

# The distributional impact of imputed rent in EU-SILC

2010 edition



# The distributional impact of imputed rent in EU-SILC

2010 edition

*Europe Direct is a service to help you find answers  
to your questions about the European Union*

Freephone number (\*):

**00 800 6 7 8 9 10 11**

(\*) Certain mobile telephone operators do not allow access  
to 00 800 numbers or these calls may be billed.

More information on the European Union is available on the Internet (<http://europa.eu>).

Cataloguing data can be found at the end of this publication

Luxembourg: Publications Office of the European Union, 2010

ISBN 978-92-79-16759-1

ISSN 1977-0375


Doi:10.2785/56240

Cat. No. KS-RA-10-023-EN-N

**Theme: Population and social conditions**

**Collection: Methodologies and working papers**

© European Union, 2010



Eurostat is the Statistical Office of the European Union (EU). Its mission is to provide the EU with high-quality statistical information. To that end, it gathers and analyses data from the National Statistical Institutes (NSIs) across Europe and provides comparable and harmonised data for the EU to use in the definition, implementation and analysis of EU policies. Its statistical products and services are also of great value to Europe's business community, professional organisations, academics, librarians, NGOs, the media and citizens. In the social field, the EU Statistics on Income and Living Conditions (EU-SILC) instrument is the main source for statistics on income, poverty, social exclusion and living conditions.


Over the last years, important progress has been made in EU-SILC. This is the result of the coordinated work of Eurostat and the NSIs, *inter alia* in the context of the EU 'Living Conditions' Working Group and various thematic Task-Forces. Despite these significant achievements, EU-SILC data are still insufficiently analysed and used.

It is in this context that Eurostat launched in 2008 a call for applications with the following aims:

- (1) develop methodology for advanced analysis of EU-SILC data;
- (2) discuss analytical and methodological papers at an international conference;
- (3) produce a number of publications presenting methodological and analytical results.

The 'Network for the Analysis of EU-SILC' (Net-SILC), an ambitious 18-partner Network bringing together expertise from both data producers and data users, was set up as in response to this call. The initial Net-SILC findings were presented at the international conference on 'Comparative EU Statistics on Income and Living Conditions' (Warsaw, 25-26 March 2010), which was organised jointly by Eurostat and the Net-SILC network and hosted by the Central Statistical Office of Poland. A major deliverable from Net-SILC is a book to be published by the EU Publications Office at the end of 2010 and edited by Anthony B. Atkinson (Nuffield College and London School of Economics, United Kingdom) and Eric Marlier (CEPS/INSTEAD Research Institute, Luxembourg).

The present methodological paper is also an outcome from Net-SILC. It has been prepared by Veli-Matti Törmälehto and Hannele Sauli (Statistics Finland). Gara Rojas González was responsible at Eurostat for coordinating the publication of the methodological papers produced by Net-SILC members.



It should be stressed that this methodological paper does not in any way represent the views of Eurostat, the European Commission or the European Union. The authors have contributed in a strictly personal capacity and not as representatives of any Government or official body. Thus they have been free to express their own views and to take full responsibility both for the judgments made about past and current policy and for the recommendations for future policy.

This document is part of Eurostat's *Methodologies and working papers* collection which are technical publications for statistical experts working in a particular field. All publications are downloadable free of charge in PDF format from the Eurostat website:

([http://epp.eurostat.ec.europa.eu/portal/page/portal/income\\_social\\_inclusion\\_living\\_conditions/publications/Methodologies and working papers](http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/publications/Methodologies_and_working_papers) ). Furthermore, Eurostat databases are freely available at this address, as are tables with the most frequently used and requested short- and long-term indicators.

## Table of contents

1. Introduction.....	6
2. Theoretical and operational considerations .....	7
2.1 Housing wealth, housing consumption and disposable income.....	7
2.2 Measurement of imputed rents as income.....	9
2.3 The potential beneficiaries.....	13
3. Data and methods.....	15
4. Imputed rent and income inequality .....	17
4.1 Overall distributional effect .....	17
4.2 Subgroup decompositions of inequality .....	22
5. Imputed rents and income poverty.....	26
5.1. Owners with a mortgage.....	31
5.2. Outright owners .....	34
5.3. Reduced rent tenants .....	36
5.4. Rent-free tenants.....	41
5.5. Tenants paying prevailing market rent.....	43
6. Imputed rent and indicators of monetary and non-monetary deprivation .....	46
6.1 The impact of the augmented income concept on selected deprivation indicators.....	46
6.2 House rich - cash poor.....	52
7. Imputed rents and alternative measures of the economic benefits of housing...57	
8. Summary and conclusions.....	61
References .....	64
Appendix.....	66





# The distributional impact of imputed rent in EU-SILC

Veli-Matti Törmälehto and Hannele Sauli<sup>1</sup>

**Abstract:** The paper provides descriptive evidence on the distributional consequences of adding imputed rents to household disposable income. It first reviews the conceptual background, and then uses EU-SILC 2007 cross-sectional data to examine how imputed rent would change the cross-national view of income inequality, income poverty, and the link between monetary poverty and non-monetary deprivation.

**Keywords:** Imputed rent, income inequality, poverty

---

<sup>1</sup> The authors are with Statistics Finland. Statistics Finland and the European Commission bear no responsibility for the analyses and conclusions, which are solely those of the authors. This paper was prepared for the 2010 International Conference on Comparative EU Statistics on Income and Living Conditions, Warsaw, Poland, 25-26 March 2010. The authors would like to thank Olympia Bover for her valuable comments and suggestions. Of course, she is not responsible in any way for the present contents. Addresses for correspondence: [Hannele.Sauli@stat.fi](mailto:Hannele.Sauli@stat.fi) and [tormaleh@ovi.com](mailto:tormaleh@ovi.com).

## 1. Introduction

The EU Statistics on Income and Living Conditions 2007 is a unique data set because it includes, for the first time and for nearly all European countries, estimates of implicit rents derived from the main residences of households. This chapter focuses on the distributional consequences of the inclusion of imputed rent into the income concept. We first review the conceptual framework of wealth, consumption and income as well as the methods for estimating imputed rents, and proceed to describe the impact of imputed rent on income distribution and income poverty. We then look at the link between income poverty and non-monetary deprivation when imputed rents are added to income; this is examined with respect to material deprivation, overcrowding and housing deprivation. Finally, we discuss imputed rent and its inclusion in the concept of EU-SILC disposable income.

The definition of imputed rent in EU-SILC takes into account both the returns to home ownership, i.e. that the main residence is an asset, as well as the economic benefits accruing to those tenants whose rent has been set below the prevailing market level. As part of a wider agenda, adding imputed rents would be an important move towards a more complete measure of economic well-being. We therefore briefly address some alternative measures of economic benefits of housing as well as some measurement issues with imputed rents. We aim to provide a reasoned argument for the inclusion of imputed rent in (or for keeping it excluded from) the income concept of EU-SILC.

One of the main results emerging from previous literature is that the results may be sensitive to estimation methods (see review in Frick *et. al*, 2008). We do touch upon this issue from time to time, but it is worth noting that this paper is not explicitly concerned with the impact of different estimation methods on the results; this is a very important question but beyond the scope of the current paper. Likewise, comparability of the data, especially the correct identification of potential beneficiaries, is a key issue but is not discussed in depth in this paper. Juntto & Reijo (2010) and Eurostat (2009) review comprehensively the comparability issues regarding the variables used in this study.

## 2. Theoretical and operational considerations

### 2.1 Housing wealth, housing consumption and disposable income

Disposable income is defined in terms of consumption and wealth<sup>2</sup>. For a meaningful discussion of imputed rents and the economic benefits of housing, the definitions of housing consumption and housing wealth must be the starting points. The distinguishing and complicating feature of a dwelling from an economic point of view is that it is at the same time both an investment and consumption good.

From the wealth perspective, the main residences of households are fixed tangible assets<sup>3</sup>, and a property right of main residence should increase current economic well-being of the owner<sup>4</sup>. For a household owner, main residence often is the largest asset type in the portfolio and increases economic well-being in at least two ways. First, it saves the household from paying the net profits of landlords and thus, *ceteris paribus*, leads to lower housing costs. Second, the collateral value of the residence may be used to acquire credit, or home equity may be released for current non-housing consumption through downsizing to a smaller dwelling or through financial instruments such as reverse mortgages<sup>5</sup>.

The main residences are not owned only by households but also by other institutional sectors. Some of these sectors, such as local government or non-profit institutions serving households, may not seek to maximize profits with their dwelling stock but rather have the objective of subsidizing the housing consumption of households through in-kind benefits. Tenants living in such accommodations are economically better off because of these in-kind housing benefits.

---

<sup>2</sup> Disposable income may be defined as “the maximum amount that a household or other unit can afford to spend on consumption goods and services during the accounting period without having to finance its expenditures by reducing its cash, by disposing of other financial or non-financial assets or by increasing its liabilities” (SNA, 1993, Section 8.15, page 187).

<sup>3</sup> As an asset type, a household’s main residence has some specific characteristics. First, it is a spatially fixed illiquid asset, or at least not a very liquid asset. In many countries, it is a tax preferred asset if interest repayments are tax deductible and imputed rents are not taxed, or capital gains are not fully taxed. Furthermore, its value is determined by heterogeneity of factors, including the characteristics of the dwelling, its location and its neighborhood. There tends to be a strong positive correlation between local housing and local labour markets.

<sup>4</sup> This holds irrespective of whether the ownership right was acquired by buying, as an inter-generational transfer, or in connection with institutional change, such as the privatization of formerly publicly owned housing stock in the transition economies during the 1990s. The share of housing in private hands increased substantially in the transition economies between 1990 and 1999 (Yemtsov, 2007).

<sup>5</sup> While downsizing or reverse mortgages may not be common in Europe, it is the possibility to rely on them in case of adverse income shocks that is important for material welfare.

Irrespective of the property right, a dwelling should provide a shelter and a flow of housing services to be consumed by the occupant(s) throughout its expected service life. A household's needs, determined largely by the household structure and preferences with regard to housing consumption, are important in the choice of tenure, in addition to the relative costs of the tenures. The choice of tenure is constrained by income available for non-housing consumption (affordability of housing), and by wealth and credit constraints. These constraints are due to both idiosyncratic and institutional reasons, the latter being related both to financial markets (required down-payments, availability of mortgage finance) and to housing markets (e.g. supply of rental and other types of dwellings in the economy).

Because the main residence is also consumption good, i.e. its purpose is to satisfy individual preferences, the decision on home equity conversion is based on more than just an economic rationale. Because of this, and possibly because of transaction costs, in the short run the potential for the main residence to offset or buffer income risks such as periods of unemployment, is restricted.

Measuring housing consumption with current monetary outflows on housing is not sufficient because consumption is not the same as expenditure. Households with similar dwellings may face very different housing costs depending on their tenure status, wealth status, and institutional arrangements. Homeowners have, *ceteris paribus*, lower housing costs than tenants, outright owners have lower costs than owners with a mortgage, and tenants in social housing may benefit from lower rents compared with free-market tenants.

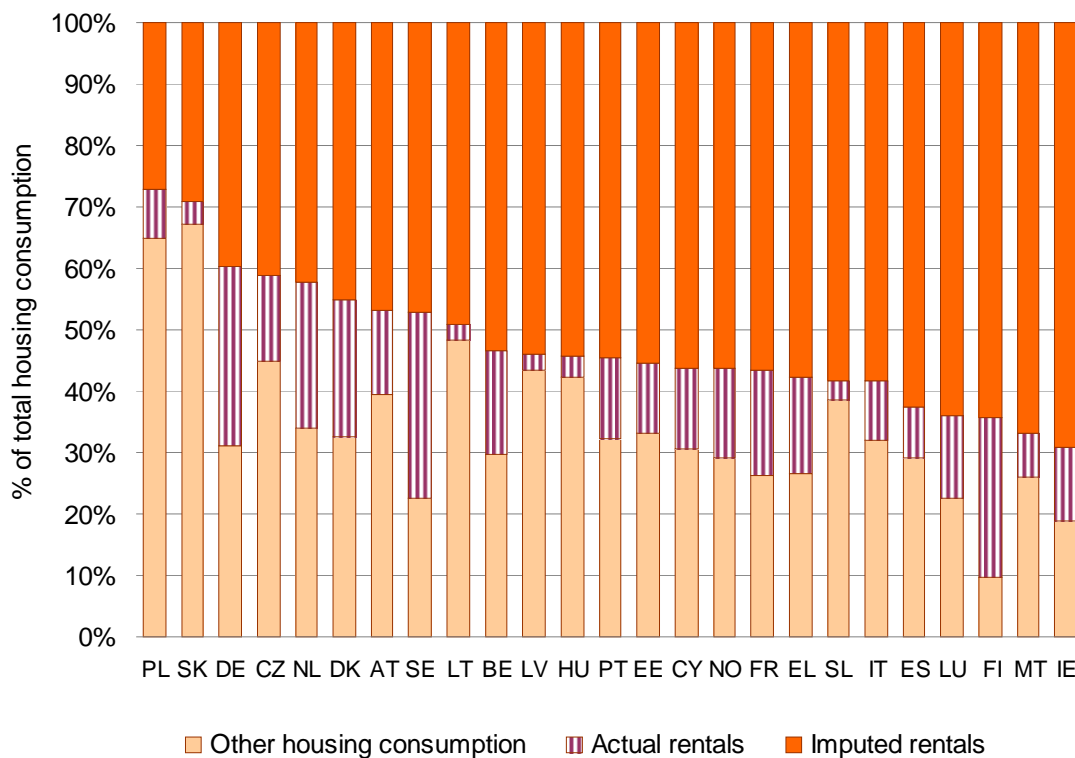
Consequently, the major statistical sources on housing consumption, such as National Accounts or Household Budget Surveys, do not measure housing consumption by actual out of pocket housing costs. Instead, they measure consumption of housing services by imputing additional housing consumption to owner-occupiers and other potential beneficiaries. Both use the COICOP<sup>6</sup> classification of consumption items, and divide total housing consumption into five components: (1) actual rentals, (2) imputed rentals, (3) maintenance and repair (4) water supply, refuse and sewerage, and (5) electricity, gas and other fuels. Data on housing consumption divided into these sub-categories are available for nearly all EU countries from both sources (NA and HBS from Eurostat; NA from OECD).

Figure 2.1 shows the structure of housing consumption in the European Countries in 2006 based on National Accounts. The share of imputed housing consumption constitutes more than half of the total housing consumption in many countries. Whether these data are comparable is a question in itself but beyond the scope of this paper. The HBS figures are different from the NA figures in many countries, suggesting further to measurement problems despite the common conceptual framework.

---

<sup>6</sup> Classification of individual consumption by purpose

**Figure 2.1: Structure of housing consumption according to the COICOP classification, 2006**



Source: Eurostat, National Accounts

NB: No data available from the United Kingdom and Iceland. Countries sorted according to share of imputed rentals

## 2.2 Measurement of imputed rents as income

Within the accounting framework, the value of housing consumption must be financed either by income received or by drawing on savings. With monetary outlays on housing, such as actual rentals or the monetary housing costs of owner-occupiers, the case is clear: these are normally paid off from current inflows of disposable money income. If imputed values are added to housing consumption<sup>7</sup>, there must be a resource inflow to ‘finance’ the additional consumption. This is achieved by adding imputed net rentals on the income side.

Only in the case of free-market tenants are there no resource inflows which should be added to their income. The value of their housing consumption

<sup>7</sup> Because income must result from a production activity, imputed rentals of owner-occupiers are treated as own-account production of services in National Accounts. This condition does not apply to EU-SILC or other micro income statistics. We do *not* consider imputed rentals of owner-occupiers as a result of own account production of services but as income based on ownership of a non-financial asset and therefore as property income.

equals their housing costs, and their incomes equal their cash incomes. When the owner does not seek full profit available from the housing markets, the addition to income is an in-kind housing benefit (either social transfer in kind or inter-household transfer) for the tenants, measured as the difference between prevailing market rent and actual rent paid. The value of their housing consumption equals their housing costs plus the in-kind housing benefit.

Owners of dwellings may have two kinds of inflows. From the residences they lease, they receive actual rental income (recorded in EU-SILC variable HY040). From the residence they own and live in, they receive implicit rental income (HY030). Both actual and implicit rental income is net of owner's costs. If the owner-occupier has a mortgage, interest repayments paid on it are deducted separately (target variable HY100). The housing consumption of owners equals their housing costs plus the implicit rental income for owner-occupiers.

Net imputed rent as income may be derived from the value of housing consumption in two ways: indirectly with the rental equivalence approach or directly with the capital market approach applying the user cost method. Consider the following definition of housing costs:

$$(1) \quad R = C + L + T + iD + d + r(V-D)$$

where

C = operational housing costs (service charges, utilities, maintenance and repairs, insurance)

L = actual rentals paid by tenants

T = property taxes – tax relief on mortgage interest – direct housing benefits

d = cost of major repairs/depreciation (of structures)

i = mortgage interest rate

r = interest rate in the alternative use of funds

D = amount of outstanding housing debt

V = current market value of the dwelling

The term C represents operational housing costs, the term T represents how taxes and benefits affect housing costs while the rest refer to the user costs of financial and fixed capital. The term L should cover the other components for free-market tenants. Capital gains, i.e. changes in housing wealth solely because relative prices change, are not taken into account in this definition.

The costs in (1) include the returns from alternative investment plans which are foregone because wealth is tied up in one's own dwelling<sup>8</sup>. For a full measure of the value of housing consumption, this user cost of capital should be included in housing costs. This opportunity cost of an alternative investment plan is also a direct measure of return to home equity. If measurement of income is the only concern, it will be enough to measure just the rate of return. This direct way of measuring imputed rents as income is labelled the capital market approach. In the accounting framework, the sum of housing costs + implicit return to home equity is the total value of housing consumption, which equals the value of own-account production of housing services.

In another approach, the rental equivalence method, one may assume that the value of housing consumption may be measured with free market rents for all tenures. For free-market tenants, the price of housing is rental  $L$ , which equals the user cost of capital and includes the net profits of the landlords. An estimate of the prevailing market value of term  $L$  for all other tenures is called rental equivalence and income is simply the difference between the rental equivalence and housing costs paid by the household. The amount that is added to income represents the amount that is saved because of the possibility to choose tenure where housing costs are below the costs of a reference choice, i.e. free-market rental.

In EU-SILC 2007, each country has estimated gross imputed rents in its own preferred way. Full details on the specific models can be found in Juntto & Reijo (2010) and Eurostat (2009). Table 2.1 summarises the methods applied in each country<sup>9</sup>, by distinguishing between the rental equivalence and the capital market approach (user cost), whether selection bias has been taken into account or not (H stands for the Heckman method), and whether the underlying data is objective external data (e.g. statistics on rents) or the subjective responses of survey respondents. These choices are mainly determined by the size of the private rental markets and the availability of statistical data.

Eurostat recommends the indirect rental equivalence approach, i.e. estimating the rental value of a similar dwelling for owner-occupiers and those who do not pay full market rent, and netting out relevant costs from this value. The use of subjective methods is strongly discouraged by Eurostat, presumably because of likely measurement errors and possible upward bias in the responses.

---

<sup>8</sup> These would be monetary income flows in the form of e.g. interest or dividends.

<sup>9</sup> Frick *et al.* (2008) and some other authors distinguish between rental equivalence, opportunity cost or 'capital market' methods, and self-assessment methods. We distinguish between the concepts and the estimation methods. In our view, the objective is to measure opportunity cost, and for this there are two basic approaches (rental market/rental equivalence and capital market/user cost approaches) and several estimation techniques (econometric techniques, stratification) based on objective data or subjective data (i.e. self-assessment by asking respondents about the potential market rent on their current dwelling) Finally, within the methods there are some options to correct for some known biases (e.g. the Heckman method within the regression method or applying regression to the self-assessed values).

