.0041 *	565.5	0.27
	13.77	11.50		4.33	8.79	
Germany	0.0017 *	151.4 *	0.35	0.0049 *	120.8	0.34
	8.01	22.85		22.56	22.82	
United Kingdom	0.0022 *	3.7 *	0.05	0.0048 *	14.1	0.09
	8.94	2.04		6.62	2.34	

Annex Table A.4. Inequality measures before and after consideration of public spending for social services

Imputation based on individual data

	Gini coefficient						Inter quintile share ratio (S80/S20)					
		Money income plus:						Money income plus:				
	1. Money income	2a. Health care services (insurance value)	2b. Health care services (actual use)	3. Education services	4. Social housing	5a. All types of services (insurance value)	1. Money income	2a. Health care services (insurance value)	2b. Health care services (actual use)	3. Education services	4. Social housing	5a. All types of services (insurance value)
Denmark	0.216	0.182	0.232	0.202	0.215	0.168	3.10	2.52	3.25	2.93	3.08	2.35
Finland	0.246	0.220	0.251	0.238	0.244	0.211	3.56	3.06	3.60	3.49	3.52	2.94
Austria	0.248	0.222	0.237	0.224	0.247	0.198	3.65	3.10	3.39	3.26	3.61	2.78
Sweden	0.249	0.219	..	0.222	..	0.193	3.58	3.07	..	3.12	..	2.65
Germany	0.258	0.227	..	0.241	0.256	0.210	3.71	3.12	..	3.44	3.68	2.87
Netherlands	0.259	0.232	0.264	0.230	0.257	0.205	3.73	3.26	3.76	3.22	3.68	2.79
Luxembourg	0.263	0.234	..	…	..	0.234	3.76	3.21	..	3.76	..	3.21
France	0.272	0.237	..	0.248	0.271	0.215	4.06	3.33	..	3.62	4.04	2.96
Belgium	0.284	0.249	..	0.269	0.282	0.235	4.14	3.41	..	3.96	4.08	3.21
Italy	0.295	0.257	0.303	0.258	0.294	0.224	4.85	3.81	4.86	3.93	4.80	3.16
Ireland	0.297	0.263	0.292	0.273	0.291	0.240	4.88	3.91	4.69	4.35	4.65	3.45
Canada	0.302	0.277	..	0.276	..	0.254	4.88	4.20	..	4.24	..	3.68
United Kingdom	0.310	0.276	0.286	0.284	0.303	0.248	5.02	4.09	4.37	4.33	4.82	3.47
Australia	0.315	0.277	..	0.293	..	0.258	5.17	4.06	..	4.66	..	3.69
Greece	0.327	0.290	..	0.310	..	0.275	5.67	4.38	..	5.23	..	4.08
Spain	0.343	0.309	0.319	0.311	0.342	0.282	5.99	4.83	5.24	4.96	5.99	4.12
Portugal	0.362	0.316	..	0.319	0.360	0.279	6.47	4.81	..	5.13	6.37	3.98
United States	0.368	0.331	..	0.331	..	0.299	7.14	5.51	..	5.63	..	4.55
Average	*0.290*	*0.257*	*0.273*	*0.266*	*0.280*	*0.235*	*4.632*	*3.759*	*4.144*	*4.069*	*4.361*	*3.330*

Note: Countries are ranked, from top to bottom, in increasing order of the Gini coefficient for money income

Annex Table A.5. Point reduction in inequality measures after consideration of public expenditures for different social services

Imputation based on individual data

	Gini coefficient					Inter quintile share ratio (S80/S20)				
	Point reduction relative to money income due to:					Point reduction relative to money income due to:				
	Health care (insurance value)	Health care (actual use)	Education	Social housing	All types of services (insurance value)	Health care (insurance value)	Health care (actual use)	Education	Social housing	All types of services (insurance value)
	(2a-1)	(2b-1)	(3-1)	(4-1)	(5a-1)	(2a-1)	(2b-1)	(3-1)	(4-1)	(5a-1)
Denmark	-0.035	0.016	-0.015	-0.001	-0.048	-0.58	0.16	-0.17	-0.01	-0.75
Finland	-0.026	0.005	-0.008	-0.002	-0.035	-0.49	0.04	-0.07	-0.03	-0.61
Austria	-0.027	-0.012	-0.025	-0.002	-0.050	-0.55	-0.26	-0.39	-0.04	-0.87
Sweden	-0.030	..	-0.027	..	-0.056	-0.51	..	-0.46	..	-0.93
Germany	-0.031	..	-0.017	-0.002	-0.048	-0.59	..	-0.27	-0.03	-0.84
Netherlands	-0.026	0.005	-0.029	-0.002	-0.054	-0.48	0.02	-0.51	-0.05	-0.95
Luxembourg	-0.029	..	…	..	-0.029	-0.54	..	..	..	-0.54
France	-0.035	..	-0.024	-0.001	-0.057	-0.73	..	-0.44	-0.03	-1.10
Belgium	-0.035	..	-0.014	-0.002	-0.049	-0.74	..	-0.18	-0.06	-0.94
Italy	-0.038	0.008	-0.037	-0.001	-0.071	-1.05	0.01	-0.92	-0.05	-1.69
Ireland	-0.034	-0.005	-0.024	-0.006	-0.057	-0.98	-0.20	-0.53	-0.23	-1.44
Canada	-0.025	..	-0.026	..	-0.048	-0.68	..	-0.65	..	-1.20
United Kingdom	-0.034	-0.024	-0.025	-0.007	-0.062	-0.93	-0.66	-0.69	-0.21	-1.56
Australia	-0.039	..	-0.023	..	-0.058	-1.11	..	-0.51	..	-1.48
Greece	-0.037	..	-0.017	..	-0.052	-1.29	..	-0.43	..	-1.59
Spain	-0.033	-0.023	-0.032	0.000	-0.061	-1.16	-0.75	-1.03	0.00	-1.87
Portugal	-0.046	..	-0.044	-0.002	-0.084	-1.66	..	-1.34	-0.10	-2.49
United States	-0.037	..	-0.037	..	-0.069	-1.63	..	-1.52	..	-2.59
Average	*-0.033*	*-0.004*	*-0.025*	*-0.002*	*-0.055*	*-0.87*	*-0.20*	*-0.60*	*-0.07*	*-1.30*

Note. The codes for different columns are those reported in Annex table A.3.