Following the rule of thumb applied in the European National Accounts, the capital market approach is in principle allowed only if the share of free-market tenants falls below 10%,

**Table 2.1: Imputed rent as income: the estimation methods in EU-SILC 2007**

<b>Rental equivalence approach</b>	
Objective, hedonic regression or Heckman method (H)	Austria, Latvia, Poland, Belgium (H), Cyprus (H), France, Italy (H), Luxembourg (H), Netherlands, United Kingdom (H), Switzerland (H)
Objective, stratification	Denmark, Germany, Greece (partly), Finland, Ireland, Lithuania, Malta, Norway, Romania, Slovenia, Spain (partly)
Subjective, regression or stratification (S)	Hungary, Greece (partly), Spain (partly), Portugal (S)
Subjective	Czech Republic
<b>Capital market approach (user cost method)</b>	
Objective, stratification	Estonia, Iceland, Slovakia, Sweden
Subjective	-

Source: Eurostat (2010), Impact study on inclusion/exclusion of non-monetary income components and extreme values, Document LC-ILC/52/10/EN.

NB: Full details on the specific models can be found in Juntto and Reijo (2010) and Eurostat (2009).

See also Eurostat (2010) for a reporting on the further harmonisation achieved in the 2008 EU-SILC operation.

Rental equivalences may be estimated using econometric methods (hedonic regression or the Heckman selection model), or following the conventions in National Accounts by using stratification methods. Most countries have used regional and physical characteristics of the dwelling as explanatory variables in their models<sup>10</sup>. Both the covariates used and the use of either the regression or stratification method may have an effect on the distribution of the estimated rental equivalences. The Heckman selection model is one way to tackle the possible selection bias induced by the segregation between owners and tenants: the ‘donors’ (private rental tenants) may differ substantially from the ‘recipients’ (owners) in many respects, such as floor area, location, or quality of housing<sup>11</sup>.

Rental equivalence is a data intensive method because it requires that the components of the value of housing consumption – with the exception of the return to home equity - are measured. Furthermore, rental markets may be very shallow in some countries or regions, are generally not regionally homogenous, the differences in price and quality between social and private rentals may be

<sup>10</sup> Some have also used household characteristics in the model. We assume that these are used as instrumental variables because in principle only characteristic of the main residence (irrespective of the household who lives in it) should be included in the model as covariates.

<sup>11</sup> These can be related to the discussion on dualist and unitary housing systems (Kemeny, 1996; Juntto & Reijo, 2009): to the level of segregation between rental and owned dwelling stock, and to the level of segregation within rental markets between private and social housing.



slight, rental markets may be regulated to a large extent, rents may be volatile, and the data available inaccurate (Juntto & Reijo, 2010).

The capital market approach may be less vulnerable to problems with data and also less sensitive to the size of the rental housing markets. One might assume that the cross-country comparability of direct estimates of net return to home equity might be better controlled for<sup>12</sup>. Nevertheless, only four countries (Estonia, Iceland, Slovakia and Sweden) have opted for the capital market approach although the share of tenant households who paid the prevailing market rent was below 10% in all Eastern European countries, Iceland, Ireland, the United Kingdom, and Spain. Given the high home ownership rates in many of these countries, the quality of the data on the current market prices of dwellings would probably be better than that on free market rents, even if the values were asked from the survey respondents.

### 2.3 The potential beneficiaries

A key question is whether the data correctly identifies those households to whom the rents are to be imputed, particularly because implicit rents must be derived also for tenants and not only for owner-occupiers. Juntto & Reijo (2010) discuss the related comparability issues and conclude that there are comparability problems in the operationalisation of tenure status. It is probably easier to identify owners because in most countries there is a legal framework for ownership rights and obligations. Even with owners, some borderline cases may cause problems. Classifying tenants into those who pay prevailing market rents and those who do not is quite problematic.

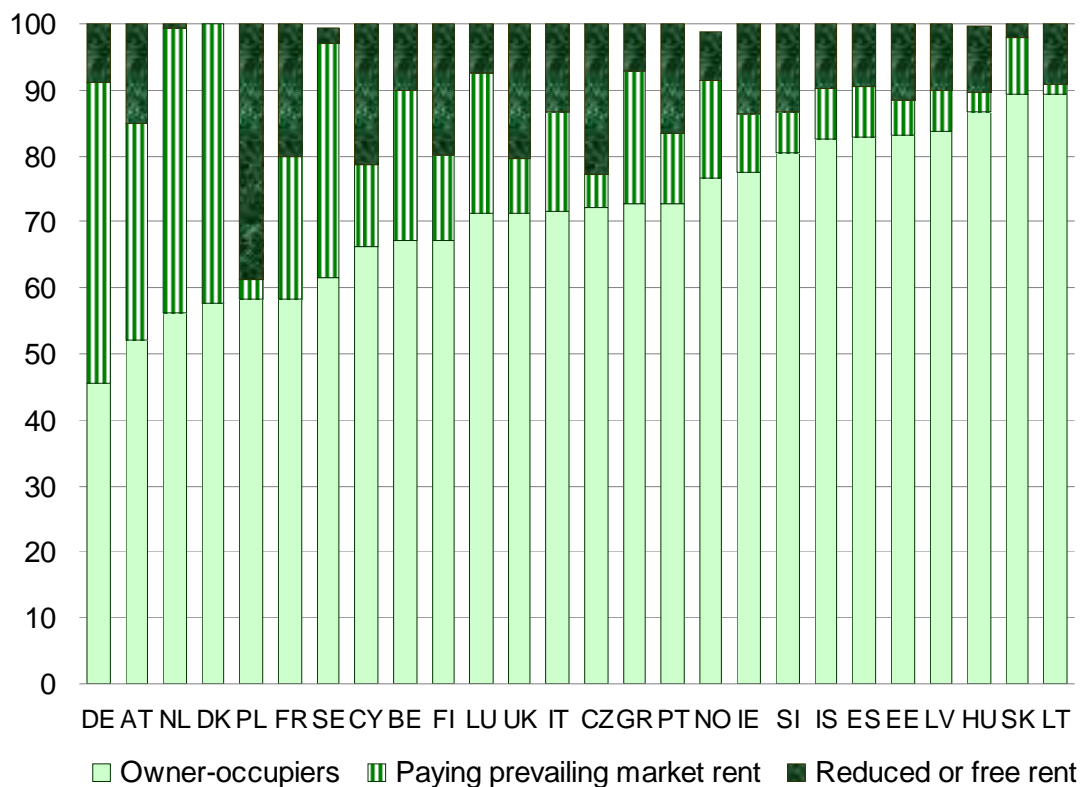
According to this data set, nearly 80% of European households either owned their main residence or their rent was below the prevailing market rent, and the share is even higher when one considers the population living in these households. The country variations in the shares largely reflect the different homeownership rates across Europe. The lowest homeownership rates are recorded in Germany and Austria where around half of the population live in own dwellings. In many Eastern European countries more than 80% of households own their dwellings. Later on we divide homeowners into outright owners and those with mortgage debt; there is substantial variation in this dimension as well.

---

<sup>12</sup> The Survey on Health, Age and Retirement (SHARE), for example, estimates imputed rents for all countries by assuming 4% rate of return on home equity.

The share of households in reduced rent or rent free dwellings appears to be significant in a number of countries, being 20% or more in Poland, the Czech Republic, Cyprus, France, the United Kingdom and Finland. In terms of beneficiaries, imputing rents to this group is therefore an important issue, both within these countries and for comparability across countries, given that in certain countries (NL, DK, SE, SK) the shares of potential beneficiaries are low or non-existent, although we have some doubts whether this is actually the case. Imputed rent values have not been included at all in some of the countries (IS, IT) with a significant share of reduced-rent-dwellings (Juntto & Reijo, 2010).

**Figure 2.2: Tenure statuses (% of the population), 2007**



Source: EU-SILC Users' database

NB: Countries are sorted according to home ownership rate

### 3. Data and methods

Our results are based on the EU-SILC 2007 data as available from the cross-sectional Users' Data Base (UDB), the first EU-SILC dataset which includes imputed rents for a household's main residence for nearly all countries. The data we have used is dated March 2009, and the corrections made to the data after that could not be incorporated in the analysis.

All countries provided imputed rents (HY030) in the data. Germany had to be excluded from the analysis due to missing information about mortgage interest repayments (HY100). The income data refers to the year 2006 for all countries except the United Kingdom and Ireland, for which it is 2007. Despite our doubts about the degree of comparability of the data, we take it as it is and only make due notes in the relevant sub-sections when apparent comparability problems emerge.

Imputed rents are recorded in one variable (HY030G) but we have broken them into three components, based on tenure status: imputed rents of owners, imputed rents of tenants not paying full market rent, and imputed rents based on free rent. These do not sum up to the target variable on imputed rent for all countries because some countries have imputed rents also to tenants paying full market rent. We have set these values to zero and thus assumed them to be measurement error. Interest repayments on mortgage are deducted only from imputed rents of owner-occupiers, i.e. setting interest payments to zero for all other tenure statuses. Consequently, also the interest payments analysed here are different from the target variable interest repayment on mortgage (HY100G).

The subtraction of mortgage interest may lead to negative values for owner-occupiers, although imputed rents are constrained to be positive in the data. A priori there is no reason to constrain imputed rents net of mortgage interest to be positive. In the short run, renting may be less costly than owning for very indebted households. A substantial number of households with negative disposable incomes would be a problem for the analysis. Adding imputed values and then deducting interest payments does not substantially change the number of observations with negative disposable incomes. Unlike e.g. Citro and Michael (1995) and Frick *et al.* (2008) but in line with Eurostat (2009), our choice is to allow imputed rents net of mortgage interest to be negative.

To be consistent with the methodology used in the OMC indicators, we apply the modified OECD equivalence scale, use the individual as the unit of analysis, set the income poverty threshold as 60% of the national median, and define deprivation in line with the most recent recommendations. Although the

standard modified OECD scale is used, this is not a trivial choice when housing is analyzed due to economies of scale derived from housing consumption. One issue to consider is that there are differences in economies of scale between countries and these may depend on a variety of factors which affect the level of actual housing costs in a country, including the institutional differences in public versus market-based provision of housing (see Marlier et. al., 2007, p. 160).

As a general method, we use decomposable inequality and poverty indices to analyze differences between the two income concepts. Both inequality and income poverty can be decomposed into within- and between-group components, e.g. inequality/poverty within age groups and inequality/poverty between age groups. While the decompositions may be interesting on their own, our purpose is to use them as a convenient way to summarise *changes* for many countries and many background variables. The analysis is based on point estimates<sup>13</sup>.

For inequality, we use the mean log deviation (MLD) for decompositions because it is more sensitive to changes at the bottom of the distribution, which we considered desirable considering the focus in EU-SILC on poverty and social exclusion. Altogether five indices are used to examine income inequality. These are the Gini coefficient and its factor decomposition, the Atkinson index (parameter=0.5) and three subgroup decomposable generalized entropy measures: mean log deviation, the Theil index, and the squared coefficient of variation. All indices differ in their sensitivity to changes in the different segments of income distribution.

For decompositions of income poverty, we look at relative changes in the first three Foster-Greer-Thorbecke (FGT) measures. The FGT measures have a direct link to the OMC indicators of at-risk-of-poverty rates and poverty gaps, and describe the incidence and intensity of poverty as well as inequality among the poor. With the FGT measures poverty can be expressed as a population weighted sum for poverty in population subgroups.

---

<sup>13</sup> The designs of EU-SILC vary but are often complex sampling designs incorporating clustering, stratification, and unequal selection probabilities. Proper variance estimation would require either replicate weights or full information on the sample design but these are not available in the data set.

## 4. Imputed rent and income inequality

In this section, we look at how income inequality changes when imputed rents are added to income, whether there are changes in the country rankings of income inequality, and what role imputed rent plays in inequalities within and between population subgroups. The imputed rents of owner-occupiers reflect asset accumulation and distribution of residential wealth, and represent a horizontal life-cycle redistribution of income. Imputed rents of tenants serve a very different purpose: they represent transfers in kind and result in a vertical redistribution of income within the income reference period.

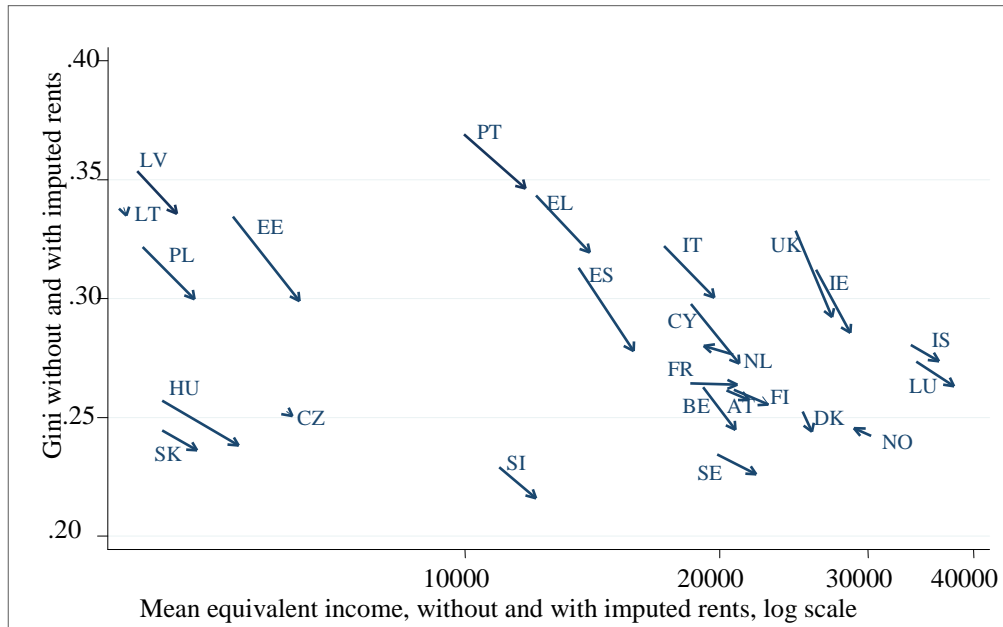
### 4.1 Overall distributional effect

Figure 4.1 plots the equity-efficiency plane with and without imputed rents, using the Gini coefficient as the inequality index. It confirms that overall the results from EU-SILC 2007 are in line with earlier studies: adding imputed rents decreases income inequality and increases mean incomes. This is the case in nearly all countries. The two exceptions are the Netherlands and Norway where inequality increases and income level decreases<sup>14</sup>. There are two countries where the changes are negligible (Lithuania, the Czech Republic), and one country where mean income increases but inequality does not change (France).

---

<sup>14</sup> The adverse results for the Netherlands and Norway reflect either the welfare effects of high indebtedness in these countries, or the data from these countries may not be comparable with the others. The share of negative *net* imputed rents of owner-occupiers usually remains at a level of 1 to 2% of the case, but is very high in Norway and the Netherlands (45 and 40%, respectively) and substantial in Denmark (16%), the United Kingdom (10%), and Iceland (9%). This may be a result of high mortgage interest payments, or low imputed rents (low gross rental equivalences or high costs of owning), or implication of measurement error. To check the data, we compared the ratio of mortgage interest repayments to total housing costs (which should include interest repayments) and to imputed rents gross of mortgage interest. The mean value of mortgage interest repayments in the Netherlands was three times higher than imputed rents; and in Norway the figure was nearly six times higher. This suggests some undocumented comparability problems, and it seems that, in addition to high interest repayments, for both countries the average of imputed rents (gross of interest payments) is lower than one would expect. In the Netherlands, estimated depreciation has been deducted from imputed rents and this may partly explain the results.

**Figure 4.1: Changes in income inequality and average income (without imputed rent --> with imputed rent), 2007**



Source: EU-SILC Users' database

Reading note: Arrows indicate changes in Gini coefficient and relative change in mean equivalent income. For example, in Estonia the Gini decreases from 33.4 to 29.9 and the mean income increases by 19.9%

The change in income distribution that results from adding net imputed rent depends on the change in average income, on the distribution of imputed rents among individuals, and on the correlation between imputed rents and cash disposable income. As shown in Table 4.1, there is substantial variation in the changes in average income levels, ranging from negative changes to increases of around 20% or more, with a number of countries having increases of around 10%. Negative average imputed rents in the Netherlands and Norway suggest that in these countries renting in fact on average should be economically preferred to owning.

If we rank people based on cash incomes, add imputed rents to disposable income and then compute Gini coefficient, we get the concentration coefficient. The difference between concentration coefficient and Gini of cash disposable income may be interpreted as the gap narrowing effect of imputed rents, i.e. by keeping rankings constant but changing income levels (Lerman and Yitzhaki, 1995; Wolff and Zacharias, 2009). With this measure, imputed rents have a gap-narrowing effect in all countries but the effect varies substantially between them (Table 4.1). Imputed rents re-rank individuals in income distribution, and a summary measure for re-ranking is the change from the concentration coefficients to the Gini coefficients of augmented incomes. Re-ranking occurs and partially offsets the gap-narrowing effect on the Gini coefficient. Net

imputed rents are more equally distributed than cash disposable income in all countries except the Netherlands and Norway.

**Table 4.1: Changes in income inequality when moving from cash incomes to incomes augmented with imputed rents, 2007**

Country	Share of beneficiaries, % of population		Mean income	Gini coefficient					Concentration coefficient
	Owners %	Tenants (not paying market rent) %	Change %	Disposable cash income (DPI)	DPI and imputed rents (DPI_IR)	Change pp	Gap change pp	Re-ranking change pp	DPI_IR, DPI %
				%	%				
NL	62.7	0.1	-7.6	27.6	28.0	0.4	-0.8	1.1	26.9
NO	82.8	0.0	-4.5	24.2	24.5	0.3	-0.1	0.4	24.1
FR	62.1	16.3	13.7	26.4	26.4	-0.1	-1.0	1.0	25.4
CZ	74.5	16.2	1.6	25.2	25.1	-0.2	-0.2	0.0	25.0
LT	89.3	9.5	0.7	33.8	33.5	-0.3	-0.4	0.1	33.4
AT	59.2	12.1	6.3	26.1	25.7	-0.4	-0.7	0.3	25.5
FI	73.6	8.1	10.1	26.2	25.5	-0.6	-1.2	0.5	25.0
IS	86.3	1.5	8.0	28.0	27.4	-0.7	-1.3	0.6	26.8
SE	68.9	2.0	11.4	23.4	22.6	-0.8	-1.3	0.5	22.1
DK	66.8	0.0	2.5	25.2	24.4	-0.9	-1.3	0.5	23.9
SK	89.1	1.2	10.0	24.5	23.6	-0.9	-1.5	0.6	23.0
LU	74.5	5.9	10.8	27.4	26.3	-1.1	-1.5	0.5	25.9
SI	81.3	12.8	10.5	22.9	21.6	-1.3	-1.6	0.3	21.3
BE	72.9	8.5	9.3	26.3	24.5	-1.8	-2.2	0.4	24.1
LV	84.5	9.9	11.4	35.4	33.6	-1.8	-2.3	0.5	33.0
HU	86.2	8.3	23.2	25.7	23.8	-1.9	-2.9	1.0	22.8
IT	72.7	9.1	14.5	32.2	30.1	-2.2	-2.8	0.6	29.5
PL	60.8	34.3	15.2	32.2	30.0	-2.2	-2.6	0.4	29.6
PT	74.5	15.9	18.4	36.9	34.6	-2.3	-3.1	0.8	33.8
EL	75.7	6.5	15.8	34.3	31.9	-2.4	-3.0	0.6	31.4
CY	74.1	15.9	14.2	29.8	27.3	-2.5	-2.8	0.3	27.0
IE	78.1	12.4	9.7	31.2	28.6	-2.6	-3.1	0.4	28.1
ES	83.6	8.3	16.2	31.3	27.8	-3.5	-4.0	0.5	27.3
EE	86.8	8.5	19.9	33.4	29.9	-3.5	-4.4	0.9	29.0
UK	72.2	17.6	10.5	32.9	29.2	-3.6	-4.5	0.8	28.4

Source: EU-SILC Users' database

NB: Countries sorted according to change in Gini coefficient. Share of beneficiaries = persons with non-zero imputed rent as a percentage of population

Reading note: In the Netherlands 62.7% of the population lives in owner-occupied houses. Augmentation of the income concept lowers the mean income by -7.6% and raises the Gini coefficient by 0.4 pp. The gap narrowing effect of -0.4% was offset by the 1.1% re-ranking effect; because of rounding, these do not exactly sum up to 0.4 pp

Figure 4.1 also shows that imputed rents substantially reduce levels of inequality in high inequality countries (in percentage points – pp) but levels do not generally reach those of medium and low inequality countries. To evaluate changes in inequality further, several conventional inequality measures were computed with both income concepts, instead of studying changes in Lorenz-dominance. The summary measures are generalised entropy measures (mean log deviation MLD, Theil, squared coefficient of variation SCV), and Atkinson index (with epsilon = 0.5).

Table 4.2 summarises the results by grouping countries into low, medium and high inequality countries using several measures. The grouping is based on the country's value relative to the median value of the countries (un-weighted by population size). Countries with low inequality have values lower than 90% of the median value, countries between 90 and 110% of median value are medium inequality countries and those above 110% of the median value are here labelled high inequality countries. The indices weight the distributions differently, so one country may be in different groups with different indices. In particular, the MLD index is sensitive to changes at the bottom of the distribution and the SCV at the top of the distribution.

**Table 4.2 Income inequality measures with (DPI+IR) and without (DPI) imputed rent, (% of median value of country indexes), 2007**

Index	Gini		Atkinson (0.5)		MLD		Theil		SCV	
	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR
SI	83	79	66	60	70	60	59	59	42	41
SE	85	83	75	72	83	77	68	72	54	53
NO	88	90	80	81	90	88	71	82	61	71
SK	88	87	80	76	84	77	74	78	56	57
CZ	91	92	85	85	86	84	81	91	71	77
DK	91	89	85	82	86	80	87	93	123	129
HU	93	87	87	76	91	76	82	78	66	57
AT	95	94	91	90	97	91	85	92	67	70
FI	95	94	94	91	94	88	94	100	103	102
BE	95	90	88	80	94	81	81	81	63	60
FR	96	97	90	90	93	90	85	93	74	76
LU	99	96	95	90	99	91	90	94	74	73
NL	100	103	100	104	100	101	100	116	102	128
IS	101	100	111	109	110	102	114	121	118	120
CY	108	100	121	105	120	100	123	117	131	116
IE	113	105	127	111	133	111	124	119	123	113
ES	113	102	122	100	137	105	110	100	78	69
PL	116	110	133	118	142	120	126	123	107	100
IT	117	110	131	118	143	124	121	120	98	91



Index	Gini		Atkinson (0.5)		MLD		Theil		SCV	
	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR
<b>UK</b>	<i>119</i>	<i>107</i>	<i>140</i>	<i>115</i>	<i>149</i>	<i>115</i>	<i>136</i>	<i>124</i>	<i>146</i>	<i>130</i>
<b>EE</b>	<i>121</i>	<i>110</i>	<i>149</i>	<i>124</i>	<i>156</i>	<i>123</i>	<i>150</i>	<i>137</i>	<i>189</i>	<i>155</i>
<b>LT</b>	<i>122</i>	<i>123</i>	<i>144</i>	<i>148</i>	<i>159</i>	<i>162</i>	<i>133</i>	<i>149</i>	<i>100</i>	<i>108</i>
<b>EL</b>	<i>124</i>	<i>117</i>	<i>149</i>	<i>133</i>	<i>160</i>	<i>137</i>	<i>141</i>	<i>140</i>	<i>119</i>	<i>113</i>
<b>LV</b>	<i>128</i>	<i>123</i>	<i>156</i>	<i>146</i>	<i>172</i>	<i>156</i>	<i>144</i>	<i>148</i>	<i>111</i>	<i>109</i>
<b>PT</b>	<i>134</i>	<i>127</i>	<i>171</i>	<i>154</i>	<i>180</i>	<i>154</i>	<i>165</i>	<i>164</i>	<i>140</i>	<i>134</i>
<b>Median</b>	100	100	100	100	100	100	100	100	100	100

Source: EU-SILC Users' database

NB: Bold indicates that the index is less than 90% and italics that the index is greater than 110% of median of country values. Countries ordered by cash income (DPI) Gini-index

For certain countries (notably Spain) we observe substantial movement towards the medium inequality group. With the admittedly arbitrary limits applied in the table, however, the overall clustering of countries does not change significantly<sup>15</sup>. Nevertheless, the Spearman rank correlations between income concepts for a given index are lower compared to the correlations between indices for a given income concept, although there are significant differences in the picture given by the various inequality indices. Some of the big changes between income concepts are not robust to the inequality indices shown here.

We next take a supranational perspective to inequality, i.e. treat the countries as if they represented a single European entity. Methodological issues relating to the supranational approach are discussed in Brandolini (2007). We have to exclude Germany because the variable on interest repayment on mortgage is not available. The results shown below thus only indicate what might happen to EU-wide inequality if imputed rents were added to income. Incomes are not adjusted with purchasing power parities.

In table 4.3, the first four rows show two subgroup decomposable inequality indices, the mean log deviation and the Theil index, computed from the whole European dataset (excluding Germany), as well as the contributions of within-countries and between-countries inequality to total inequality. Total inequality in the continent decreases when imputed rents are added, and so do inequalities both within and between countries. In relative terms, the between-countries component becomes more significant, reflecting the fact that imputed rent changes average incomes quite differently from one country to the next.

<sup>15</sup> The country inequality rankings may be of some interest to the general public. The addition of imputed rent does not generally lead to significant changes in rank order. There is somewhat more pronounced deterioration in the ranks of Norway and the Czech Republic with all indices while Hungary improves its rank with regard to all inequality measures. We conclude, however, that these movements are mostly within the clusters of countries in terms of income inequality.

Gini cannot be decomposed exhaustively to between- and within-countries contributions. For the total European Gini coefficient, the lower part of Table 4.3 shows a decrease as well when imputed rents are added to income. Currently, the EU-wide inequality indicator is measured as a population weighted average of country indicators and not by treating the EU as a single entity. This measurement leads to lower inequality than the supranational indicator as it ignores the inequalities between countries. Nevertheless, inequality would decrease by roughly the same proportion in both approaches.

**Table 4.3: EU-wide income inequality indicators**

Inequality measure		Total inequality	Within countries	Between countries	Total, %	Within, %	Between, %
<b>MLD</b>	DPI	0.30	0.16	0.14	100.0	53.3	46.7
	DPI + IR	0.27	0.14	0.13	100.0	51.1	48.9
<b>Theil</b>	DPI	0.27	0.16	0.11	100.0	60.6	39.4
	DPI + IR	0.24	0.14	0.10	100.0	59.0	41.0
			<b>Supranational (indicator computed from the whole data set)</b>		<b>Population weighted average of country indicators</b>		
<b>Gini</b>	DPI		0.392			0.300	
	DPI + IR		0.373			0.281	

Source: EU-SILC Users' database

NB: Germany excluded

## 4.2 Subgroup decompositions of inequality

Imputed rents change the distribution of income both between and within population sub-groups. We next describe the changes in within-group inequality of the MLD index while the changes in between-group inequality are simply illustrated with changes in mean income levels.

Regarding owner-occupiers, we see the expected results: outright owners gain on average more income and see more reduction in income inequality among them compared to the mortgage indebted owners (Figure 4.2). This holds for nearly all countries, and the relative change for outright owners in income levels is + 20% and for inequality levels around -20% for a number of countries. Changes in mean incomes are notably smaller in the Netherlands, the Czech Republic, Norway, and Lithuania. The Netherlands, Norway and Lithuania show a trend opposite to the other countries.

**Figure 4.2: Changes in mean income and inequality within the population sub-group: outright owners and owners with outstanding mortgage**



Source: EU-SILC Users' database

NB: Countries sorted according to change in inequality of outright owners

For tenants, the mean income and within-group inequality of free market tenants of course remain unchanged. Imputed rents of reduced rent tenants are particularly important in the United Kingdom where there is a 30 per cent change both in the increase in mean income and in the decrease in within-group inequality<sup>16</sup>. The changes are significant in Belgium, Ireland, and Portugal as well, while some countries record much smaller changes, even though population shares may be quite large. As for tenants who do not pay rent, the pattern is more uniform with the MLD index reducing and mean income increasing around one fifth in a number of countries.

<sup>16</sup> We discuss tenants who do not pay prevailing market rent later in the section on relative income poverty (see tables 5.3 and 5.4).

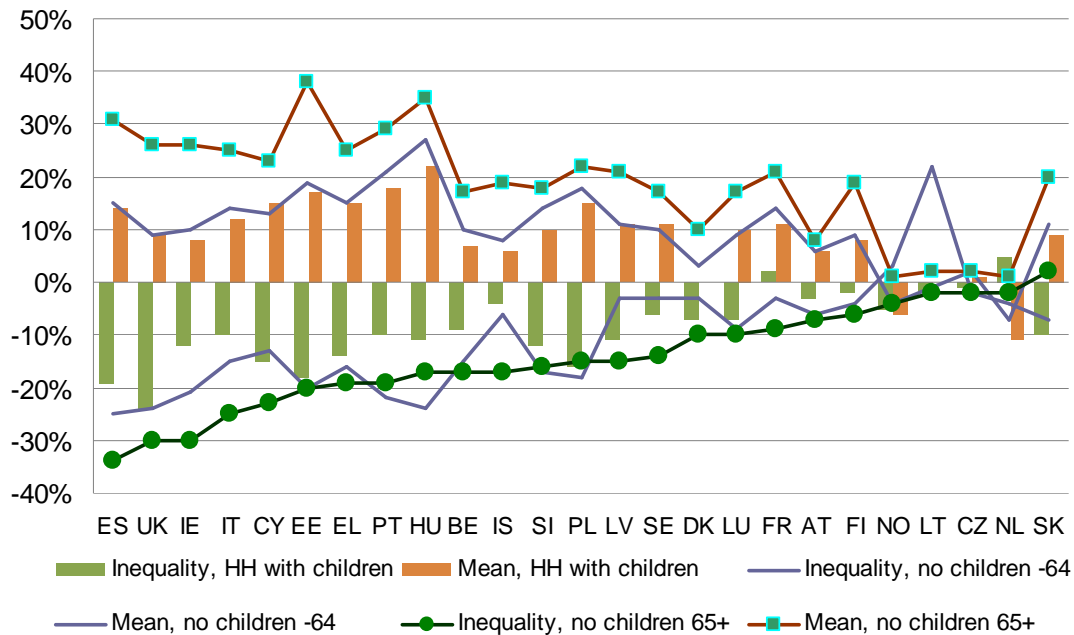
The inequality decompositions reveal decreasing inequality within tenures in most countries. There is also an increase in inequality between the tenures in most countries, and in percentage points the share of total inequality attributable to differences between tenures becomes more important. There are exceptions; in the three Baltic countries, Norway, the Netherlands, and the United Kingdom both inequality between groups and its share of total inequality fall.

Figure 4.3 shows changes for households with children, and households without children divided into the elderly and the others. Generally, the income level of the elderly increases more than is the case with the other household types, reflecting life-cycle effects such as lower mortgage indebtedness and more spacious apartments. Changes in elderly mean incomes exceed 20% in a number of countries. The changes in income levels for households with children are very similar to the changes for households without children.

At sub-group level, the differences between countries are significant as well. For example the incomes of the elderly increase by 31% in Spain, 21% in France, 10% in Denmark, and 2% in the Czech Republic. For households with children, the differences are not as sizable although e.g. in Hungary mean incomes increase by 22%, in Sweden by 11%, while there was no increase in Denmark and a decrease of -6% in Norway.

Looking at changes in inequalities within the household types, we find that within-group inequality decreases in all household types in most countries. While inequality both within and between household types generally decreases, the relative decrease in within-group inequality is usually smaller than the relative change in between-groups inequality. Consequently, the share of total inequality attributable to differences between household types generally decreases, while there is a corresponding increase in the share attributable to inequalities within household types.

**Figure 4.3: Changes in mean income and within-group inequality (%) by household type**



Source: EU-SILC Users' database

NB: Countries ranked according to change in inequality of households with at least one member aged 65 or more

The MLD decompositions by age, labour status, and degree of urbanisation suggest that the general result of adding imputed rents to income is that of decreasing inequality within the population subgroups. The decompositions reflect their interaction with tenure status<sup>17</sup>. The outright owners tend to be older, live more in less dense areas, and be either employed or retired; the indebted owners are younger and more urban than outright owners and are active in work life; free market tenants tend to be younger and more urban (Juntto & Reijo, 2010).

<sup>17</sup> The results are available on request from the authors.

## 5. Imputed rents and income poverty

Imputed rents change median income and therefore also the income poverty threshold when it is set (in line with the EU definition of ‘at-risk-of-poverty’) at 60% of the median equivalised income. Some households will end below the new threshold and some will rise above it, depending on how much the household’s income changes relative to the change in the median income. Most of the households at risk of poverty will nevertheless remain income poor even when imputed rents are added to income.

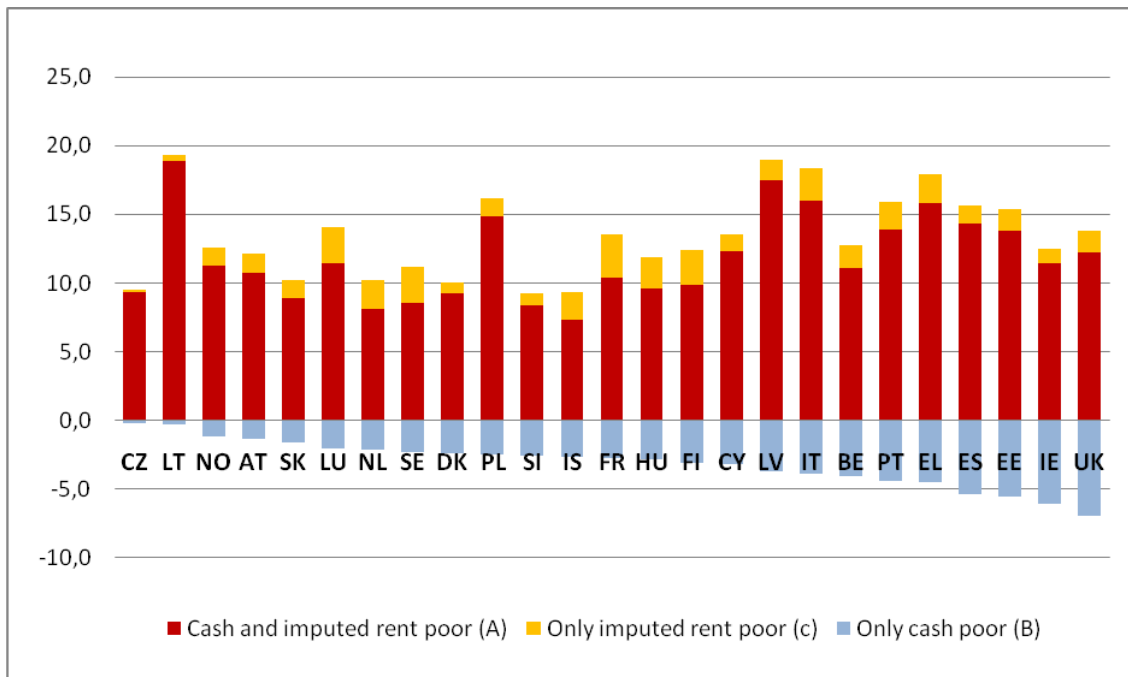
**Table 5.1 Subgroups discussed in chapters 5 and 6**

Income: Imputed rent included	Income: Cash income without imputed rent	
	At risk of poverty 62.9 million persons	Not at risk of poverty 318.8 million
At risk of poverty 55.6 million persons	A. Cash and imputed rent poor 48.2 million	C. Only imputed rent poor 7.4 million
Not at risk of poverty 326.1 million	B. Only cash poor 14.7 million	D. Not poor at all 311.4 million

NB: Figures in Table 5.1 refer to estimated total number of persons in 24 countries (Germany excluded)

In the following, we concentrate on the transitions in and out of poverty caused by the change of income concept and ignore the great majority whose poverty status does not change. In 22 countries only cash poor persons (subgroup B in table 5.1) account for at least 10% of all cash poor persons (subgroups A+B). To bring this chapter into clearer focus, we illustrate in Figure 5.1 the population shares of persons with different poverty status. In the extreme case of the United Kingdom, one out of three cash poor persons (36%) is no more at risk of poverty if imputed rent is added to the income concept. A great majority of the poor population is at risk of poverty according to both income concepts (Section A in Figure 5.1).

**Figure 5.1: Changes in the at-risk-of-poverty positions when imputed rents are added to income**



Source: EU-SILC Users' database

NB: Population shares. Countries sorted by share of only cash poor. Letters in parenthesis refer to subgroups presented in table 5.1

Reading note: in the United Kingdom, one out of three cash poor persons (36%) is no more at risk of poverty if imputed rent is added to the income concept

The changes in the at-risk-of-poverty rates are shown by household type and tenure in table 5.2. In the United Kingdom and Ireland at-risk-of-poverty rates fall around -5 pp and in Spain and Estonia around -4 pp. In all countries, at-risk-of-poverty rates fall in elderly single and couple households and in households who are outright owners (table 5.2). In the extreme case of Ireland, at-risk-of-poverty rate of population in the elderly single and couple households falls by 23 pp, when imputed rents are added to income. In households with children a similar, but smaller effect can be observed in 10 countries, while there is an increase in the other countries. Not surprisingly, the at-risk-of-poverty rates increase strongly among market renters, with exceptions of Lithuania, Norway and the Netherlands.

**Table 5.2: Change in the at-risk-of-poverty rates by type of household when imputed rents are added to income**

	Overall change	Elderly single and couple households	Households with children	Other households	Outright owners	Owners with mortgage	Free-market tenants	Other tenants
<b>UK</b>	-5.3	-16.8	-3.4	-2.8	-11.0	1.0	5.5	-18.0
<b>IE</b>	-5.0	-23.0	-1.9	-5.4	-9.1	-0.8	9.3	-10.3
<b>ES</b>	-4.1	-17.8	-1.6	-2.7	-7.4	-0.9	8.4	-2.8
<b>EE</b>	-4.0	-17.9	0.3	-4.1	-5.3	0.6	9.2	0.5
<b>BE</b>	-2.4	-9.0	-0.5	-2.2	-7.1	0.0	6.5	-15.8
<b>PT</b>	-2.4	-8.0	-0.8	-2.7	-5.6	0.6	11.1	-3.7
<b>EL</b>	-2.4	-6.7	-1.3	-2.1	-5.6	-1.2	9.8	-5.8
<b>LV</b>	-2.2	-12.8	-0.1	-1.6	-3.2	-0.1	7.5	0.5
<b>CY</b>	-2.0	-9.5	-0.9	-1.3	-3.4	0.6	8.8	-22.5
<b>SI</b>	-1.6	-6.7	-0.5	-1.7	-2.6	4.3	9.5	5.5
<b>DK</b>	-1.6	-10.1	0.4	-0.3	-11.9	-0.5	1.3	0.0
<b>IT</b>	-1.4	-10.2	1.4	-1.0	-5.2	1.5	10.3	15.3
<b>PL</b>	-1.1	-2.8	-0.3	-2.2	-1.5	-1.7	9.7	-0.1
<b>FI</b>	-0.6	-8.5	1.1	0.8	-7.7	-0.4	8.3	8.3
<b>IS</b>	-0.6	-7.6	0.4	0.1	-6.6	-0.5	5.6	11.5
<b>HU</b>	-0.5	-2.9	0.6	-1.3	-1.6	3.7	12.3	-4.2
<b>SK</b>	-0.3	-1.9	0.6	-1.2	-1.1	-0.8	6.4	11.6
<b>NL</b>	0.0	-4.8	1.6	-0.4	-3.3	2.9	-4.3	0.0
<b>CZ</b>	0.0	-0.3	0.1	0.0	-0.2	0.0	1.9	0.3
<b>AT</b>	0.1	-2.0	0.7	0.3	-2.4	-0.6	4.2	1.1
<b>LT</b>	0.2	-1.3	0.5	0.1	-0.1	4.5	0.0	-0.5
<b>NO</b>	0.2	-2.8	1.2	0.0	-2.5	2.1	-2.4	-4.7
<b>SE</b>	0.3	-1.4	0.7	0.8	-7.5	-1.7	9.1	-11.6
<b>FR</b>	0.4	-2.9	1.8	-0.2	-4.3	-0.2	10.8	1.3
<b>LU</b>	0.5	-1.3	1.0	0.5	-2.1	-0.9	11.0	-12.9

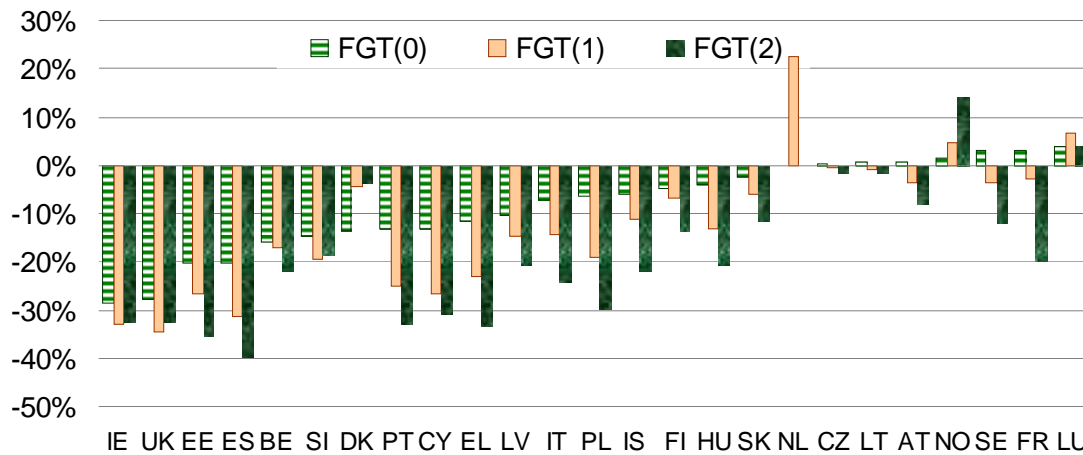
Source: EU-SILC Users' database

NB: Countries sorted according to overall change

Figure 5.2 shows how imputed rents change income poverty measures in the total population in relative terms. In a majority of countries, the at-risk-of-poverty rate falls (FGT0) the average distance to the poverty line decreases (FGT1), and inequality among the poor falls (FGT2). Relative changes are more pronounced in Ireland, the United Kingdom, Estonia, and Spain. In a few countries, such as France, Luxembourg and Sweden, the total poverty rate slightly increases although the change is not likely to be statistically significant. Some countries with a large share of mortgage indebted households (NL, NO) see increase in the severity of poverty, to the extent that the FGT2 measure had to be excluded from the picture for the Netherlands.