Annex Table A.6. Distribution of public spending for public services across quintiles

Imputation based on grouped data

		spending on public services to hous. disp.	Share of public services going to each quintile				
			1	2	3	4	5
Australia	Total	0.28	0.25	0.23	0.19	0.17	0.15
	Health	0.14	0.28	0.21	0.18	0.17	0.17
	Education	0.10	0.17	0.23	0.22	0.21	0.17
	Other	0.03	0.42	0.32	0.14	0.09	0.03
Austria	Total	0.26	0.22	0.22	0.20	0.19	0.18
	Health	0.11	0.21	0.21	0.20	0.19	0.19
	Education	0.12	0.24	0.22	0.20	0.18	0.16
	Other	0.03	0.16	0.22	0.22	0.20	0.20
Canada	Total	0.26	0.21	0.21	0.19	0.19	0.20
	Health	0.12	0.20	0.22	0.20	0.19	0.19
	Education	0.09	0.24	0.21	0.21	0.19	0.15
	Other	0.05	0.21	0.17	0.15	0.18	0.29
Czech Republic	Total	0.28	0.25	0.22	0.19	0.18	0.16
	Health	0.16	0.22	0.24	0.20	0.17	0.17
	Education	0.10	0.25	0.18	0.20	0.20	0.17
	Other	0.02	0.49	0.19	0.14	0.12	0.07
Denmark	Total	0.37	0.25	0.23	0.19	0.17	0.15
	Health	0.14	0.27	0.21	0.17	0.17	0.18
	Education	0.12	0.19	0.20	0.23	0.21	0.16
	Other	0.11	0.30	0.29	0.18	0.13	0.09
Finland	Total	0.27	0.24	0.22	0.20	0.19	0.16
	Health	0.10	0.26	0.21	0.18	0.17	0.18
	Education	0.11	0.20	0.22	0.21	0.21	0.16
	Other	0.06	0.26	0.24	0.20	0.19	0.11
France	Total	0.33	0.22	0.21	0.20	0.19	0.17
	Health	0.16	0.22	0.20	0.19	0.19	0.19
	Education	0.12	0.22	0.22	0.21	0.19	0.16
	Other	0.05	0.24	0.25	0.22	0.15	0.14
Germany	Total	0.28	0.22	0.21	0.20	0.19	0.18
	Health	0.15	0.22	0.21	0.19	0.19	0.19
	Education	0.08	0.23	0.22	0.21	0.19	0.15
	Other	0.05	0.19	0.22	0.21	0.19	0.19
Greece	Total	0.19	0.20	0.19	0.21	0.19	0.21
	Health	0.09	0.23	0.20	0.19	0.18	0.19
	Education	0.06	0.18	0.21	0.22	0.20	0.19
	Other	0.04	0.14	0.16	0.22	0.19	0.29
Hungary	Total	0.27	0.22	0.21	0.20	0.19	0.18
	Health	0.13	0.22	0.22	0.20	0.18	0.17
	Education	0.11	0.22	0.20	0.20	0.20	0.19
	Other	0.04	0.21	0.23	0.22	0.17	0.16
Ireland	Total	0.23	0.24	0.21	0.20	0.18	0.17
	Health	0.12	0.27	0.19	0.18	0.18	0.18
	Education	0.10	0.17	0.22	0.23	0.20	0.18
	Other	0.01	0.43	0.20	0.19	0.11	0.08
Italy	Total	0.25	0.22	0.22	0.20	0.19	0.18
	Health	0.14	0.22	0.22	0.20	0.19	0.18
	Education	0.10	0.23	0.22	0.20	0.18	0.17
	Other	0.01	0.16	0.20	0.21	0.19	0.24
Japan	Total	0.23	0.21	0.21	0.21	0.20	0.18
	Health	0.13	0.21	0.20	0.19	0.19	0.20
	Education	0.07	0.20	0.22	0.23	0.21	0.14
	Other	0.02	0.20	0.21	0.20	0.18	0.20