**Figure 5.2: Relative changes in the FGT poverty measures: total population, 2007**



Source: EU-SILC Users' database

NB: Countries sorted according to change in the headcount rate (FGT0). FGT2 measure not shown for the Netherlands

To identify the population subgroups where the changes occur, we conducted a decomposition analysis of the FGT measures for each of the main variables available in the dataset (age, household type, tenure status, employment status, education). Table 5.3 shows one view on the decompositions by showing the contributions of certain household types combined with tenures to the change in the headcount rate (FGT0). There are interesting variations between the countries, but generally the contributions of outright owners (particularly the elderly) reduce the poverty rates while free-market tenants' contributions work to increase the headcount rates.

**Table 5.3 Contributions of selected subgroups to the change in the total at-risk-of-poverty rate (FGT0), percentage points (pp)**

	Total	Outright owners			Owners with mortgage	Free-market tenants		Other tenants
		Elderly single and couple households	Households with children	Other	All	Households with children	Other	
UK	-5.3	-2.0	-0.4	-0.6	0.5	0.2	0.3	-3.3
IE	-5.0	-2.1	-0.9	-1.1	-0.3	0.6	0.2	-1.4
EE	-4.0	-2.4	-0.3	-1.1	0.1	0.3	0.1	-0.7
ES	-4.0	-2.0	-0.8	-1.0	-0.3	0.3	0.4	-0.6
BE	-2.4	-1.3	-0.5	-0.6	0.0	0.7	0.5	-1.3
PT	-2.4	-1.2	-0.7	-0.9	0.1	0.6	0.5	-0.8
EL	-2.4	-1.0	-1.4	-1.1	-0.1	1.1	0.7	-0.4

		Outright owners			Owners with mortgage	Free-market tenants		Other tenants
Total		Elderly single and couple households	Households with children	Other	All	Households with children	Other	
LV	-2.2	-1.6	-0.5	-0.5	0.0	0.2	0.2	0.0
CY	-2.0	-0.4	-1.1	-0.3	0.1	0.4	0.5	-1.2
SI	-1.6	-0.8	-0.6	-0.7	0.2	0.3	0.2	-0.3
DK	-1.6	-1.4	-0.1	-0.3	-0.3	0.1	0.4	0.0
IT	-1.4	-1.9	-0.6	-0.6	0.2	0.8	0.8	-0.2
PL	-1.1	-0.2	-0.3	-0.3	-0.1	0.1	0.1	-0.5
FI	-0.6	-1.6	-0.3	-0.6	-0.2	0.3	0.6	1.2
IS	-0.6	-0.6	-0.2	-0.2	-0.4	0.1	0.2	0.4
HU	-0.5	-0.4	-0.5	-0.3	0.5	0.1	0.2	-0.2
SK	-0.3	-0.4	-0.3	-0.2	0.0	0.4	0.2	0.1
NL	0.0	-0.2	0.0	0.0	1.7	-0.6	-0.8	0.0
DE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CZ	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
AT	0.1	-0.3	-0.3	-0.2	-0.2	0.6	0.6	-0.2
LT	0.2	-0.2	0.1	0.0	0.3	0.0	0.0	0.0
NO	0.2	-0.3	-0.1	-0.1	1.2	-0.1	-0.2	-0.2
SE	0.3	-0.7	-0.2	-0.2	-0.9	1.0	1.6	-0.2
FR	0.4	-0.7	-0.4	-0.4	-0.1	1.1	0.9	-0.1
LU	0.5	-0.2	-0.2	-0.3	-0.4	1.3	0.9	-0.6

Source: EU-SILC Users' database

NB: the first columns shows the change in the at-risk-of-poverty rate for the total population and is the sum of the other columns which show the population weighted changes in the at-risk-of-poverty rates

In the following, we structure the discussion on income poverty by tenure status; we first look at owners, and specifically owners with mortgage debt, and then examine the three types of tenant groups defined in EU-SILC.

## 5.1. Owners with a mortgage

While the main residence is the main asset of many households, the mortgage loan on it is generally their main liability. Housing indebtedness affects only the augmented income measure through interest repayments because only when imputed rents are added to income should interest repayments on mortgage be deducted from income<sup>18</sup>. The concern for the situation of indebted owners has been used as one argument in favour of adding imputed rents to income (e.g. Frick et. al., 2008).

Figure 5.3 shows that there is significant variation in mortgage indebtedness between countries, and between age groups within countries<sup>19</sup>. The overall mortgage take-up rates range from more than 50% in Sweden, Denmark, Norway, Iceland and the Netherlands to the lows of a few per cent in Eastern and Southern Europe. To cite a few examples, in Iceland 73% and in the Netherlands 59% of population lived in households with a mortgage while in Italy the share was 14% and in Poland 3%. There is a positive correlation with income and mortgage indebtedness among countries, which may result from many factors<sup>20</sup>, among others those related to the transmission mechanisms of housing wealth and the need for and access to external financing, particularly in Eastern and Southern European countries with very high home ownership rates. A simple correlation coefficient at country level between mean values of interest repayments and equivalent incomes is a high of 0.75.

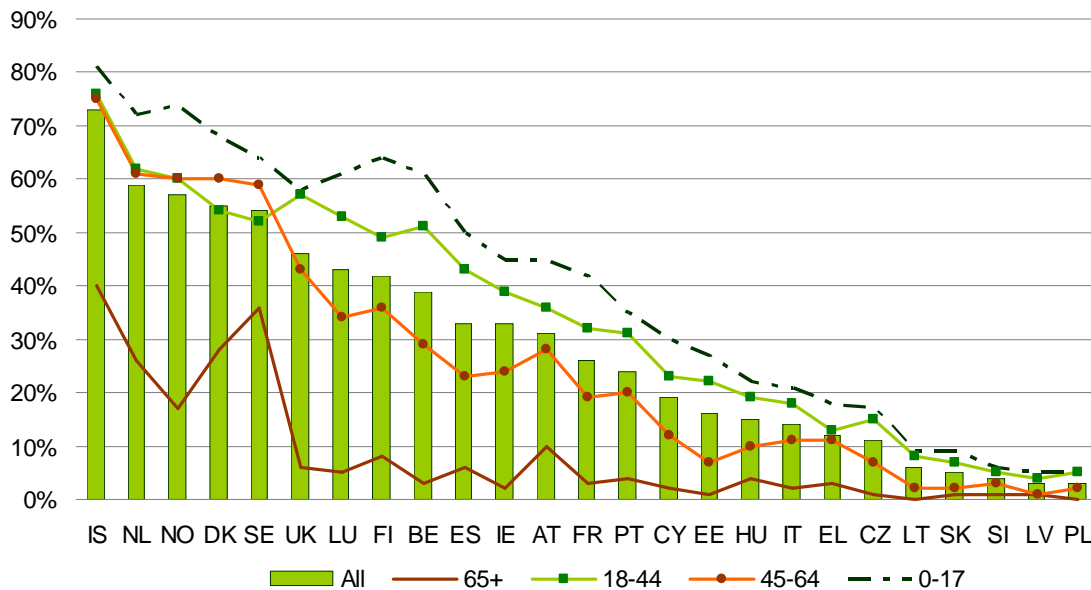
---

<sup>18</sup> In the current framework, the repayment of the mortgage principal is a saving, i.e. asset accumulation. They increase households' debt service-to-income ratio which describes the financial burden of mortgage debt. This common indicator cannot be computed from EU-SILC because repayments on the principal are not available. The preferential treatment of housing ownership is manifested in several countries through the right to deduct mortgage interest in taxation even when the corresponding income, i.e. the imputed rents of owner-occupiers, is not taxable.

<sup>19</sup> The evidence on mortgage indebtedness from EU-SILC seems to be in broad consensus with other available evidence on the role of mortgage debt in financing home purchases (e.g. OECD, 2004) or debt to income ratios from aggregate sources. For example, the particularly high interest costs in the Netherlands are consistent with other sources, and may be partly explained by the prevalence of interest only and contractual savings mortgages (ECB 2009), higher typical and maximum loan-to-value ratios and longer loan terms than in other countries.

<sup>20</sup> The country variation in mortgage indebtedness is an outcome of several factors, including a country's income level, interest rates, housing prices, competition and diversification in mortgage markets, taxation, demographics, wealth transmission mechanisms such as inheritances and privatisation, and also cultural differences regarding indebtedness. In part, higher mortgage indebtedness may signal more complete mortgage markets and better access to finance, including possibilities for housing equity withdrawal, i.e. the collateral value of one's own dwelling may be used to finance other consumption than housing.

**Figure 5.3: Owner-occupiers with mortgage debt, as a proportion of total population (% of individuals), by country and age of individual**



Source: EU-SILC Users' database

NB: Countries are sorted by the overall proportion. No data from Germany

Consistent with the life-cycle hypothesis of asset accumulation, the shares of the elderly with mortgage debt are significantly lower than those of other age groups in all countries, and in absolute terms very low (below 10%) in the majority of the countries. Four of the Nordic countries and the Netherlands stand out as having absolutely and relatively more mortgage indebtedness for the elderly in addition to the total population. The highest rates are observed for children (0-17 years). Compared to outright owners, the median age of the mortgage indebted is around 15-20 years lower in most countries.

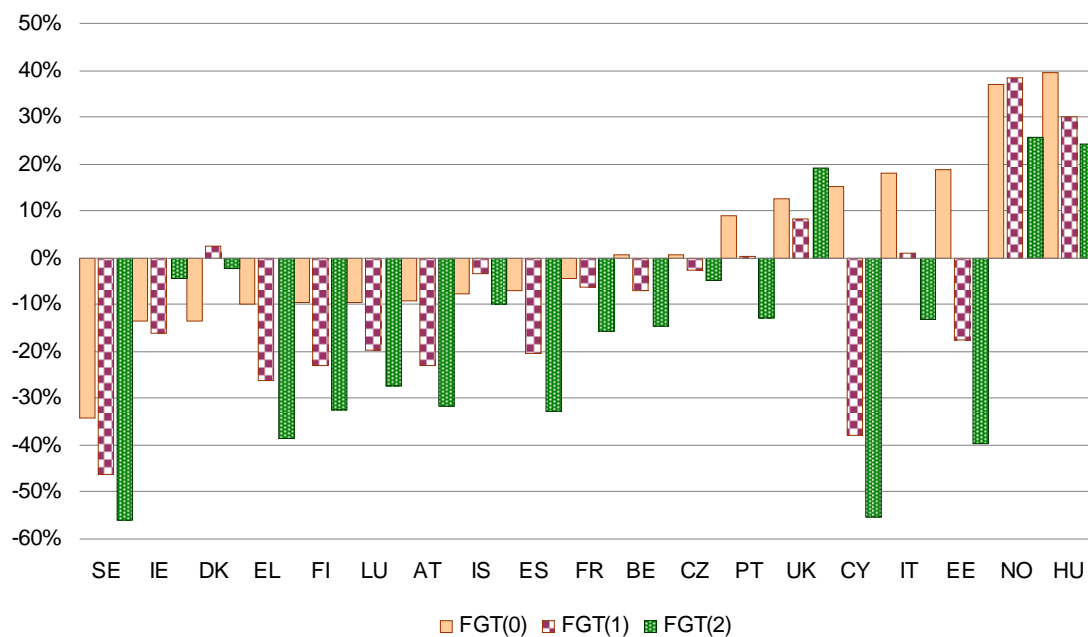
For poverty measures, it is important to note that within the country income distributions, those with mortgage debt generally are not in the lower part of the distribution because they are of working age and working, and apart from housing needs and preferences, indebtedness reflects also better access to mortgage finance. Controlling for age, there is a positive correlation between income and mortgage interest repayments. Current income reflects permanent income or anticipated lifetime income, which is important for access to external finance.

As a consequence, income distribution among the mortgage indebted changes largely above the commonly used poverty thresholds. If imputed rents were added to income, the poverty rate of the mortgage indebted would change markedly only in a few countries. Figure 5.4 shows the changes in the FGT poverty measures for people in mortgage indebted households. We find a substantial relative reduction in all poverty indices only in Sweden; in many

countries the change in headcount rate (FGT0) is quite mitigated while poverty gaps (FGT1 and FGT2) decrease more, indicating that poverty among the poor becomes more severe.<sup>21</sup>

Notice that figure 5.4 depicts relative changes; in percentage point (pp) terms the changes e.g. in the FGT(0) index, i.e. headcount rate, do not appear as dramatic. Thus, in Sweden the poverty rate falls from 4.9% to 3.2%; in Norway the poverty rate increases from 5.6% to 7.7%.

**Figure 5.4: Relative changes in the FGT poverty measures: the mortgage indebted**

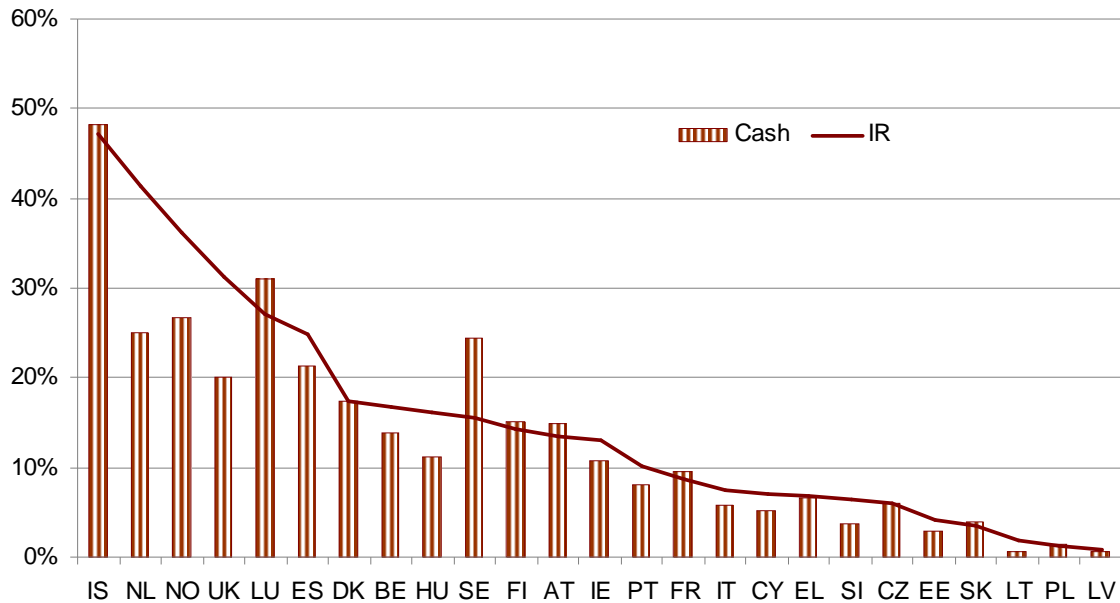


Source: EU-SILC Users' database

Figure 5.5 depicts the relative contributions of mortgage indebted to the overall headcount rate, thus eliminating the differences in total poverty rates from the picture. There are significant differences between countries, and the contribution of the mortgage indebted naturally reflects the population shares of indebted households. That is why the rankings of countries in Figures 5.5 and 5.3 above are quite similar.

<sup>21</sup> Against expectations, the share of the mortgage indebted among the elderly seems to be significant in Iceland, the Netherlands, Norway, Denmark and Sweden (Figure 5.3). A combination of mortgage debt and pension income leads to increased incidence of poverty, in general, but we find only a slight increase in Denmark, Iceland and Sweden while in the Netherlands and Norway the effects are negligible.

**Figure 5.5: Relative contribution of the mortgage indebted to total poverty rate, cash income and income augmented with imputed rent**



Source: EU-SILC Users' database

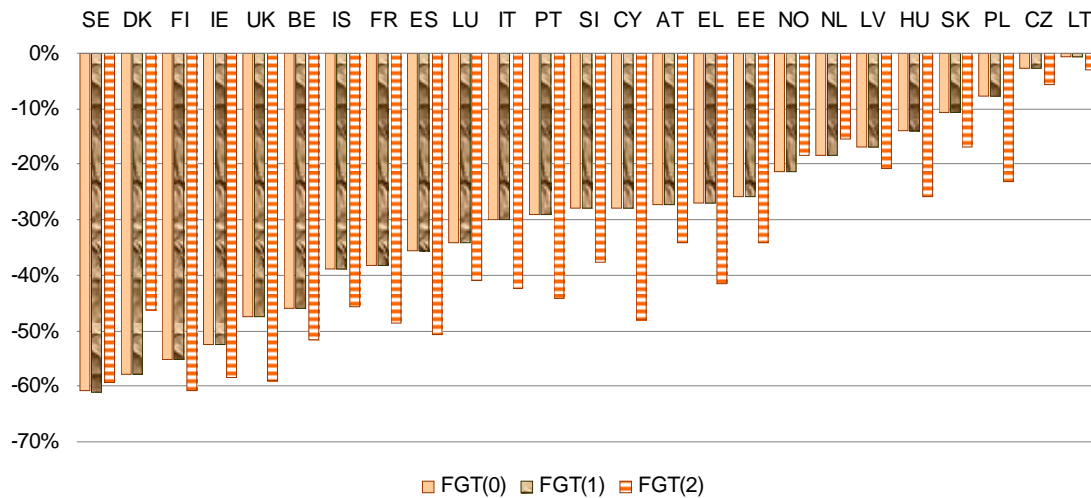
NB: Countries sorted according to relative contribution with augmented incomes

The increase in the relative contribution of this subgroup to the total headcount rate exceeds 5 pp in the Netherlands, Norway, and the United Kingdom, and increases somewhat in Hungary and Spain. The figure shows as well a marked trend away from poverty for the mortgage indebted in Sweden. In the Netherlands, the relative contribution rises from 25% to 41% and the poverty rate from 4.4% to 7.3% in this sub-group while the overall poverty rate remains unchanged. In the United Kingdom, the relative contribution rises from 20% to 30% and the poverty rate from 8.3% to 9.3% for the mortgage indebted while total poverty decreases by 5.3 pp from 19.1% to 13.8%.