		spending on public services to hous. disp.	Share of public services going to each quintile				
			1	2	3	4	5
Luxembourg	Total	0.24	0.23	0.22	0.20	0.18	0.16
	Health	0.12	0.20	0.22	0.20	0.19	0.19
	Education	0.08	0.28	0.21	0.21	0.17	0.13
	Other	0.04	0.25	0.24	0.20	0.17	0.14
Mexico	Total	0.11	0.20	0.19	0.19	0.19	0.23
	Health	0.04	0.21	0.20	0.20	0.20	0.20
	Education	0.06	0.22	0.21	0.21	0.19	0.17
	Other	0.01	0.11	0.10	0.12	0.13	0.54
Netherlands	Total	0.20	0.23	0.22	0.20	0.18	0.16
	Health	0.10	0.21	0.22	0.19	0.19	0.19
	Education	0.08	0.24	0.21	0.21	0.19	0.15
	Other	0.02	0.26	0.28	0.19	0.16	0.11
New Zealand	Total	0.25	0.23	0.22	0.20	0.18	0.16
	Health	0.13	0.21	0.24	0.19	0.18	0.19
	Education	0.11	0.25	0.21	0.21	0.19	0.15
	Other	0.01	0.50	0.22	0.18	0.08	0.02
Norway	Total	0.34	0.25	0.23	0.19	0.17	0.15
	Health	0.13	0.28	0.21	0.18	0.17	0.17
	Education	0.12	0.18	0.23	0.23	0.20	0.17
	Other	0.09	0.30	0.26	0.19	0.15	0.10
Poland	Total	0.21	0.22	0.21	0.20	0.19	0.19
	Health	0.09	0.18	0.21	0.21	0.21	0.19
	Education	0.10	0.24	0.20	0.19	0.18	0.19
	Other	0.01	0.32	0.23	0.17	0.14	0.14
Portugal	Total	0.27	0.22	0.21	0.20	0.19	0.18
	Health	0.13	0.26	0.20	0.18	0.18	0.18
	Education	0.12	0.19	0.23	0.21	0.19	0.18
	Other	0.02	0.18	0.19	0.19	0.19	0.25
Spain	Total	0.23	0.22	0.21	0.20	0.19	0.18
	Health	0.12	0.22	0.21	0.20	0.19	0.18
	Education	0.10	0.23	0.21	0.20	0.18	0.17
	Other	0.01	0.21	0.17	0.20	0.20	0.21
Sweden	Total	0.40	0.24	0.23	0.20	0.17	0.15
	Health	0.14	0.27	0.21	0.17	0.17	0.18
	Education	0.13	0.20	0.22	0.23	0.19	0.15
	Other	0.13	0.26	0.27	0.19	0.16	0.12
Switzerland	Total	0.21	0.24	0.20	0.20	0.19	0.17
	Health	0.09	0.28	0.17	0.18	0.18	0.19
	Education	0.09	0.21	0.23	0.22	0.20	0.15
	Other	0.02	0.22	0.21	0.19	0.18	0.20
Turkey	Total	0.13	0.21	0.20	0.20	0.19	0.19
	Health	0.06	0.19	0.20	0.20	0.20	0.20
	Education	0.07	0.23	0.22	0.20	0.19	0.17
	Other	0.00	0.12	0.13	0.26	0.20	0.29
United Kingdom	Total	0.20	0.24	0.22	0.20	0.18	0.16
	Health	0.10	0.23	0.22	0.19	0.18	0.18
	Education	0.08	0.23	0.21	0.21	0.19	0.16
	Other	0.02	0.32	0.28	0.20	0.12	0.08
United States	Total	0.22	0.24	0.21	0.20	0.18	0.17
	Health	0.12	0.21	0.20	0.20	0.19	0.20
	Education	0.10	0.24	0.23	0.21	0.19	0.14
	Other	0.01	0.45	0.23	0.13	0.10	0.10
Average	*Total*	*0.25*	*0.23*	*0.21*	*0.20*	*0.18*	*0.17*
	Health	*0.12*	*0.23*	*0.21*	*0.19*	*0.18*	*0.19*
	Education	*0.10*	*0.22*	*0.21*	*0.21*	*0.19*	*0.16*
	Other	*0.04*	*0.27*	*0.22*	*0.19*	*0.16*	*0.17*

Annex Figure A.7. Distribution of income plus public services across quintiles of the income distribution

Imputation based on grouped data

		Share of income plus public services going to each quintile							Share of income plus public services going to each quintile				
		1	2	3	4	5			1	2	3	4	5
Australia	Money income	0.08	0.13	0.18	0.24	0.38	Luxembourg	Money income	0.10	0.14	0.18	0.23	0.36
	Income plus health	0.10	0.14	0.18	0.23	0.35		Income plus health	0.11	0.15	0.18	0.22	0.34
	Income plus education	0.09	0.14	0.18	0.24	0.36		Income plus education	0.11	0.15	0.18	0.22	0.34
	Income plus other services	0.09	0.13	0.17	0.24	0.37		Income plus other services	0.10	0.14	0.18	0.22	0.35
	Income plus all services	0.12	0.15	0.18	0.23	0.33		Income plus all services	0.12	0.16	0.18	0.22	0.32
Austria	Money income	0.09	0.14	0.19	0.24	0.34	Mexico	Money income	0.04	0.09	0.13	0.21	0.53
	Income plus health	0.10	0.15	0.19	0.23	0.33		Income plus health	0.05	0.09	0.14	0.21	0.52
	Income plus education	0.11	0.15	0.19	0.23	0.32		Income plus education	0.05	0.09	0.14	0.21	0.51
	Income plus other services	0.09	0.15	0.19	0.24	0.34		Income plus other services	0.04	0.09	0.13	0.20	0.53
	Income plus all services	0.12	0.16	0.19	0.23	0.31		Income plus all services	0.06	0.10	0.14	0.20	0.50
Canada	Money income	0.08	0.13	0.18	0.23	0.38	Netherlands	Money income	0.10	0.14	0.18	0.23	0.35
	Income plus health	0.09	0.14	0.18	0.23	0.36		Income plus health	0.11	0.15	0.18	0.23	0.33
	Income plus education	0.09	0.14	0.18	0.23	0.36		Income plus education	0.11	0.15	0.19	0.23	0.33
	Income plus other services	0.09	0.14	0.18	0.23	0.38		Income plus other services	0.10	0.15	0.18	0.23	0.34
	Income plus all services	0.11	0.15	0.18	0.22	0.34		Income plus all services	0.12	0.16	0.19	0.22	0.31
Czech Republic	Money income	0.10	0.14	0.17	0.22	0.36	New Zealand	Money income	0.08	0.12	0.17	0.23	0.41
	Income plus health	0.12	0.16	0.18	0.21	0.34		Income plus health	0.09	0.13	0.17	0.22	0.39
	Income plus education	0.11	0.15	0.18	0.22	0.35		Income plus education	0.09	0.13	0.17	0.23	0.38
	Income plus other services	0.11	0.14	0.17	0.22	0.36		Income plus other services	0.08	0.12	0.17	0.23	0.41
	Income plus all services	0.13	0.16	0.18	0.21	0.32		Income plus all services	0.11	0.14	0.17	0.22	0.36
Denmark	Money income	0.10	0.15	0.19	0.23	0.33	Norway	Money income	0.10	0.15	0.18	0.22	0.36
	Income plus health	0.13	0.16	0.19	0.22	0.31		Income plus health	0.12	0.15	0.18	0.21	0.34
	Income plus education	0.11	0.16	0.19	0.23	0.31		Income plus education	0.10	0.16	0.19	0.22	0.34
	Income plus other services	0.12	0.16	0.19	0.22	0.31		Income plus other services	0.11	0.16	0.18	0.21	0.34
	Income plus all services	0.14	0.17	0.19	0.21	0.28		Income plus all services	0.14	0.17	0.18	0.21	0.31
Finland	Money income	0.10	0.14	0.18	0.23	0.36	Poland	Money income	0.07	0.12	0.15	0.20	0.45
	Income plus health	0.11	0.15	0.18	0.22	0.34		Income plus health	0.08	0.13	0.16	0.20	0.43
	Income plus education	0.11	0.15	0.18	0.23	0.34		Income plus education	0.09	0.13	0.16	0.20	0.42
	Income plus other services	0.11	0.15	0.18	0.22	0.34		Income plus other services	0.08	0.12	0.15	0.20	0.44
	Income plus all services	0.13	0.16	0.19	0.22	0.31		Income plus all services	0.10	0.13	0.16	0.20	0.40
France	Money income	0.09	0.14	0.18	0.23	0.37	Portugal	Money income	0.07	0.12	0.16	0.22	0.43
	Income plus health	0.11	0.15	0.18	0.22	0.34		Income plus health	0.09	0.13	0.16	0.21	0.40
	Income plus education	0.11	0.15	0.18	0.22	0.34		Income plus education	0.08	0.13	0.17	0.22	0.41
	Income plus other services	0.10	0.14	0.18	0.22	0.36		Income plus other services	0.07	0.12	0.16	0.22	0.43
	Income plus all services	0.12	0.16	0.18	0.22	0.32		Income plus all services	0.10	0.14	0.17	0.21	0.38
Germany	Money income	0.09	0.14	0.18	0.23	0.36	Spain	Money income	0.07	0.12	0.17	0.23	0.40
	Income plus health	0.10	0.15	0.18	0.23	0.34		Income plus health	0.09	0.13	0.17	0.23	0.38
	Income plus education	0.10	0.15	0.18	0.23	0.35		Income plus education	0.09	0.13	0.17	0.23	0.38
	Income plus other services	0.09	0.14	0.18	0.23	0.36		Income plus other services	0.07	0.12	0.17	0.23	0.40
	Income plus all services	0.11	0.16	0.18	0.22	0.32		Income plus all services	0.10	0.14	0.18	0.22	0.36
Greece	Money income	0.07	0.12	0.17	0.23	0.42	Sweden	Money income	0.10	0.15	0.18	0.22	0.34
	Income plus health	0.08	0.13	0.17	0.22	0.40		Income plus health	0.12	0.16	0.18	0.22	0.32
	Income plus education	0.08	0.13	0.17	0.23	0.40		Income plus education	0.11	0.16	0.19	0.22	0.32
	Income plus other services	0.07	0.12	0.17	0.23	0.41		Income plus other services	0.12	0.16	0.18	0.22	0.32
	Income plus all services	0.09	0.13	0.17	0.22	0.38		Income plus all services	0.14	0.17	0.19	0.21	0.29
Hungary	Money income	0.09	0.13	0.17	0.23	0.38	Switzerland	Money income	0.09	0.14	0.18	0.23	0.36
	Income plus health	0.10	0.14	0.18	0.22	0.36		Income plus health	0.11	0.15	0.18	0.22	0.34
	Income plus education	0.10	0.14	0.17	0.23	0.36		Income plus education	0.10	0.15	0.18	0.23	0.34
	Income plus other services	0.09	0.14	0.17	0.23	0.37		Income plus other services	0.09	0.14	0.18	0.23	0.35
	Income plus all services	0.11	0.15	0.18	0.22	0.34		Income plus all services	0.12	0.15	0.18	0.22	0.33
Ireland	Money income	0.07	0.13	0.18	0.24	0.37	Turkey	Money income	0.05	0.10	0.14	0.21	0.50
	Income plus health	0.10	0.14	0.18	0.23	0.35		Income plus health	0.06	0.10	0.14	0.21	0.48
	Income plus education	0.08	0.14	0.19	0.24	0.36		Income plus education	0.06	0.11	0.14	0.21	0.48
	Income plus other services	0.08	0.13	0.18	0.24	0.37		Income plus other services	0.05	0.10	0.14	0.21	0.50
	Income plus all services	0.11	0.14	0.19	0.23	0.34		Income plus all services	0.07	0.11	0.15	0.21	0.46
Italy	Money income	0.07	0.12	0.17	0.23	0.41	United Kingdom	Money income	0.08	0.12	0.17	0.23	0.40
	Income plus health	0.09	0.13	0.17	0.22	0.39		Income plus health	0.09	0.13	0.17	0.22	0.38
	Income plus education	0.08	0.13	0.17	0.22	0.39		Income plus education	0.09	0.13	0.17	0.23	0.39
	Income plus other services	0.07	0.12	0.17	0.23	0.41		Income plus other services	0.08	0.13	0.17	0.23	0.40
	Income plus all services	0.10	0.14	0.18	0.22	0.37		Income plus all services	0.11	0.14	0.17	0.22	0.36
Japan	Money income	0.07	0.13	0.18	0.24	0.38	United States	Money income	0.06	0.12	0.17	0.23	0.42
	Income plus health	0.08	0.14	0.18	0.24	0.36		Income plus health	0.08	0.13	0.17	0.23	0.39
	Income plus education	0.08	0.14	0.18	0.24	0.36		Income plus education	0.08	0.13	0.17	0.23	0.39
	Income plus other services	0.07	0.13	0.18	0.24	0.38		Income plus other services	0.06	0.12	0.17	0.23	0.41
	Income plus all services	0.09	0.14	0.19	0.23	0.34		Income plus all services	0.09	0.14	0.18	0.22	0.37
							Average	*Money income*	*0.08*	*0.13*	*0.17*	*0.23*	*0.39*
								Income plus health	*0.10*	*0.14*	*0.17*	*0.22*	*0.37*
								Income plus education	*0.09*	*0.14*	*0.18*	*0.22*	*0.37*
								Income plus other services	*0.09*	*0.13*	*0.17*	*0.22*	*0.38*
								Income plus all services	*0.11*	*0.15*	*0.18*	*0.22*	*0.35*