## 5.2. Outright owners

Outright owners benefit more from imputed rents compared to other tenures (Figure 4.2), and this is also reflected in the poverty indices. Figure 5.6 shows the relative changes in the FGT poverty measures for the outright owners. All indices show a reduction in poverty: there are substantial relative reductions in the headcount rates (FGT0), and outright owners who remain poor experience less severe poverty as both their average distance to the poverty line (FGT1) and inequality among (FGT2) them decrease. Regarding outright owners, we see a drop in headcount poverty rates in all countries, while for indebted owners the pattern is considerably more varied.

**Figure 5.6: Relative change in the FGT poverty measures: outright owners**



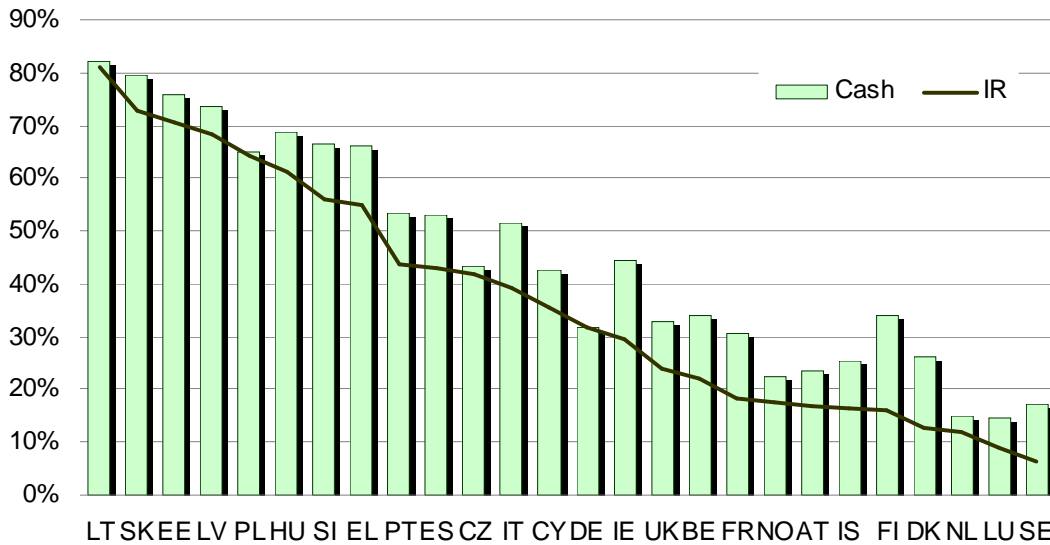
Source: EU-SILC Users' database

NB: Countries are sorted according to the change in the headcount rate (FGT0). No data from Germany

The effect of imputed rents on outright owners is more pronounced in Sweden, Denmark, Finland, Ireland, the United Kingdom, Belgium and Ireland, where all the indices fall by more than 40%. With respect to the headcount rate (FGT0), this means that poverty rates are nearly halved in many countries. For example in Sweden the poverty rate for outright owners falls from 12.3% to 4.8%; in the United Kingdom from 23.1% to 12.2%; and in France from 11.2% to 6.9%.

Outright owners contribute significantly to total poverty rates in Eastern and Southern European countries where home ownership rates are high (Figure 5.7). The relative contributions of outright owners to overall poverty rates range from around 80% in Lithuania to 14% in Luxembourg. When imputed rents are added, the relative contributions of outright owners to total poverty fall in all countries. Largest changes are observed in Finland, Ireland, Denmark, Sweden, Italy, France and Belgium while the effect is quite modest in many Eastern European member states and nearly non-existent in the Czech Republic and Lithuania. In Poland, for instance, the headcount rate of outright owners falls only from 18.9% to 17.5% and the contribution to the total poverty rate remains unchanged at around 65%.

**Figure 5.7: Relative contributions of the outright owners to total poverty rate, cash income and income augmented with imputed rent**



Source: EU-SILC Users' database

NB: Countries sorted according to relative contribution with augmented incomes

Poverty among elderly outright owners falls in many countries markedly and this subgroup contributes significantly to changes in poverty rates (see tables 5.2 and 5.3) even when the total poverty rate may remain unchanged, i.e. when the reduction is offset by the increased poverty rates of other subgroups. Given the low mortgage take-up rates among the elderly, it seems that it is the absence of mortgage indebtedness combined with low cash incomes that causes transitions in poverty status among owner-occupiers.

### 5.3. Reduced rent tenants

Social benefits in EU-SILC have been restricted to cash benefits but with imputed rents, an estimate of in-kind housing benefits is now included. The in-kind social benefit is the imputed rent of tenants paying less than the prevailing market rent, defined as the non-negative difference between imputed rental equivalence and the actual rental paid by the reduced rent tenant. We assume that the imputed rents of reduced rent tenants mostly represent in-kind social housing benefits<sup>22</sup>.

<sup>22</sup> This tenure, however, covers more than just social housing and consequently more than just in-kind social benefits in the housing function, namely when renting at a reduced rate from an employer, or those in accommodation where the actual rent is fixed by law. Furthermore, national definitions of the “reduced rent” sector are accepted as well. Imputed rents based on an employment contract should be included in wages and salaries in kind.



There is no uniform definition of social housing for the European countries. The EU-SILC definition is based on the reduced rent level. The definition of social housing could be based on ownership (non-profit organization, central or local government), the purpose for which the housing is provided (e.g. student housing), restricted access (means testing), or the rent level. Rents on dwellings may be close to market rents even when owned by government or non-profit institutions; further difficulties arise because private sector rents may be regulated (Juntto & Reijo, 2010). The estimation may not adequately capture quality differences in the dwellings either.

Despite the caveats, we proceed to analyse imputed rents in those countries where the population share in this group exceeds 5% in the EU-SILC data. The shares of tenants paying reduced rent are highest in the United Kingdom (18%), the Czech Republic (18%), Finland (16%), France (15%), and Ireland (12%). There are no households at all in this group in the Netherlands and Denmark; all tenants have been coded as paying the prevailing market rent.

Given the rent-based EU-SILC definition of social housing, the housing costs of free-market tenants obviously should be higher than those of reduced rent tenants, at least after controlling for quantity, quality and location factors. Linear regressions with a dummy for reduced renters suggest this to be true in all countries, although the magnitude of rent reduction varies greatly between countries. Table 5.4 shows the simple averages of the total monthly housing costs of the two tenures, without any controls, for the restricted set of ten countries analyzed here. The relative difference is substantial in Ireland, the United Kingdom, Portugal and Belgium, while it is smaller in the other countries and nearly non-existent in Finland and France.

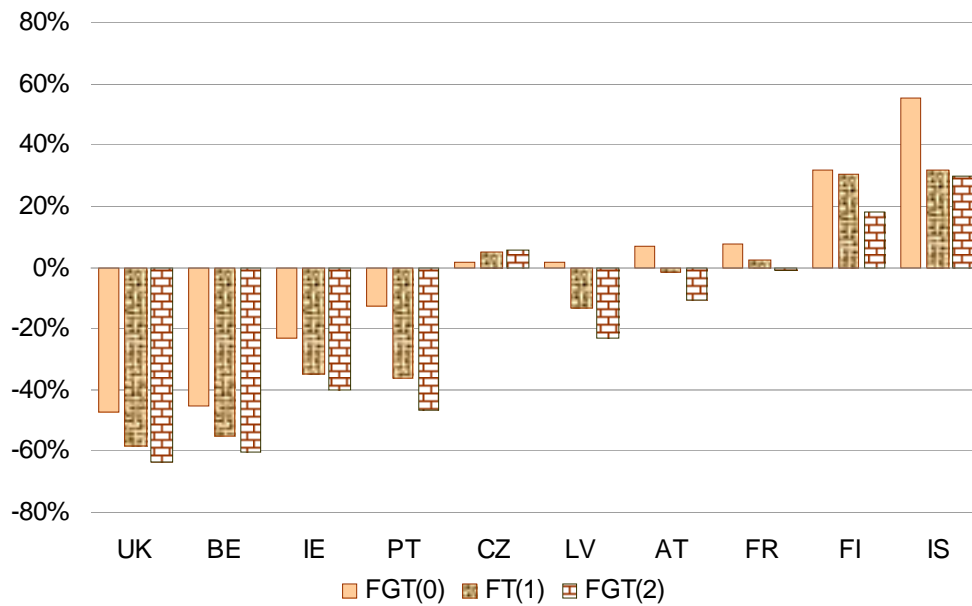
**Table 5.4 Basic characteristics of reduced rent tenants**

	AT	BE	CZ	FI	FR	IE	IS	LV	PT	UK
Population share, %	6.4	7.1	17.8	15.8	15.3	12.1	6.4	6.3	7.6	17.5
Structure:										
% elderly	32	53	34	20	30	35	21	11	22	24
% families with children	17	24	26	17	25	49	33	32	25	26
% others	58	44	38	58	51	36	45	41	30	37
Housing costs , % of housing costs of free-market tenants	83	69	76	95	78	41	67	73	59	59
At-risk-of-poverty rate, cash income	16.7	35	17.4	26	17.9	44.8	20.7	33.6	29.7	38.2
At-risk-of-poverty rate, augmented income	17.8	19.2	17.7	34.3	19.2	34.6	32.2	34.1	26	20.2
Change in mean income,%	4.3	23.0	0.6	2.6	9.6	14.4	0.0	8.5	22.8	29.9
Change in within group inequality (MLD), %	-8.4	-28.0	-0.2	-8.9	-6.5	-20.6	0.0	-4.9	-19.6	30.3

Source: EU-SILC Users' database

Figure 5.8 shows relative changes in the headcount rates and the poverty gap measures due to imputed rents for this subgroup. The average distance from the poverty line as well as inequality among the poor reduced rent tenants falls in the United Kingdom, Belgium, Ireland, Portugal, and to some extent in Latvia. In Finland and Iceland, all poverty measures show increased poverty for this group because of imputed rents. In the United Kingdom, the at-risk-of-poverty rate decreases by 18 pp (from 38.2 to 20.2%). In Finland and Iceland, poverty increases because of no imputation (Iceland) or only small changes in mean incomes in this group compared to owner-occupiers (Finland).

**Figure 5.8: Relative changes in the FGT poverty measures (%) in EU-SILC 2007, tenants paying reduced rent**

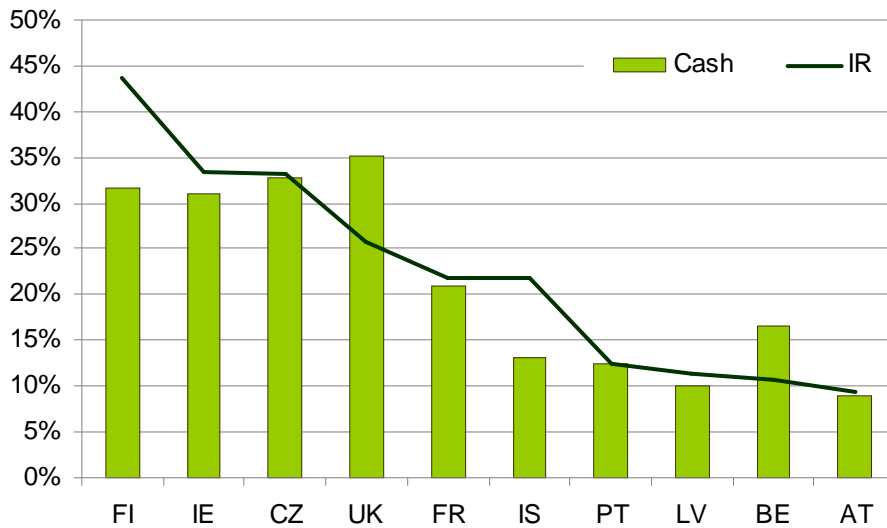


Source: EU-SILC Users' database

NB: Countries sorted by the change in headcount rate (FGT0). Only countries where population share exceeds 5%

Reduced rent tenants contribute roughly one third to the total poverty rate in the United Kingdom, the Czech Republic, Ireland and Finland, and around one fifth in France (Figure 5.9). When imputed rents are added, the contribution drops in the United Kingdom and Belgium, remains at the same level in most countries but increases in Finland and Iceland where little or nothing was imputed despite the relatively large size of this population subgroup.

**Figure 5.9 Relative contribution of the reduced rent tenants to total poverty rate in EU-SILC 2007, cash income and income augmented with imputed rent**



Source: EU-SILC Users' database

NB: Countries sorted according to relative contribution with augmented incomes. Only countries where population share exceeds 5%

In the United Kingdom, the total poverty rate was 19.1% with cash incomes, and the contribution of reduced rent tenants of this was 6.3 pp (33%). Including imputed rents decreased the total poverty rate to 13.8% of which 3.6 pp (25.7%) was the contribution of reduced rent tenants. In Belgium, the total poverty rate decreased from 15.1% to 12.7%, and the contribution of reduced rent tenants to this fell from 2.5 pp (17%) to 1.4 pp (11%).

## 5.4. Rent-free tenants

According to the EU-SILC definition, households that do not have to pay rent should include cases where the accommodation comes with the job or is provided rent free from a private source, for example from another household<sup>23</sup>. Table 5.5 also shows the basic characteristics of rent free tenants for those ten countries where the population share in this group exceeds 5%: Austria, Greece, Spain, Cyprus, Portugal, Italy, Estonia, Hungary, Latvia and Poland. In some countries, this category covers significant proportion of population: in Poland 34% and in Cyprus 15% of households are categorised as having rent-free accommodation<sup>24</sup>. In most countries, the share is either low or non-existent.

**Table 5.5: Basic characteristics of rent free tenants in EU-SILC 2007**

	AT	CY	EE	ES	EL	HU	IT	LT	PL	PT	SI
Population share, %	5.7	15.1	7.3	5.9	5.6	5.2	9.1	7.8	34.0	8.3	11.4
Structure:											
% elderly	57	53	34	20	30	35	21	11	22	24	17
% families with children	14	22	23	37	39	32	38	58	38	48	57
% others	30	25	43	43	31	33	41	31	40	27	26
Housing costs, % of free-market tenants	52	25	42	23	35	104	33	33	80	31	42
At-risk-of-poverty rate, cash income	20.4	33.8	35.0	30.2	21.6	18.6	29.2	34.2	14.8	25.2	12.6
At-risk-of-poverty rate, augmented income	16.4	27.1	25.3	20.5	15.2	17.1	22.7	34.2	13.4	19.1	9.0
Change in mean income, %	10.9	21.2	22.4	22.1	20.5	28.9	18.8	-0.3	14.8	25.5	12.3
Change in within group inequality (MLD), %	-20.4	-23.2	-22.1	-37.3	-23.4	-13.4	-20.9	13.5	-14.3	-19.2	-19.6

Source: EU-SILC Users' database

<sup>23</sup> When Eurostat calculates indicators, this category is combined with the owner category. We consider it as a separate group both to study it in its own and because of possible comparability problems with the classification.

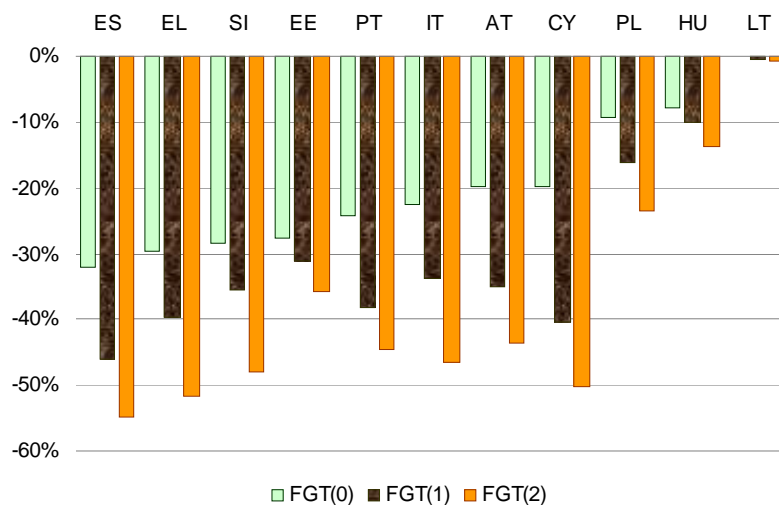
<sup>24</sup> Given that this group is quite large in many Eastern and Southern European countries, it would be good to know to what extent do these imputed rents represent inter-generational transfers, e.g. cases where the elderly live in a dwelling owned by their children, or students live in dwellings owned by their parents, and whether this kind of tenure in fact is comparable e.g. in Poland compared to Cyprus or Italy. For example, the high share of population in rent-free dwellings in Poland may be explained by the inclusion of households with full or restricted tenure rights to co-operative dwellings in this category, and classifying as owners only those who have absolute ownership of the dwelling.

Although the rent free tenants in the EU-SILC data might not pay rent, they still have housing costs in most countries. While these costs in most countries are considerably lower than those of free market tenants, the difference is quite small in Poland and the same in Hungary. Therefore, caution is warranted when interpreting the results. There are no easily discernable patterns in the types of household that live rent-free. In Austria and Cyprus, more than half of the households in this group are elderly. In Slovenia, Portugal and Lithuania around half or more are households with children, and the shares are relatively high in Greece, Italy and Poland as well. Employment rates are not significantly different from tenants paying full rent; we are unable to see from the data whether the dwellings have been provided rent-free by employers.

Without imputed rents, at-risk-of-poverty rates in this group are either on the same level with free market tenants (Austria, Greece, Hungary, Italy, Portugal, Spain), at clearly lower level (Poland, Slovenia), or at clearly higher level (Cyprus, Estonia, Lithuania). With imputed rents, at-risk-of-poverty rates are lower than those of free market tenants in all countries except Lithuania.

In relative terms, we find quite significant changes (at least -20%) in all countries except in Poland, Hungary – where the housing costs of this group were around the same level with tenants paying prevailing market rent - and Lithuania (Figure 5.10). Average poverty gaps and squared poverty gaps decrease even more in relative terms, indicating that poverty among rent-free tenants is also less severe with imputed rents. In Spain, poverty rate among rent free tenants decreases by 10 pp, from 30% to 20% while the poverty rate of tenants paying prevailing market rent increases by more than 8 pp, from 29% to 37%.

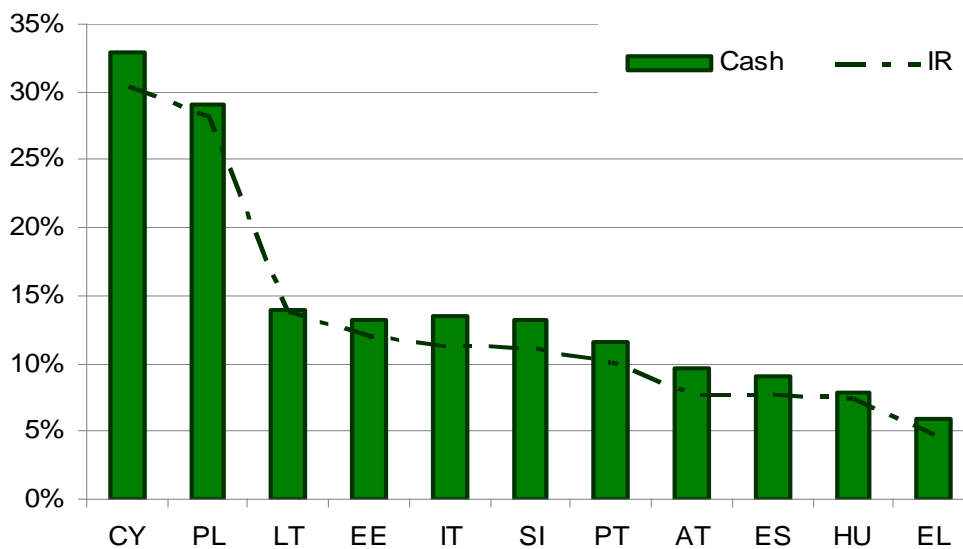
**Figure 5.10: Relative changes in the FGT poverty measures (%) in EU-SILC 2007, rent-free tenants**



Source: EU-SILC Users' database

The relative contribution of rent-free tenants to the total poverty rate is significant in Poland and Cyprus (Figure 5.11) where its share is around one third, reflecting the population size of the subgroup. The households in this group in Cyprus seem to be dominated by the elderly, which is not the case in Poland. The relative contributions decrease very slightly in all countries, and in absolute terms poverty rates and contributions fall.