Annex Figure A.8. Ratio between the benefits from public services and the disposable income of each quintile of the income distribution

Imputation based on grouped data

	Health					Education					Other social services					All public services				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
Australia	0.50	0.24	0.14	0.10	0.06	0.23	0.19	0.13	0.09	0.05	0.18	0.08	0.03	0.01	0.00	0.91	0.51	0.30	0.20	0.11
Austria	0.27	0.16	0.12	0.09	0.06	0.34	0.19	0.13	0.09	0.06	0.05	0.04	0.03	0.02	0.02	0.65	0.39	0.28	0.21	0.13
Canada	0.30	0.20	0.13	0.10	0.06	0.27	0.14	0.10	0.07	0.04	0.14	0.07	0.05	0.04	0.04	0.71	0.40	0.28	0.21	0.14
Czech Republic	0.35	0.28	0.18	0.13	0.08	0.34	0.18	0.13	0.09	0.04	0.09	0.03	0.02	0.01	0.00	0.69	0.43	0.31	0.23	0.13
Denmark	0.36	0.19	0.12	0.10	0.08	0.23	0.16	0.15	0.12	0.06	0.30	0.20	0.10	0.06	0.03	0.89	0.55	0.38	0.28	0.17
Finland	0.27	0.15	0.10	0.07	0.05	0.23	0.17	0.13	0.10	0.05	0.17	0.11	0.07	0.05	0.02	0.68	0.42	0.30	0.23	0.12
France	0.38	0.23	0.17	0.13	0.08	0.30	0.20	0.15	0.11	0.05	0.12	0.08	0.06	0.03	0.02	0.80	0.51	0.38	0.27	0.16
Germany	0.40	0.23	0.16	0.12	0.08	0.22	0.13	0.10	0.07	0.03	0.11	0.08	0.06	0.04	0.03	0.73	0.43	0.32	0.23	0.14
Greece	0.31	0.15	0.11	0.07	0.04	0.16	0.10	0.08	0.05	0.03	0.09	0.06	0.06	0.04	0.03	0.56	0.31	0.24	0.16	0.10
Hungary	0.32	0.21	0.15	0.10	0.06	0.27	0.16	0.12	0.09	0.05	0.10	0.07	0.05	0.03	0.02	0.69	0.44	0.33	0.23	0.13
Ireland	0.42	0.18	0.12	0.09	0.06	0.23	0.17	0.13	0.08	0.05	0.08	0.02	0.01	0.01	0.00	0.73	0.37	0.26	0.18	0.11
Italy	0.45	0.25	0.17	0.11	0.06	0.35	0.18	0.12	0.08	0.04	0.03	0.02	0.02	0.01	0.01	0.83	0.45	0.31	0.21	0.11
Japan	0.43	0.21	0.14	0.11	0.07	0.22	0.13	0.09	0.06	0.03	0.07	0.04	0.03	0.02	0.01	0.73	0.37	0.27	0.19	0.11
Luxembourg	0.25	0.18	0.13	0.10	0.06	0.24	0.13	0.10	0.06	0.03	0.09	0.06	0.04	0.03	0.01	0.58	0.37	0.27	0.19	0.11
Mexico	0.17	0.08	0.05	0.03	0.01	0.29	0.14	0.09	0.05	0.02	0.04	0.02	0.01	0.01	0.01	0.50	0.24	0.15	0.10	0.04
Netherlands	0.22	0.16	0.10	0.08	0.06	0.22	0.18	0.14	0.10	0.05	0.06	0.05	0.02	0.02	0.01	0.49	0.32	0.22	0.16	0.10
New Zealand	0.35	0.27	0.15	0.10	0.06	0.27	0.16	0.11	0.08	0.04	0.05	0.01	0.01	0.00	0.00	0.77	0.49	0.30	0.20	0.10
Norway	0.39	0.19	0.13	0.10	0.06	0.28	0.14	0.09	0.06	0.02	0.29	0.17	0.09	0.06	0.03	0.89	0.54	0.37	0.27	0.14
Poland	0.21	0.15	0.12	0.09	0.04	0.37	0.21	0.14	0.10	0.04	0.06	0.03	0.01	0.01	0.00	0.61	0.35	0.26	0.19	0.09
Portugal	0.49	0.22	0.15	0.11	0.06	0.20	0.11	0.09	0.06	0.03	0.05	0.03	0.02	0.02	0.01	0.86	0.47	0.32	0.23	0.11
Spain	0.37	0.20	0.14	0.10	0.05	0.31	0.17	0.11	0.08	0.04	0.04	0.02	0.01	0.01	0.01	0.72	0.39	0.27	0.19	0.10
Sweden	0.38	0.20	0.14	0.11	0.08	0.24	0.13	0.11	0.09	0.05	0.34	0.24	0.14	0.09	0.05	0.98	0.63	0.44	0.31	0.18
Switzerland	0.28	0.11	0.09	0.07	0.05	0.23	0.13	0.09	0.06	0.03	0.06	0.04	0.03	0.02	0.01	0.55	0.30	0.23	0.17	0.10
Turkey	0.21	0.12	0.09	0.06	0.02	0.25	0.19	0.16	0.11	0.06	0.00	0.00	0.00	0.00	0.00	0.50	0.27	0.18	0.12	0.05
United Kingdom	0.31	0.19	0.12	0.08	0.05	0.32	0.22	0.15	0.10	0.05	0.09	0.05	0.03	0.01	0.00	0.62	0.36	0.24	0.16	0.08
United States	0.41	0.20	0.13	0.09	0.06	0.38	0.18	0.11	0.08	0.03	0.08	0.02	0.01	0.00	0.00	0.88	0.40	0.26	0.17	0.09
Average	*0.34*	*0.19*	*0.13*	*0.10*	*0.06*	*0.21*	*0.15*	*0.11*	*0.08*	*0.04*	*0.11*	*0.06*	*0.04*	*0.03*	*0.01*	*0.71*	*0.41*	*0.29*	*0.20*	*0.11*

Annex Table A.9. Gini coefficient before and after consideration of public services

Imputation based on grouped data

	A. Money income	Gini coefficient				F. Difference (A-E)
		Money income plus:				
		B. Health	C. Education	D. Other social services	E. All public services	
Australia	0.30	0.25	0.27	0.28	0.21	0.09
Austria	0.25	0.22	0.21	0.25	0.19	0.06
Canada	0.29	0.26	0.26	0.28	0.23	0.06
Czech Republic	0.25	0.21	0.23	0.24	0.18	0.07
Denmark	0.22	0.18	0.19	0.18	0.13	0.09
Finland	0.25	0.22	0.23	0.23	0.18	0.07
France	0.27	0.23	0.23	0.25	0.19	0.08
Germany	0.27	0.23	0.25	0.26	0.20	0.07
Greece	0.34	0.30	0.32	0.33	0.28	0.05
Hungary	0.29	0.25	0.26	0.27	0.22	0.07
Ireland	0.30	0.26	0.27	0.29	0.23	0.07
Italy	0.34	0.29	0.30	0.34	0.26	0.08
Japan	0.31	0.27	0.28	0.30	0.25	0.06
Luxembourg	0.26	0.23	0.23	0.24	0.19	0.06
Mexico	0.47	0.45	0.44	0.47	0.42	0.04
Netherlands	0.25	0.22	0.22	0.24	0.19	0.05
New Zealand	0.33	0.29	0.29	0.32	0.25	0.08
Norway	0.25	0.21	0.22	0.21	0.16	0.09
Poland	0.36	0.33	0.32	0.35	0.29	0.07
Portugal	0.35	0.30	0.31	0.34	0.27	0.08
Spain	0.32	0.28	0.29	0.32	0.25	0.07
Sweden	0.24	0.20	0.20	0.19	0.14	0.10
Switzerland	0.26	0.23	0.23	0.25	0.21	0.06
Turkey	0.43	0.40	0.40	0.42	0.37	0.05
United Kingdom	0.32	0.28	0.29	0.31	0.25	0.07
United States	0.35	0.31	0.31	0.34	0.27	0.08
Average	*0.30*	*0.27*	*0.27*	*0.29*	*0.23*	*0.07*

Annex Table A.10. Inter-quintile ratio before and after government expenditure for education under different assumption on inequality in access by income levels