**Figure 5.11: Relative contribution of the rent free tenants to total poverty rate in EU-SILC 2007, cash income and income augmented with imputed rent**



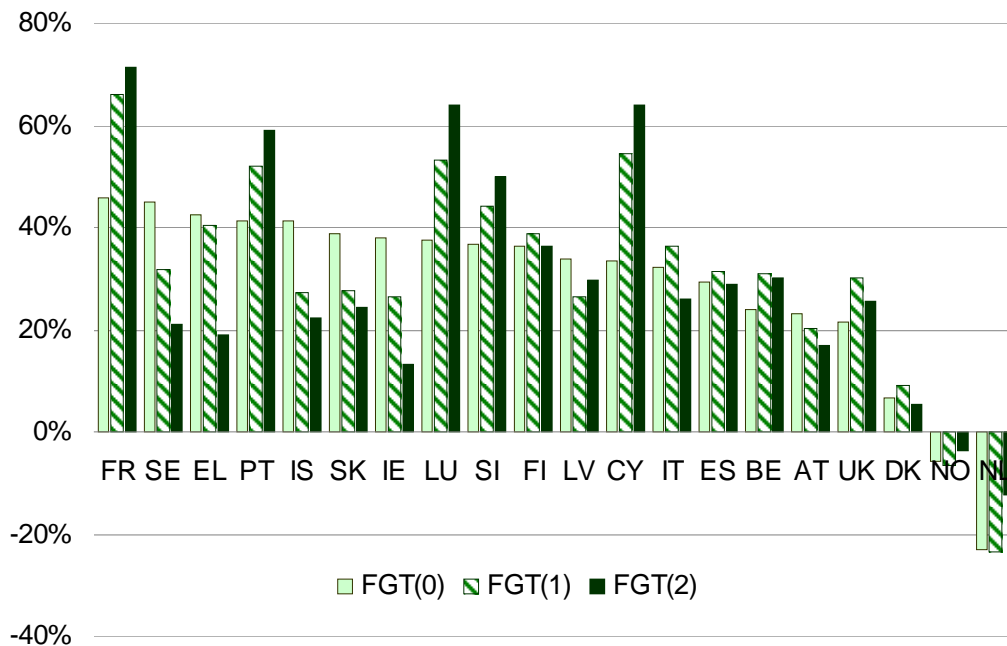
Source: EU-SILC Users' database

NB: Countries sorted according to relative contribution with augmented incomes

### 5.5. Tenants paying prevailing market rent

Tenants who pay the prevailing market rent do not have rents imputed to them but their relative position with respect to other population subgroups changes. Figure 5.12 shows the relative changes in the headcount (FGT0) and poverty gap measures for free market tenants. In all countries except Norway and the Netherlands, tenants paying prevailing market rent experience more poverty and more severe poverty, i.e. their average distance from the poverty risk line increases. The increases are substantial also in terms of percentage points (pp). Substantial changes in headcount rates (+ 10 pp) are observed in France, Italy, Luxembourg, and Portugal, excluding countries where the population share in this group is below 5%. For example, in France the poverty rate in this group increases from 23.7% to 34.5% while the total poverty rate remains almost unchanged.

**Figure 5.12: Relative changes in the FGT poverty measures (%) in EU-SILC 2007, tenants paying prevailing market rent**



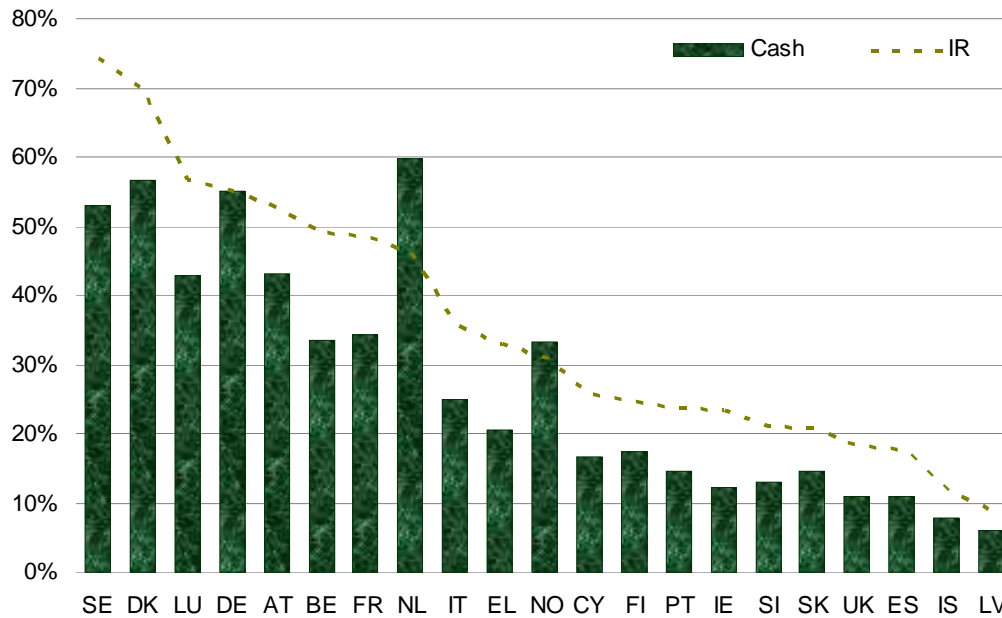
Source: EU-SILC Users' database

NB: Countries sorted by change in the headcount rate (FGT1). Only countries where population share exceeds 5%

The relative contribution of this group increases along with the increases in poverty rates when imputed rents are added to income. The contributions vary quite a bit, reflecting the wide variation in the population shares of free market tenants rather than variation in poverty rates. The differentiation of tenants between free market tenants and reduced rent tenants is difficult, so the contributions reflect apparent comparability problems with the data: for example, in Denmark and the Netherlands all tenants are categorized as free market tenants, and consequently the contribution of this group to total poverty exceeds 50% (Figure 5.13).



**Figure 5.13: Relative contributions of free market tenants to total poverty rate in EU-SILC 2007, cash income and income augmented with imputed rent**



Source: EU-SILC Users' database

NB: Countries sorted according to relative contribution with augmented incomes. Only countries where population share exceeds 5%

## 6. Imputed rent and indicators of monetary and non-monetary deprivation

### 6.1 The impact of the augmented income concept on selected deprivation indicators

In this section, we analyse the impact of the augmented income definition on consistency between indicators of monetary and non-monetary deprivation. To examine the effect of the income concept change on non-monetary indicators of material deprivation among the population at risk of poverty, the following dimensions of non-monetary deprivation are analysed: material deprivation, housing deprivation, overcrowding, and quality of the neighbourhood. The first three are included in the EU list of structural or context indicators.

The income concept change leads in most countries to better consistency of income poverty status and non-monetary deprivation indicators. Some of the outright owners or tenants with reduced rents who fall under the relative cash income-based poverty line are repositioned above the new poverty threshold as imputed rents are added to disposable income. According to deprivation indicators, they are better-off than the remaining population at risk of poverty. The remaining population who are cash and imputed rent poor are, evidently, more deprived if examined by non-monetary indicators. Results from EU-SILC data generally show that this is the case, though not for all countries.

As the overall deprivation rate differences are rather small among the poor defined either way, we choose to illustrate the change in deprivation rates among the population who remain at risk of poverty after the income concept change. To visualize clearly how the concept change transforms the composition of the population at risk of poverty, we compare deprivation rates in the cash and imputed rent poor population to the deprivation rates in the cash poor population.

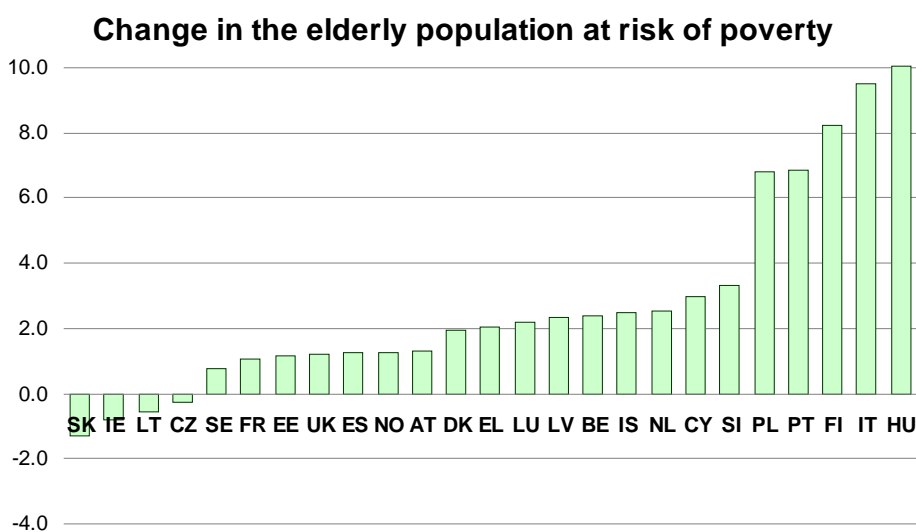
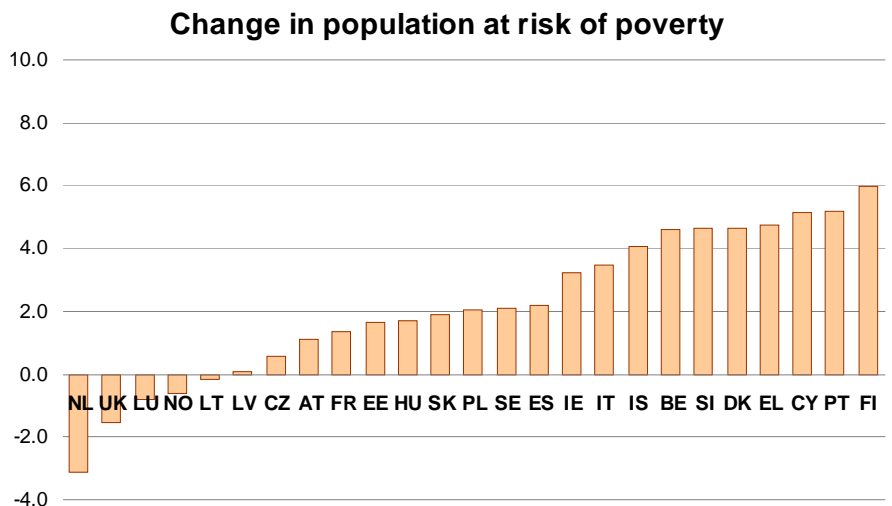
*The material deprivation rate*, defined as enforced lack of at least three out of nine material deprivation items in the 'economic strain and durables' dimension<sup>25</sup>, is generally higher among the population at risk of poverty when imputed rent is included in the income concept. Figure 6.1 illustrates the effect of the income concept change on the material deprivation rate. The rise in the material deprivation rate in the population at risk of poverty indicates that the concept change adds consistency between monetary and material deprivation: imputed rents push materially less deprived owners and tenants above the new poverty threshold and leave more deprived persons under it. This is the case especially in Cyprus, Portugal and Finland (Figure 6.1), but does not hold true for the highly indebted Netherlands, the United Kingdom, Luxembourg, and Norway. There is no effect in Lithuania and Latvia. The effect is most pronounced in the elderly population, where Hungary, Italy, Finland, Portugal, and Poland stand out in particular.

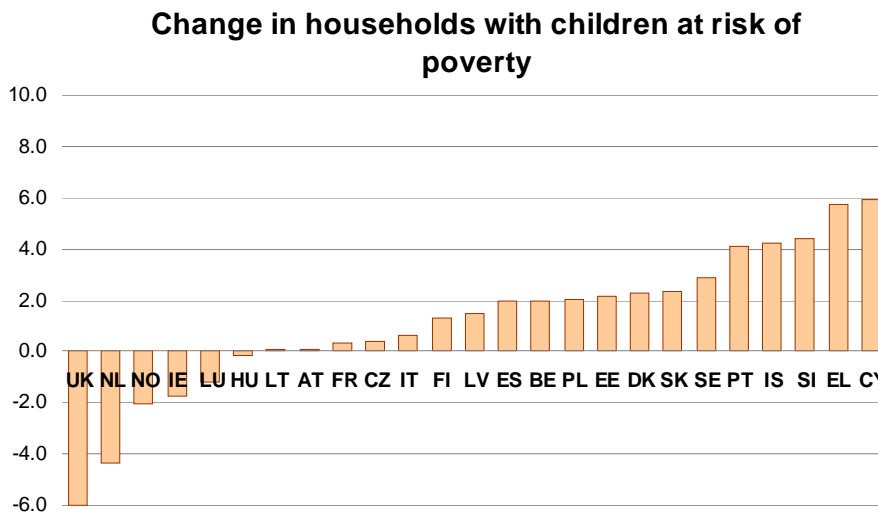
In Norway and the Netherlands the addition of imputed rent in the income concept has a different effect in the elderly population than in the population living in households with children. The elderly population remaining under the new at-risk-of-poverty threshold are materially more deprived than the elderly only cash poor population, while the opposite is true in households with children. The elderly and families with children are at opposite ends of their housing careers, and negative imputed rents are more widespread in the early stages of family formation. We tentatively conclude that negative imputed rents should be interpreted as an investment to living standards through indebtedness, indicating immediate possession of material resources rather than a lack of them. As a consequence of negative income items, strongly indebted, but materially not deprived, households fall under the new threshold, decreasing the deprivation rate of the population at risk of poverty inclusive of imputed rent. (See Section 5.1. on sources and connections to cash income levels of negative imputed rents.)

---

<sup>25</sup> The nine items considered are 1) arrears on mortgage or rent payments, utility bills, hire purchase instalments or other loan payments; 2) capacity to afford paying for one week's annual holiday away from home; 3) capacity to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day; 4) capacity to face unexpected financial expenses (set amount corresponding to the monthly national at-risk-of-poverty threshold of the previous year); 5) household cannot afford a telephone (including mobile phone); 6) household cannot afford a colour TV; 7) household cannot afford a washing machine; 8) household cannot afford a car and 9) ability of the household to pay for keeping its home adequately warm.

**Figure 6.1: Change in material deprivation rate among the population at risk of poverty when imputed rent is brought into the income concept; general population, the elderly and population in households with children**





Source: EU-SILC Users' database

NB: Small number of observations in DK, IE, IS, LU, NL, NO, SE

Reading note; in the lowest graph presented above, it can be read that in the United Kingdom persons belonging to households with children and remaining under the at-risk-of-poverty threshold after imputed rent was added to the income concept, are materially better off than are the responding, but only cash poor population. On the other end of the graph, the results in Cyprus indicate that the population remaining in poverty risk after the augmentation of the income concept are materially worse off than those who are only cash poor

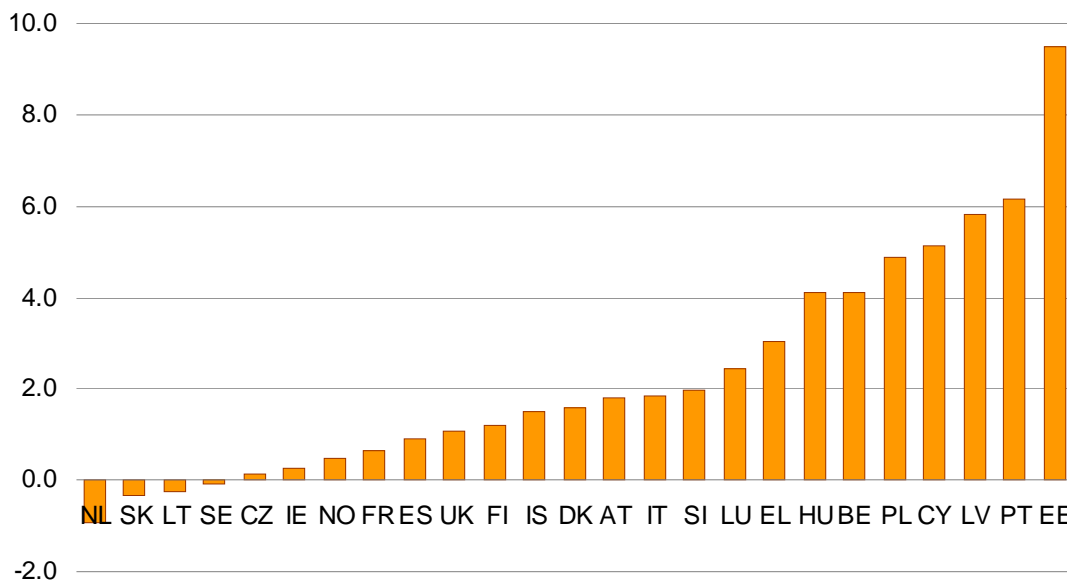
*Housing deprivation* is defined as enforced lack of any of the four items in the dimension 'Housing'<sup>26</sup>. The established indicator is composed of ten distinct combinations of the four items. This (secondary) indicator can be interpreted as the physical quality of the dwelling, indicating the existence of facilities to keep dwelling conditions healthy and hygienic.

Instead of all the ten measures of housing deprivation, we present a simplified version of it, namely, the change of rate of **deprivation for at least one of the four housing items** among the population at risk of poverty (Figure 6.2).

For example, in Estonia experience of housing deprivation is almost 10% higher in the population at risk of cash and income poverty than in the only cash poor population. As expected, including the imputed rent in the income concept increases the consistency between housing deprivation and income poverty: housing deprivation increases among the income poor when imputed rents are added to income; this holds true in all countries except the Netherlands, Slovakia, Lithuania and Sweden.

<sup>26</sup> The following housing deprivation items are considered: 1) leaking roof, damp walls/floors/foundations, or rot in window frames or floors; 2) no bath or shower in the dwelling; 3) no indoor flushing toilet for the sole use of the household; 4) dwelling too dark. The established indicator consists of the percentage of the population deprived of each housing deprivation item, and by number of items. See Appendix C for statistics.

**Figure 6.2: Change in rate of housing deprivation of one item of four among the population at risk of poverty when imputed rent is brought into the income concept**



Source: EU-SILC Users' database

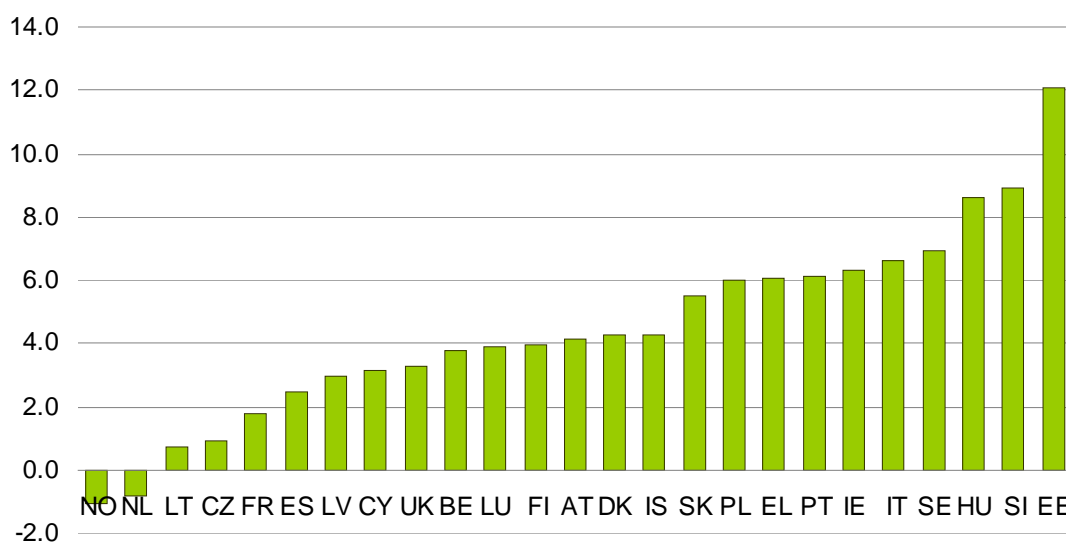
*Overcrowding*, a secondary indicator defined as the ratio of the number of rooms to the number of adults and age-sex-specified composition of children in the household<sup>27</sup>, is clearly higher<sup>28</sup> among the poor when imputed rents are added to income, with the exception of Norway and the Netherlands (fig. 6.3). The size of the dwelling and the estimated values of imputed rents are positively correlated – it is only to be expected that people who are able to afford to live in bigger dwellings are lifted above the new at-risk-of-poverty threshold. Speculatively, we may hypothesize that the cases of Norway and the Netherlands confirm the underlying connection: overcrowding is avoided if

<sup>27</sup> A dwelling is overcrowded if any of the criteria mentioned below is not fulfilled: one room for the household; one room for each couple; one room for each single person aged 18+; one room for two single persons of the same sex between 12 and 17 years of age; one room for two single persons of different sex between 12 and 17 years of age; one room for two persons under 12 years of age. In this analysis, a one-person household living in a one-room dwelling is considered to be an example of overcrowding.