Estimates based on grouped data

	Money income	Money income plus expenditure in education									
		No inequalities in access to education				Reduct. rel. to money income	Inequalities in access to education				Reduct. rel. to money income
		0-17	18-25	26-40	All		0-17	18-25	26-40	All	
Australia	4.87	4.18	4.82	4.84	4.14	-0.73	4.19	4.85	4.85	4.18	-0.69
Austria	3.88	3.13	3.78	3.85	3.06	-0.82	3.14	3.84	3.87	3.14	-0.74
Canada	4.78	4.07	4.57	4.74	3.90	-0.88	4.11	4.61	4.76	3.99	-0.79
Czech Republic	3.61	3.08	3.54	3.59	3.04	-0.57	3.09	3.58	3.61	3.08	-0.52
Denmark	3.14	2.93	2.89	3.11	2.71	-0.43	2.93	2.93	3.12	2.75	-0.39
Finland	3.72	3.46	3.39	3.69	3.16	-0.55	3.47	3.42	3.70	3.21	-0.51
France	4.04	3.40	3.86	4.03	3.28	-0.76	3.40	3.90	4.04	3.32	-0.72
Germany	4.26	3.79	4.05	4.23	3.61	-0.65	3.80	4.08	4.25	3.66	-0.60
Greece	6.02	5.54	5.80	5.99	5.33	-0.69	5.56	5.84	6.01	5.40	-0.62
Hungary	4.40	3.75	4.29	4.37	3.66	-0.74	3.75	4.33	4.39	3.71	-0.69
Ireland	5.01	4.33	4.92	4.99	4.27	-0.74	4.35	4.98	5.02	4.35	-0.67
Italy	6.16	4.95	5.87	6.13	4.76	-1.41	4.95	5.95	6.16	4.83	-1.34
Japan	5.69	4.91	5.54	5.67	4.79	-0.90	4.91	5.59	5.69	4.85	-0.84
Luxembourg	3.69	3.08	3.69	3.69	3.08	-0.61	3.09	3.69	3.69	3.09	-0.60
Mexico	12.59	10.25	12.12	12.56	9.93	-2.66	10.34	12.39	12.59	10.22	-2.37
Netherlands	3.58	3.19	3.45	3.57	3.08	-0.50	3.20	3.47	3.58	3.13	-0.45
New Zealand	5.38	4.23	5.15	5.35	4.08	-1.30	4.24	5.22	5.36	4.15	-1.24
Norway	3.72	3.40	3.52	3.70	3.23	-0.50	3.41	3.56	3.71	3.27	-0.45
Poland	6.07	4.88	5.83	6.05	4.73	-1.34	4.91	5.87	6.07	4.80	-1.28
Portugal	6.23	5.07	6.05	6.19	4.93	-1.30	5.08	6.12	6.23	5.01	-1.22
Spain	5.59	4.59	5.37	5.56	4.44	-1.15	4.59	5.43	5.59	4.49	-1.09
Sweden	3.41	3.11	3.14	3.38	2.87	-0.54	3.12	3.18	3.39	2.91	-0.50
Switzerland	3.90	3.41	3.84	3.88	3.35	-0.55	3.42	3.87	3.90	3.41	-0.49
Turkey	9.31	7.72	8.87	9.28	7.41	-1.90	7.82	9.33	9.31	7.85	-1.46
United Kingdom	5.17	4.45	5.03	5.14	4.33	-0.83	4.45	5.07	5.15	4.38	-0.79
United States	6.88	5.36	6.52	6.84	5.13	-1.76	5.39	6.59	6.87	5.22	-1.67
Average	*5.20*	*4.39*	*5.00*	*5.17*	*4.24*	*-0.95*	*4.41*	*5.07*	*5.19*	*4.32*	*-0.87*

Note. The estimates in the right-hand panel (which are those underlying the results presented in previous tables) assumed that enrolment rates in education are the same across deciles. Those in the left-hand panel (i.e. allowing for inequalities in access in education by income deciles) as based on the enrolment rates shown in Annex Table A.11.

Annex Table A.11. Enrolment rates by income decile under the assumption of inequality in access