<sup>28</sup> It is not possible to construct the normative overcrowding figure for all households. As the number of rooms was top coded to 6+, there were 562 households with 6+ rooms but who should have more than 6 rooms on the basis of the number of adults and the age- and sex composition of children. Moreover, there are 421 household-level observations with missing HH030 (number of rooms) in the data. Together, there are 421 + 562 = 983 household-level observations for which overcrowding cannot be established. The **weighted** number of **persons** is, however, negligible: only 0.8% (2.9 million) of all persons lived in dwellings of unknown size or dwellings with 6+ rooms and an overcrowding threshold higher than 6. Most of them did not consider their dwelling overcrowded: about 0.1% (0.5 million) lived in a dwelling of unknown size and considered it overcrowded. We have excluded the 'unknown dwelling size' observations from our analysis.

dwellings are bigger, but then the mortgage interest payments are also higher which may lead to negative imputed rents. Consequently, some of the indebted owners are repositioned under the new at-risk-of-poverty threshold.

**Figure 6.3: Change in overcrowding rate among the population at risk of poverty when imputed rent is brought into the income concept**



Source: EU-SILC Users' database

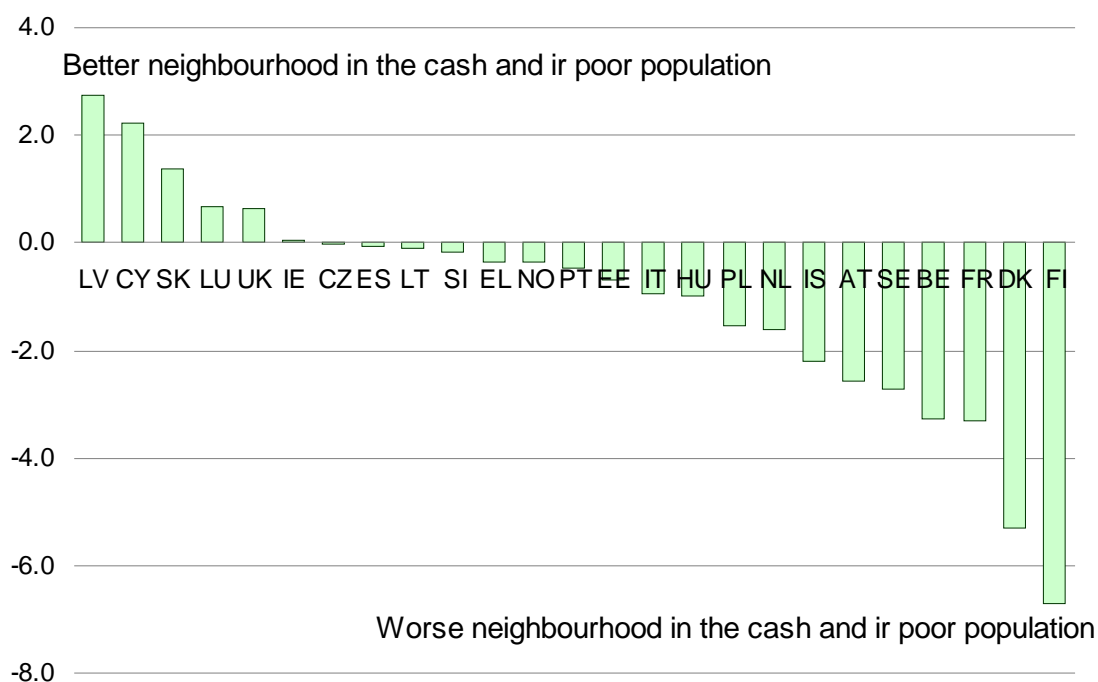
Other non-material deprivation indicators with respect to housing circumstances in the EU-SILC data concern *the quality of the area surrounding the dwelling*. Three variables have been collected to indicate deprivation of environmental quality: 1) noise from neighbours or from the street, 2) pollution, grime or other environmental problems, and 3) crime, violence or vandalism in the area. These variables measure the views of respondents whether the above-mentioned items are a problem in the area where the household lives.

The general prevalence of the three problems varies a lot, and the connection between income poverty and deprivation of environmental quality is not similar in all countries. While in most countries persons at risk of poverty have problems in their neighbourhoods more often than persons not at risk of poverty, the opposite pattern can be found in Cyprus, Estonia, Spain, Greece, Lithuania, Latvia, Portugal, and the United Kingdom in all or two out of the three variables. In these countries, persons not at risk of poverty express concerns more often than poor people.

Again, for brevity's sake, instead of presenting the three variables separately, we combine them to sum up our findings. We consider that seeing none of the three items as problematic is an indication of a better quality neighbourhood. In Figure 6.4 we show the change in the rates when imputed rents are added to disposable income. For example in Latvia, where those at risk of poverty are

less afflicted by environmental problems than the general population, persons who still are income poor after the imputed rent is added to income, fare better than cash poor persons. At the other extreme, in Finland the quality of neighbourhood factor is worse among the population that still is at risk of poverty after the imputed rent is added than in the cash poor population.

**Figure 6.4: Change in percentage of persons having no problems in their neighbourhood among the population at risk of poverty when imputed rent is brought into the income concept**



Source: EU-SILC Users' database

NB: In Latvia, persons who still are income poor after the imputed rent is added to income, fare better than cash poor persons, while the opposite is true in Finland

## 6.2 House rich - cash poor

For many households, ones' own home is both its most important asset and most important consumption good. The elderly, in particular, may consume more housing services than they actually need, e.g. by staying in the old apartment after the children have left or the spouse has passed away. There may be many reasons for this 'excess' consumption of housing services, but the main reasons are related to preferences, such as bequest motives, an aversion to moving, transaction costs, preferring more liquid assets to finance consumption, or having no need for additional non-housing consumption (Lefebure, Mangeleer & Van Den Bosch, 2006).



It must be recognised that most households have the option to decrease their housing consumption (and costs) to increase their non-housing consumption. This could be achieved by downsizing, i.e. moving to a smaller and cheaper dwelling. One option is to sell the home and become a renter; in this case the income measure would equal cash income and consumption expenditure would equal the actual rent paid. Another way is to turn the home equity into income with a reverse mortgage; in this case, the measured level of housing consumption does not decrease because the owner stays in the dwelling, but housing wealth is dis-saved to be able to increase non-housing consumption.

The house rich/cash poor phenomenon is significant for poverty indicators. Net imputed rent is an indicator of demand for housing services. Imputed rental equivalences measure the value of housing consumption, and even after relevant costs are deducted, the income measure inclusive of imputed rent may very well overstate the household's command over resources in these cases.

We define as house rich and cash poor those who are at risk of cash income poverty but not at risk of poverty inclusive of imputed rent and who consume housing services excessively relative to their needs and relative to their cash disposable income. To identify households that can be characterised as house rich/cash poor we analyse the ratio of imputed rents to disposable cash income in the cash poor population. The data in Figure 6.5 is set out according to the proportion of persons with positive imputed rent. In the Netherlands, Norway, Denmark and Sweden, persons with no or negative imputed rent form a majority of the population at risk of cash income poverty<sup>29</sup>. In proportion to disposable cash income, imputed rent adds typically less than 50% to it for those at risk of cash income poverty. On the other hand, more than 20% of the cash poor in Estonia, Spain, the United Kingdom, Portugal, Hungary, Greece and Italy live in dwellings with imputed rents higher than 50% of their household disposable cash income.

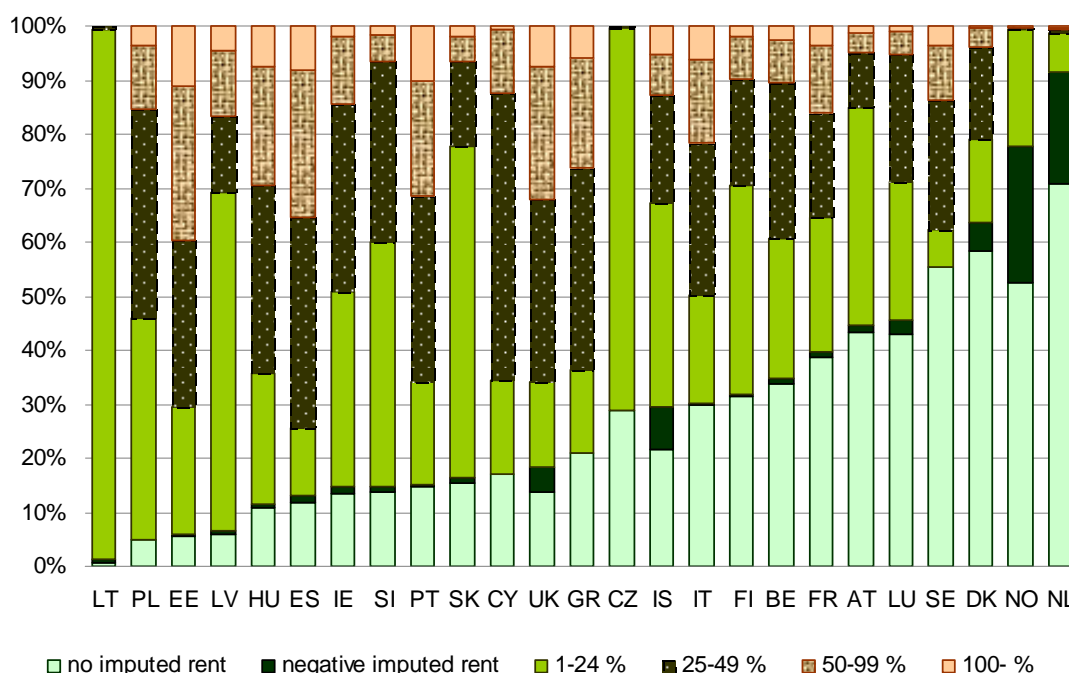
In most countries the house rich/cash poor problem seems to be rather marginal considering the small size of the group. In total, about 6% of persons at risk of cash income poverty in the countries involved here have their income doubled or more thanks to imputed rent (Figure 6.5). In addition, for some (1% of the cash poor population) the imputed rent is the only income.

However, relatively high shares of the population at risk of monetary poverty whose disposable income is at least doubled by imputed rent can be found in Estonia (13%), Portugal (10%), Spain (10%), the United Kingdom (8%), Italy (8%), Latvia (8%), Greece (8%) and Hungary (8%).

---

<sup>29</sup> Negative imputed rents again lead to reverse conclusions in some countries (especially in the Netherlands and Norway). See comments on negative imputed rents in Sections 3 and 5.

**Figure 6.5: Distribution of the ratio of imputed rent values to disposable cash income among cash poor population**



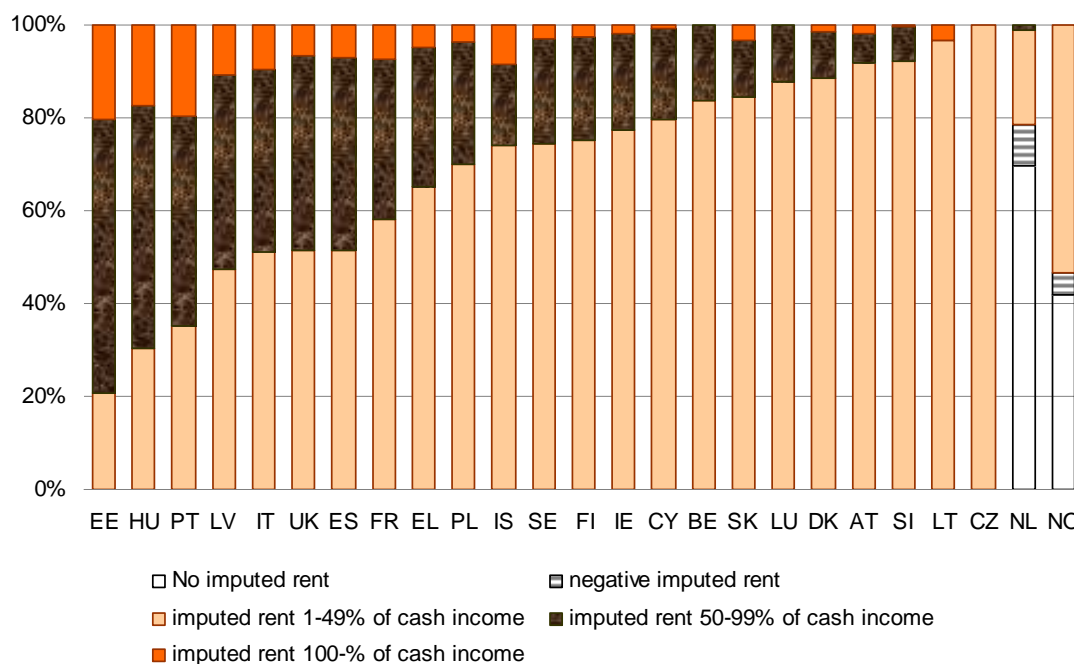
Source: EU-SILC Users' database

NB: In Estonia, 30% of population in cash poor households, receive no imputed rent or less than a quarter of their disposable cash income, while it is between a quarter and a half for another 30%, and for nearly 30% more than half of their disposable cash income. For a good 10% of Estonian cash poor population the imputed rent exceeds the disposable cash income

We focus next on those who are only cash poor, i.e. *on persons who exit poverty when imputed rents are added to income* (subgroup C in figure 5.1). To be able to evaluate the effect of imputed rent estimates on income level, we examine the dispersion of imputed rent values in this group (Figure 6.6).

Typically, the transition reflects reasonable increments to the income measure, i.e. additions less than 50% of cash income (note that we are looking at rather low cash income levels here). But in some countries (Estonia, Hungary, Portugal), a fifth of the transition is caused by cases of 100% increase in income – cases we classify as the house rich/cash poor (to a lesser extent also in Latvia, Italy, and the United Kingdom). In the Netherlands and Norway, market rent tenants are pushed above the new threshold by the mortgage indebted owner-occupants whose income falls when negative imputed rents are added to disposable income.

**Figure 6.6: Ratio of imputed rent to disposable cash income among the only cash poor**



Source: EU-SILC Users' database

NB: 1) few observations in LU, LT, CZ and IS. 2) In Estonia, 20% of persons who exit poverty after imputed rent is added in the income concept have imputed rent higher than their cash disposable income

To summarise the findings in chapter 6, in general the cash and imputed rent poor are more deprived than the only cash poor. The change in income concept increased the consistency of monetary poverty and non-monetary deprivation measures in most countries, but countries with the highest levels of housing indebtedness often show opposite trends in consistency of deprivation measures than less indebted countries, an obvious consequence of negative imputed rents. High mortgages reflect simultaneously higher dwelling standards and reduced capacity for other consumption. It is worth reflecting on how negative imputed rents should be treated in redefining the income concept.

A glance at the dispersion of the ratio between imputed rent values and disposable cash income shows that, in most countries excessive housing consumption (house rich/cash poor) is a minor problem, most concentrated in the elderly population. Looking at very high imputed rents, one might doubt whether the changes they induce in income positions reflect the value of housing services. Of those at risk of cash poverty rising above the new threshold with **positive** imputed rent, 17% are in the 4th or higher decile when imputed rent is added to income. Great leaps upward (3 steps or more) on the decile scale due to the addition of imputed rent can be found (over 10% of the group concerned) especially in Estonia, France, Hungary, Latvia, and Portugal.

The opposite movement caused by the negative imputed rents also may show some incredible changes in income positions. Of those falling under the new threshold from high cash income positions with **negative** imputed rents, 27% fall from disposable cash income deciles 4.–10., i.e. in 27% of the cases the fall is substantial. A majority of these observations come from two countries, from the Netherlands and the United Kingdom.

## 7. Imputed rents and alternative measures of the economic benefits of housing

Imputed rent as a concept reflects many facets of reality: the distribution of housing wealth, needs and preferences, credit constraints and borrowing opportunities, social and private and intergenerational transfers, and cultural and institutional differences. Although imputed rent is theoretically sound and logical in the asset-income-consumption framework, it is 'hardly intuitive or palatable to many people' (Citro & Michael, 1995, p.245). The estimation itself is often difficult, as noted by Van Der Laan (2006), 'non-monetary income components (notably imputed rent) cause measurement problems in any income statistics in any country at any point in time'.

The criticism may be answered by seeking conceptually alternative ways of measuring economic benefits from housing, or by seeking adjustments to the measurement of imputed rents in order to rectify some of the known shortcomings.

If the intention is to put different tenures on the same line in statistics, the first choice for the layman would probably be to deduct actual (out-of-pocket) housing costs from income. A common objection to this is that expenditures reflect preferences, and as a rule one should not deduct from income something that is used for satisfaction of individual preferences, i.e. for consumption. Furthermore, it would not be consistent with the above-mentioned framework and consequently not conceptually coherent with other statistical apparatuses such as the system of National Accounts or the Household Budget Surveys<sup>30</sup>.

This is not to say that income after housing costs is not a relevant measure for some purposes if the assumptions are made clear; for example, one would then essentially consider housing consumption expenditure as a necessity or 'compulsory' consumption which delimits non-housing consumption. This would not be disposable income but disposable income after housing costs. In this case, one would have to adjust (steepen) the equivalence scale since housing costs are a significant source of economies of scale in consumption. In practice, deducting something from income usually results in having negative values, and this certainly takes place if housing costs are deducted from cash incomes.

---

<sup>30</sup> Conceptually, a dwelling would be then treated as a consumer durable and not as an investment good. The EU-SILC definition is not fully aligned with the ESA95 definition because depreciation (consumption of fixed capital) is not taken into account.

The differences in housing costs reflect the needs, preferences, and constraints the household faces. An option would be to adjust housing costs so that we would only deduct costs which reflect needs. If a household prefers to have higher housing costs by having more floor space than needed, it should not appear as less well-off than a household which has just enough space with lower costs. A solution would be to determine or model 'need-based rental equivalence', i.e. fair acceptable housing costs which would then be deducted from disposable income. Normative estimates of such fair costs may already exist in many countries (see e.g. Citro and Michael 1995, p. 189-191). If only costs reflecting needs were deducted, a household which prefers to have higher housing costs by having more floor area would be as well-off as a household with the same income level but just enough space with lower costs.

For the owner-occupiers, disposable income which includes imputed rents is one way to integrate housing wealth into the analysis of economic well-being, and to take into account the fact that home equity may be available to smooth consumption when cash incomes fall. The standard analysis based on cash disposable income takes into account household wealth only through cash property income generated within the income reference period, in EU-SILC through interest, dividends and actual rents received by landlords. For the tenants, imputed rents extend the income concept to take into account (mostly) public in-kind benefits.

Consequently, imputed rents of owner-occupiers partially address the fact that income poor may not be asset poor. Rather than imputing capital income flows to households, a dual condition could also be imposed, defining poverty both on the basis of income and wealth. The easier part would be to find consensus on the asset poverty line to define who the asset poor are, as in Haveman and Wolff (2004). The difficult part would be to collect *valid* and reliable income and asset variables in the same multinational household survey for all European countries.

Regarding the measurement of imputed rents, it may be argued that in real life imputed rent cannot be used for non-housing consumption expenditure at all, and that its inclusion could overstate the capacity of the household to avoid deprivation and social exclusion (Marlier *et al*, 2006). Excessive consumption of housing services may be a problem (the house-rich/cash poor problem described earlier) but this problem should not be overstated. In any case, the results in this paper suggest that income which includes imputed rents is a more suitable income concept for poverty analysis than the current income concept.