	Income deciles											Income deciles											Income deciles										
	1	2	3	4	5	6	7	8	9	10	Total	1	2	3	4	5	6	7	8	9	10	Total	1	2	3	4	5	6	7	8	9	10	Total
	People aged 0 to 17											*People aged 18 to 25*											*People aged 26 to 29*										
Australia	0.88	0.88	0.89	0.89	0.90	0.90	0.91	0.92	0.92	0.92	*0.90*	0.41	0.42	0.43	0.45	0.46	0.47	0.49	0.50	0.51	0.52	*0.47*	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	*0.21*
Austria	0.92	0.92	0.92	0.93	0.93	0.93	0.94	0.94	0.95	0.95	*0.93*	0.23	0.25	0.27	0.28	0.30	0.32	0.33	0.35	0.37	0.39	*0.31*	0.04	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.15	*0.10*
Canada	0.72	0.73	0.74	0.75	0.77	0.78	0.79	0.80	0.81	0.82	*0.77*	0.35	0.37	0.38	0.40	0.41	0.42	0.44	0.45	0.47	0.48	*0.42*	0.07	0.08	0.09	0.10	0.11	0.13	0.14	0.15	0.16	0.17	*0.12*
Czech Republic	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	*0.98*	0.27	0.29	0.30	0.32	0.34	0.35	0.37	0.38	0.40	0.42	*0.34*	0.01	0.02	0.04	0.05	0.06	0.07	0.08	0.09	0.11	0.12	*0.07*
Denmark	0.96	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.97	*0.97*	0.43	0.44	0.45	0.47	0.48	0.49	0.51	0.52	0.53	0.54	*0.49*	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	*0.20*
Finland	0.86	0.86	0.87	0.88	0.88	0.89	0.89	0.90	0.90	0.91	*0.88*	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.62	*0.57*	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	*0.24*
France	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*1.00*	0.34	0.36	0.37	0.39	0.40	0.42	0.43	0.45	0.46	0.48	*0.41*	0.00	0.01	0.02	0.04	0.05	0.06	0.07	0.08	0.10	0.11	*0.05*
Germany	0.94	0.94	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	*0.95*	0.40	0.42	0.43	0.44	0.46	0.47	0.48	0.50	0.51	0.52	*0.46*	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	*0.12*
Greece	0.82	0.83	0.84	0.85	0.85	0.86	0.87	0.88	0.88	0.89	*0.86*	0.39	0.41	0.42	0.43	0.45	0.46	0.48	0.49	0.50	0.52	*0.45*	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.15	0.16	0.17	*0.12*
Hungary	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.97	0.97	0.98	*0.97*	0.31	0.33	0.34	0.36	0.37	0.39	0.41	0.42	0.44	0.45	*0.38*	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	0.15	0.16	*0.11*
Ireland	0.87	0.88	0.88	0.89	0.89	0.90	0.90	0.91	0.91	0.92	*0.90*	0.27	0.28	0.30	0.31	0.33	0.35	0.36	0.38	0.39	0.41	*0.34*	0.03	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.12	0.13	*0.08*
Italy	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	*0.89*	0.29	0.31	0.32	0.34	0.35	0.37	0.39	0.40	0.42	0.43	*0.32*	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.11	0.12	0.13	*0.07*
Japan	0.97	0.97	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	*0.97*	0.23	0.25	0.26	0.28	0.30	0.32	0.33	0.35	0.37	0.38	*0.31*	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.10	0.11	0.13	*0.07*
Luxembourg	0.88	0.88	0.89	0.89	0.90	0.90	0.91	0.91	0.92	0.92	*0.90*	0.14	0.16	0.18	0.20	0.22	0.23	0.25	0.27	0.29	0.31	*0.23*	..	..	..	..	..	..	..	..	..	..	*..*
Mexico	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	*0.81*	0.09	0.11	0.13	0.15	0.17	0.19	0.21	0.24	0.26	0.28	*0.18*	0.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04	*0.02*
Netherlands	0.88	0.89	0.89	0.90	0.90	0.91	0.91	0.92	0.92	0.93	*0.90*	0.39	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.50	0.51	*0.45*	0.03	0.04	0.05	0.07	0.08	0.09	0.10	0.11	0.12	0.13	*0.08*
New Zealand	0.94	0.94	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	*0.95*	0.31	0.32	0.34	0.35	0.37	0.38	0.40	0.42	0.43	0.45	*0.38*	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.19	0.20	0.21	*0.16*
Norway	0.94	0.94	0.95	0.95	0.95	0.95	0.96	0.96	0.96	0.96	*0.95*	0.40	0.41	0.43	0.44	0.45	0.47	0.48	0.49	0.51	0.52	*0.46*	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.19	0.20	0.21	*0.16*
Poland	0.85	0.86	0.87	0.87	0.88	0.88	0.89	0.90	0.90	0.91	*0.88*	0.45	0.46	0.48	0.49	0.50	0.51	0.53	0.54	0.55	0.56	*0.51*	0.01	0.03	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.12	*0.07*
Portugal	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.97	0.97	*0.96*	0.28	0.30	0.31	0.33	0.35	0.36	0.38	0.39	0.41	0.43	*0.35*	0.04	0.05	0.06	0.08	0.09	0.10	0.11	0.12	0.13	0.14	*0.09*
Spain	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	*0.99*	0.31	0.32	0.34	0.35	0.37	0.38	0.40	0.42	0.43	0.45	*0.38*	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.12	0.13	0.14	*0.09*
Sweden	0.96	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.97	0.97	*0.97*	0.44	0.46	0.47	0.48	0.49	0.51	0.52	0.53	0.54	0.56	*0.50*	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.26	0.27	*0.23*
Switzerland	0.86	0.87	0.87	0.88	0.88	0.89	0.90	0.90	0.91	0.91	*0.89*	0.30	0.31	0.33	0.34	0.36	0.37	0.39	0.41	0.42	0.44	*0.37*	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.15	0.16	*0.11*
Turkey	0.69	0.70	0.71	0.73	0.74	0.75	0.77	0.78	0.79	0.81	*0.75*	0.01	0.03	0.05	0.08	0.10	0.12	0.14	0.17	0.19	0.21	*0.11*	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	*0.02*
United Kingdom	0.94	0.94	0.94	0.95	0.95	0.95	0.95	0.96	0.96	0.96	*0.95*	0.30	0.31	0.33	0.34	0.36	0.38	0.39	0.41	0.42	0.44	*0.37*	0.13	0.14	0.15	0.17	0.18	0.19	0.20	0.21	0.22	0.23	*0.18*
United States	0.88	0.89	0.89	0.90	0.90	0.91	0.91	0.92	0.92	0.93	*0.90*	0.28	0.30	0.32	0.33	0.35	0.36	0.38	0.40	0.41	0.43	*0.36*	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.14	0.15	0.16	*0.11*
Average	*0.90*	*0.90*	*0.91*	*0.91*	*0.92*	*0.92*	*0.92*	*0.93*	*0.93*	*0.94*	*0.91*	*0.31*	*0.33*	*0.34*	*0.36*	*0.37*	*0.39*	*0.41*	*0.42*	*0.44*	*0.45*	*0.38*	*0.07*	*0.08*	*0.09*	*0.10*	*0.11*	*0.12*	*0.13*	*0.14*	*0.15*	*0.16*	*0.11*

Note. Estimates of enrolment rates by income decile are computed as $\tau^{ai} = c_{inegalités} \times (1 - \tau^a) \times i + c$, where τ^a is the enrolment rate of age group a, $c_{inégalités}$ is a coefficient expressing inequalities in access to education according to income and c is a constant. This expression means that, for a given coefficient, the disparities of access will be higher in inverse proportion to the level of education of each age-group. The values of the inequality coefficient used are 5, 2.5 and 1.25 for the three age groups.