In our view, implicit rental income is available for consumption or saving, and is not restricted somehow to only housing consumption. If a tenant becomes an owner for whatever reason and ends up with lower housing costs, she can use that money for saving or consumption any way she likes. A tenant who finances the dwelling with a sizable mortgage has to service the debt but is also choosing to save; her net worth will increase with every instalment, although

this saving may feel quasi-compulsory and increases the burden of housing costs (debt service to income ratio). Likewise, getting access to social housing, perhaps means-tested does save in housing costs; this saving can be used for other purposes.

If it is thought that imputed rents do not fully represent additional money that is available for other consumption but are only added to offset differences in housing costs, imputed rents could be capped to reflect this. This approach is suggested e.g. by Citro and Michael (1995, p. 246) and Ruggles (1990). This discussion seems to be relevant only for the income account since the households actually are consuming the housing services, sometimes excessively relative to their needs and to their incomes. The results for cash poor/house rich phenomenon would actually suggest that such capping could be considered as automated editing of a rather marginal number of outlying values. (See Sauli and Törmälehto (2010) for an exercise in capping the value of imputed rent using the threshold of overcrowding as a cut point.)

The difficulty of estimation is probably the main argument against including imputed rents. While comparability of the data is addressed e.g. by Eurostat (2009), the sensitivity of the results to the different estimation methods should be verified, along the lines of Frick et al. (2008). To our knowledge this has not been done using the full EU-SILC. The estimation is sensitive both with regard to the models and the underlying data used in the models. It is not obvious that the rental equivalence method is the optimal choice in view of cross-country comparability of income particularly when non-subsidized rental markets are small in a number of countries. The capital market approach is less data intensive and more straightforward to apply when only measurement of income is concerned, so this approach should be considered at least as a benchmark to the current results.

In addition to issues with the underlying data, the estimation is complicated by the different institutional features of housing markets, affecting both the delineation of the different tenures and the valuation of housing services, for instance, when rents are regulated. Furthermore, the estimation of opportunity costs of housing assumes that rental housing markets exist and that housing markets as a whole are essentially frictionless, while in fact the rental markets may be very thin and have constant excess demand so that the housing services become valued at supply prices.

Comparability in time is another aspect which should be addressed in the future. The snapshot of the effects provided in this paper should be supplemented by a time series analysis once more data become available. This is important because the income reference year 2006 or 2007 coincides with the end or near-end of substantial rises in dwelling prices and mortgage indebtedness in many countries, and does not include the impacts of the economic crisis of 2008-2009 which lead to substantial decreases in dwelling prices and interest rates. The estimation methods are related to prices in

housing markets (rents and sale prices), and their sensitivity to changes in these prices should be analyzed in the future.

This leads us to conclude that alternative measures of economic benefits of housing should be tested, the most prominent candidate being cash disposable income after housing costs. In doing so, the assumptions and possible implications for the horizontal equity of any alternative concepts should be made clear as well. The measurement of imputed rents could be improved, with improved harmonization and attention to unreasonably large estimates the practical way forward.



## 8. Summary and conclusions

Imputed rent is not only one of the most significant income components of disposable income, as has long been known from National Accounts, but has also significant distributional consequences. Imputing implicit rents to households is a sort of mass imputation on a European scale: overall, nearly 80% of households in Europe either owned their main residence or had their rent set below the prevailing market rent.

This paper has described the effects of imputed rents on income inequality, income poverty, and non-material deprivation.

First of all, there was wide variation in changes in mean incomes when imputed rents were added to income, ranging from nearly -8% in the Netherlands to more than 23% in Hungary. With regard to results on *income inequality*, imputed rent decreased inequality in all countries except Norway and the Netherlands. The main beneficiaries were outright owners, both in terms of increase in income and reduction in within-group inequality. Correlated with this, the income level of the elderly generally increased more than that of other household types but there were significant differences between countries.

While the changes in inequality were substantial in some countries and high inequality countries generally moved closer to medium and low inequality countries, the clusters of countries and country rankings did not change significantly. EU-wide inequality decreased, and there was a decrease in inequality both within and between countries.

Income-based measures of the at-risk-of-poverty rate generally decreased, notably so in the United Kingdom, Ireland, Spain and Estonia, or remained more or less unchanged in a few countries. There were large changes within the population subgroups, with substantial decreases in the headcount rates of the elderly and increases for the free-market tenants, while the changes for the mortgage indebted were quite mitigated, reflecting the fact that the mortgage indebted on average are positioned relatively high in the cash income distribution. Apart from the substantial relative reductions in headcount rates, distances to the poverty line and inequality among the poor generally decreased as well.

We assumed that rents imputed to reduced rent tenants mainly represent in-kind housing benefits from social housing. Without imputed rents, reduced rent tenants contributed roughly one third to the total poverty rate in Finland, Ireland, the Czech Republic and the United Kingdom and around one fifth in France. When imputed rents are added, the contribution changed somewhat in Finland and the United Kingdom. The imputed rents of tenants who do not pay rent (but have housing costs in most countries) may represent the effects of inter-generational transfers, among other things. This group is especially important in size in Poland. Imputed rents decreased poverty but the relative contributions changed only slightly.

While nothing is imputed to tenants paying prevailing market rent, their relative poverty indices decline in all countries except the Netherlands and Norway. The contribution of this group to total poverty is significant except in Eastern and Southern Europe, reflecting the population shares as well as high poverty rates. As with other tenant groups, there seem to be problems with the categorization of tenant and households, and thus the results are not fully comparable.

Examining the *change in deprivation rates* before and after the inclusion of imputed rent in income we found that in most countries the change is towards a better consistency between income inclusive-of-imputed-rent poverty and other deprivation indicators. The cash and imputed rent poor generally are more deprived than the only cash poor.

The most conspicuous increase in consistency is found in the connection between *material deprivation* and risk of poverty, particularly in the elderly population and to a lesser extent in households with children. The material deprivation rate increased except in countries which are highly mortgage indebted (UK, NL, NO, IE). *Housing deprivation* shows a similar trend: there is more housing deprivation among the income poor when imputed rents are added to income. The *overcrowding* rate is clearly higher among the poor when imputed rents are added to income. There is more variation in an indicator we call *neighbourhood disadvantages*: in some countries the only cash poor are more disturbed by noise, pollution and disorders in their neighbourhoods, while in other countries the opposite is true.

Some *measurement issues* require further thought. These include the comparability of the tenure status variable, in particular the delineation of different subgroups of tenants, the treatment of negative imputed rents due to mortgage interest repayments, and the treatment of extreme values of imputed rents.

Interest repayments on mortgages result in a significant number of negative net imputed rents in a few countries, although these negative values generally do not result in negative disposable incomes. The highly indebted countries behaved differently in the analysis in most respects, e.g. mean incomes, income dispersion, income poverty, and linkage between income poverty and material deprivation. Further investigation is needed into whether the interest repayments are correctly measured in relation to gross imputed rents, and whether the decline in incomes seen in the highly indebted countries gives a correct picture of changes in economic resources. The common practice simply of setting negative imputed rents to zero would need to be justified as well; in our view there is no theoretical basis for doing that.

Generally speaking, in most countries the house rich/cash poor seems only a marginal problem considering the small size of the group. About 6% of persons at risk of cash income poverty in the countries involved had their income doubled or more thanks to imputed rent. In addition, for some (1% of the cash poor population) the imputed rent was the only income. Although excessive imputed rents seem to be a marginal issue in general, there are variations between countries in this respect, and techniques such as capping of the estimates should be examined further.

We conclude that imputed rents are in our view income at the disposal of households for consumption or saving. However, given the large changes both in the level and in the distribution of current economic well-being it should not be incorporated into the EU-SILC income concept before further validation and studies of alternative measures of the economic benefits of housing.

## References

Brandolini, A (2007), 'Measurement of income distribution in supranational entities: the case of the European Union', in S. Jenkins and J. Micklewright (editors) *Inequality and Poverty Re-examined*, Oxford University Press, Oxford, pp. 62-83.

Citro, C. F., Michael, R. T. (eds.) (1995), *Measuring Poverty: A New Approach*, National Academy Press, Washington D.C.

Chapter IV. Housing Markets, Wealth and the Business Cycle in OECD Economic Outlook 2004:75.

Eurostat (2009), 'Impact study of inclusion/exclusion of non-monetary income components and extreme values', Document LC-ILC/33/09/EN prepared for the Working Group meeting of Statistics on Living Conditions in Luxembourg, 10-12 June 2009.

Frick, J., Grabka, M. M., Smeeding, T., Tsakloglou, P. (2008), 'Distributional effects of imputed rents in seven European countries', AIM-AP-Project 1 – Comparative report.

Haveman, R., Wolff, E. (2005), 'The Concept and Measurement of Asset Poverty: Levels, Trends and Composition for the US, 1983-2001', *Journal of Economic Inequality*, Vol. 2, No. 2.

Juntto, A., Reijo, M. (2010), 'Comparability of imputed rent In EU-SILC 2007 - Differences in variable definitions and methods concerning institutional housing. Methodological paper', Paper prepared for the conference in Warsaw, March 2010.

Kemeny, J. (1996), 'From public housing to the social housing market: Rental policy strategies in comparative perspective', Routledge, London.

Lerman, R.I., Yithzaki, S. (1995), 'Changing ranks and the inequality impacts of taxes and transfers'. *National Tax Journal* XLVIII (1): pp. 45-49.

Lefebure, M., Van Den Bosch, K. (2006), 'Elderly Prosperity and Home Ownership in the European Union: New Evidence from the Share Data', Paper prepared for the 29<sup>th</sup> General Conference of the International Association for Research in Income and Wealth, Joensuu, Finland, 20-26 August 2006.

Marlier, E., Atkinson A. B., Cantillon B., Nolan, B. (2007), *The EU and Social Inclusion: Facing the Challenges*, Policy Press, Bristol.

Nolan, B., Whelan, C.T. (1996), '*Resources, Deprivation and Poverty*', Oxford and New York: Oxford University Press/Clarendon Press.

Ruggles, P. (1990), '*Drawing the Line – Alternative Poverty Measures and Their Implications for Public Policy*', The Urban Institute Press, Washington, D.C.

Sauli, H., Törmälehto, V-M. (2010), 'The distributional impact of imputed rent', Marlier, E. and Atkinson, A.B. (eds.): *Income and living conditions in Europe*: pp. 155-178.

Van der Laan, P. (2006), 'The Income Concept in EU-SILC: Relevance, Feasibility, Challenges', Paper presented at the International Conference on Comparative Statistics on Income and Living Conditions, Issues and Challenges, Helsinki, 6-7 November 2006.

Wolff, E. N., Zacharias, A. (2009), 'Household wealth and the measurement of economic well-being in the United States', *Journal of Economic Inequality* 7: pp. 83-115.

Yemtsov, R. (2007), 'Housing Privatization and Household Wealth in Transition', UNU-WIDER Research Paper No. 2007/02, UNU-WIDER.

## Appendix

Table A.1: FGT poverty measures, total population

Country	Cash disposable income (DPI)				Augmented income (DPI+IR)			
	FGT(0)	FGT(1)	FGT(2)	Poverty threshold	FGT(0)	FGT(1)	FGT(2)	Poverty threshold
AT	0.1204	0.0299	0.0131	10945	0.1214	0.0287	0.0121	11726
BE	0.1513	0.0369	0.0174	10538	0.1271	0.0306	0.0136	11598
CY	0.1555	0.0352	0.0118	9590	0.1350	0.0259	0.0081	11204
CZ	0.0952	0.0214	0.0079	3251	0.0954	0.0213	0.0077	3310
DE	0.1519	0.0549	0.0811	10624	0.1634	0.0527	0.0583	12621
DK	0.1165	0.0420	0.1191	14004	0.1008	0.0401	0.1147	14427
EE	0.1937	0.0531	0.0251	2668	0.1540	0.0390	0.0162	3291
ES	0.1966	0.0627	0.0338	7200	0.1571	0.0431	0.0207	8523
FI	0.1300	0.0254	0.0094	11222	0.1238	0.0236	0.0081	12371
FR	0.1314	0.0305	0.0157	9938	0.1353	0.0296	0.0126	11276
EL	0.2028	0.0637	0.0354	6120	0.1789	0.0489	0.0236	7181
HU	0.1236	0.0289	0.0108	2361	0.1188	0.0251	0.0086	2976
IE	0.1750	0.0388	0.0154	13291	0.1252	0.0260	0.0104	14628
IS	0.0999	0.0231	0.0104	17214	0.0939	0.0206	0.0082	18671
IT	0.1983	0.0625	0.0358	9003	0.1839	0.0534	0.0271	10527
LT	0.1914	0.0603	0.0307	1966	0.1929	0.0597	0.0301	1991
LU	0.1353	0.0284	0.0097	17929	0.1408	0.0303	0.0101	20425
LV	0.2117	0.0650	0.0323	2010	0.1898	0.0555	0.0257	2257
NL	0.1022	0.0330	0.0334	10924	0.1019	0.0404	0.1052	10072
NO	0.1241	0.0480	0.0698	17257	0.1258	0.0503	0.0797	16450
PL	0.1734	0.0503	0.0231	2101	0.1621	0.0406	0.0162	2476
PT	0.1823	0.0509	0.0213	4564	0.1583	0.0381	0.0143	5516
SE	0.1083	0.0316	0.0176	11132	0.1115	0.0305	0.0155	12497
SI	0.1086	0.0259	0.0490	6092	0.0924	0.0208	0.0398	6773
SK	0.1051	0.0269	0.0120	2382	0.1025	0.0253	0.0106	2649
UK	0.1914	0.0548	0.0267	12572	0.1381	0.0359	0.0180	14120

Source: EU-SILC Users' database

**Table A.2: Inequality indices: Atkinson, Mean Log Deviation, Theil, squared coefficient of variation**

Country	Atkinson (0.5)		MLD		Theil		SCV	
	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	SCVDPI	DPI+IR
AT	0.059	0.057	0.123	0.117	0.125	0.120	0.328	0.311
BE	0.057	0.050	0.120	0.104	0.120	0.105	0.312	0.268
CY	0.078	0.066	0.153	0.128	0.181	0.152	0.645	0.518
CZ	0.055	0.054	0.109	0.107	0.120	0.118	0.348	0.341
DK	0.055	0.052	0.109	0.102	0.128	0.121	0.606	0.575
EE	0.096	0.078	0.199	0.158	0.221	0.178	0.930	0.687
ES	0.079	0.063	0.174	0.135	0.161	0.130	0.387	0.305
FI	0.061	0.058	0.119	0.113	0.138	0.130	0.508	0.452
FR	0.058	0.057	0.118	0.116	0.124	0.122	0.365	0.336
EL	0.097	0.085	0.204	0.175	0.207	0.182	0.587	0.504
HU	0.057	0.048	0.116	0.097	0.121	0.101	0.326	0.255
IE	0.082	0.070	0.169	0.143	0.182	0.155	0.607	0.503
IS	0.072	0.069	0.140	0.131	0.167	0.158	0.581	0.533
IT	0.085	0.075	0.182	0.159	0.177	0.156	0.481	0.403
LT	0.094	0.094	0.202	0.208	0.195	0.194	0.493	0.482
LU	0.062	0.057	0.125	0.116	0.133	0.122	0.367	0.325
LV	0.101	0.093	0.219	0.200	0.211	0.193	0.546	0.483
NL	0.065	0.066	0.127	0.129	0.147	0.151	0.504	0.571
NO	0.052	0.052	0.114	0.113	0.105	0.106	0.301	0.316
PL	0.086	0.075	0.180	0.154	0.185	0.161	0.530	0.445
PT	0.111	0.098	0.229	0.198	0.243	0.214	0.689	0.594
SE	0.049	0.046	0.105	0.099	0.100	0.093	0.267	0.236
SI	0.043	0.038	0.089	0.077	0.087	0.077	0.208	0.182
SK	0.052	0.048	0.107	0.098	0.109	0.101	0.278	0.254
UK	0.091	0.073	0.189	0.148	0.201	0.162	0.720	0.576

Source: EU-SILC Users' database

Table A.3: Spearman Correlation Coefficients, inequality indices, N = 26

	Atkinson		MLD		Theil		SCV		Gini	
	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR	DPI	DPI+IR
Atkinson DPI	1.00	<b>0.96</b>	0.99	0.94	0.98	0.95	0.78	0.67	0.99	0.95
Atkinson DPI+IR		1.00	0.95	0.98	0.95	0.99	0.77	0.74	0.95	0.98
MLD DPI			1.00	<b>0.96</b>	0.96	0.94	0.73	0.63	0.99	0.95
MLD DPI+IR				1.00	0.91	0.96	0.67	0.64	0.95	0.99
Theil DPI					1.00	<b>0.96</b>	0.87	0.77	0.96	0.91
Theil DPI+IR						1.00	0.81	0.79	0.94	0.96
SCV DPI							1.00	<b>0.93</b>	0.74	0.69
SCV DPI+IR								1.00	0.65	0.67
Gini DPI									1.00	<b>0.95</b>
Gini DPI+IR										1.00

Source: EU-SILC Users' database



Table A.4: Descriptive statistics, net imputed rents, all households

Country	% of all households (weighted)			Weighted quantiles (euro/household)						
	<0	=0	>0	P1	P10	Q1	Median	Q3	P90	P99
AT	1	33	66	-735	0	0	1 594	3 546	5 020	9 452
BE	2	23	75	-1 914	0	3	3 553	4 796	5 738	7 198
CY	1	13	87	0	0	3 397	5 315	6 919	8 337	10 358
CZ	0	10	90	0	0	57	131	235	366	783
DK	16	43	42	-8 963	-1 384	0	0	2 776	5 350	8 825
EE	1	6	94	0	480	899	1 519	2 403	3 239	6 729
ES	2	8	90	-1 270	0	3 129	4 369	5 448	6 445	9 339
FI	2	23	75	-1 003	0	11	2 658	4 947	7 335	14 699
FR	1	24	75	-427	0	0	3 516	6 265	9 207	19 579
EL	1	20	79	0	0	1 685	3 403	4 814	6 345	12 183
HU	1	6	93	0	537	1 196	1 814	2 505	3 078	4 480
IE	5	10	85	-6 653	0	3 190	5 313	6 938	10 281	13 647
IS	9	16	76	-7 056	0	168	3 695	7 828	12 279	21 219
IT	2	19	80	-814	0	2 357	4 649	6 399	8 085	12 083
LT	5	1	94	-1 245	20	29	39	99	252	399
LU	4	21	74	-5 013	0	0	6 748	9 730	12 942	22 896
LV	1	6	93	0	123	249	593	1 314	1 644	2 826
NL	40	47	12	-20 356	-7 790	-3 715	0	0	664	3 809
NO	46	24	30	-15 117	-6 657	-3 225	0	488	790	1 721
PL	0	5	94	0	469	801	1 154	1 565	2 069	3 234
PT	1	11	88	-33	0	1 746	2 910	4 656	5 946	14 549
SE	0	36	64	0	0	0	3 947	5 474	6 918	10 293
SI	1	7	92	-405	874	1 669	2 324	3 021	3 021	5 799
SK	2	9	89	-300	0	369	638	1 061	1 762	3 267
UK	10	10	80	-10 943	-98	1 500	4 965	7 394	10 211	15 363

Source: EU-SILC Users' database



European Commission  
**The distributional impact of imputed rent in EU-SILC**

Luxembourg: Publications Office of the European Union

2010 — 69 pp. — 21 x 29.7 cm

ISBN 978-92-79-16759-1  
ISSN 1977-0375  
Doi:10.2785/56240  
Cat. No KS-RA-10-023-EN-N

**Theme: Population and social conditions**

**Collection: Methodologies and working papers**

## **How to obtain EU publications**

### **Free publications:**

- via EU Bookshop (<http://bookshop.europa.eu>);
- at the European Union's representations or delegations. You can obtain their contact details on the Internet (<http://ec.europa.eu>) or by sending a fax to +352 2929-42758.

### **Priced publications:**

- via EU Bookshop (<http://bookshop.europa.eu>).

### **Priced subscriptions (e.g. annual series of the *Official Journal of the European Union* and reports of cases before the Court of Justice of the European Union):**

- via one of the sales agents of the Publications Office of the European Union ([http://publications.europa.eu/others/agents/index\\_en.htm](http://publications.europa.eu/others/agents/index_en.htm)).



ISBN 978-92-79-16759-1



9 789279 167591



Publications Office