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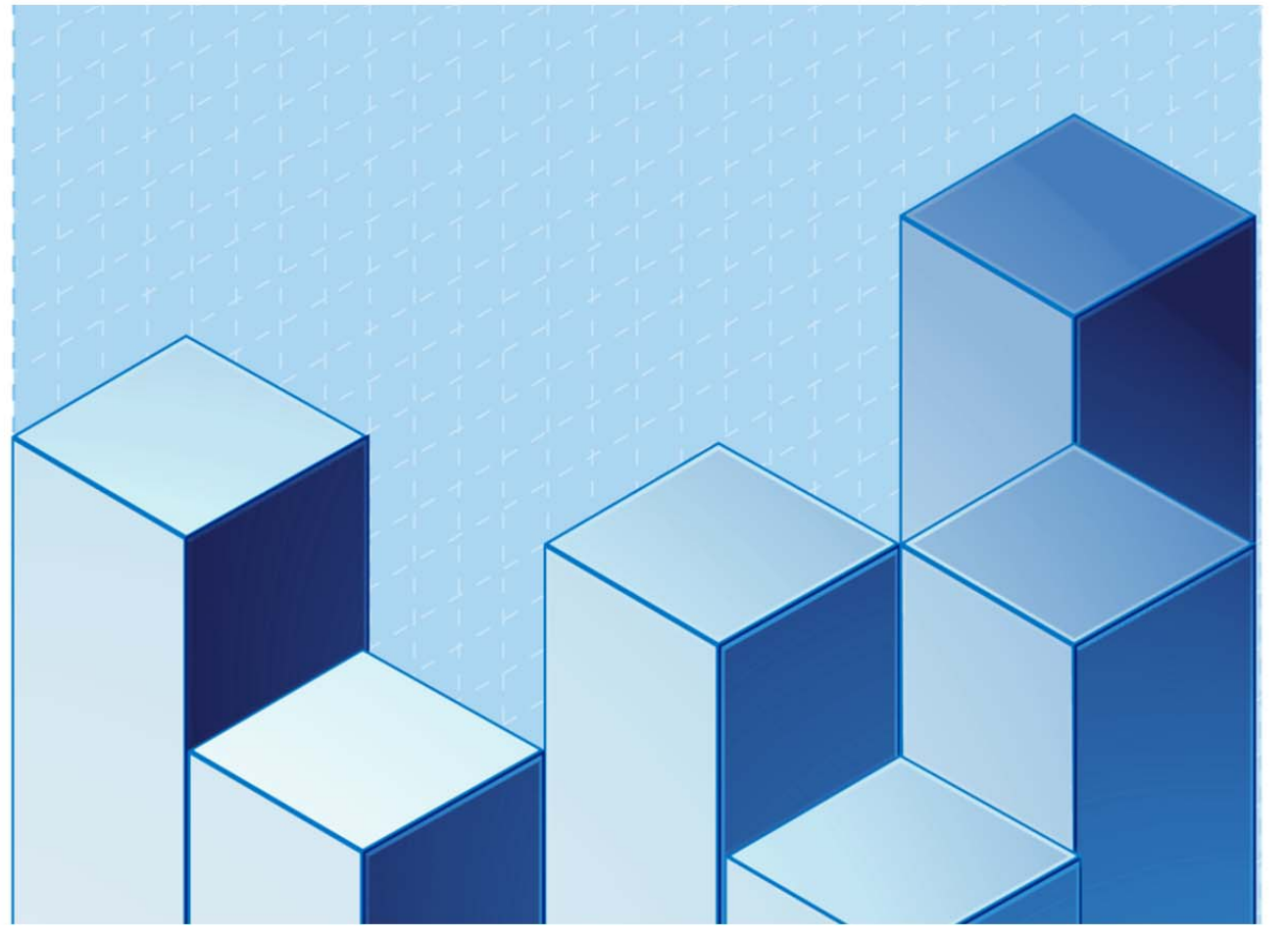
FISCAL CONSOLIDATION AND INCOME DISTRIBUTION

Francisco J. Goerlich
Laura Hernández



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Abstract

This working paper attempts to shed light on distributional effects of recent fiscal consolidation policies, mainly through the channel of in-kind public transfers. We look at the distribution of income in 16 EU countries during the recent global financial and economic crisis, and the subsequent period of fiscal consolidation. Experiences in terms of the depth of the recession and the policies implemented to deal with vary greatly across EU countries. We illustrate this diversity, and show how the crisis has accentuated the differences among EU countries, both in income levels and in inequality. The effects of the public sector on household income distribution have traditionally been measured through the effects of money transfers and taxes, but in developed economies in-kind transfers are of increasing importance. In our context, the analysis of in-kind transfers –mainly education and health– from a distributional perspective is of paramount importance, since fiscal consolidation programmes have led to a reduction in public expenditure in these services in many countries. We mainly use the EU Survey of Income and Living Conditions (EU-SILC), which allows us to track the distributional effects of public interventions in the economy, namely money transfer and taxes. For in-kind services we impute benefits at the individual level from the EU-SILC database. Starting from aggregate figures, we make a number of adjustments and arrive at an extended household income. Finally, we measure the distribution in this extended income for all countries in the analysis, before and after the crisis. Our results point to the absence of relative inequality effects of fiscal consolidations in those countries where public sector cuts have been deeper. This fact is due to the emphasis on measuring inequality in relative terms, given that primary incomes have fallen by more than the cuts in public services provided to citizens.

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1. Introduction: The road map

Most European Union (EU) countries entered the global economic and financial crisis with already high levels of income inequality, a situation made much worse by the crisis (OECD, 2011). Although this seems to suggest a continuation of the long-term trend in rising inequality experienced by many developed countries a few decades ago (OECD, 2008), a closer look at the data reveals that the crisis has significantly changed some of the underlying factors in the rise of income inequality in most EU countries.

This working paper looks at the distribution of income during the recent global economic crisis, and the subsequent period of fiscal consolidation. While the effects of fiscal consolidation on output and unemployment have been extensively investigated in the literature, only a few studies have explored their distributional effects.

The final aim is to investigate the effects of the fiscal consolidation programmes initiated by many EU countries on the income distribution among European citizens. We look at trends in market and disposable income inequality, paying attention to the process of going from market income to disposable income, thereby examining the distributional role of direct taxes and social money transfers in recent years. Disposable income is not, however, the final income concept analysed. In today's developed economies households receive a non-negligible amount of in-kind public services, that is, services which people enjoy but do not pay for directly, and whose value the consumer may be uncertain of. This concept can be clearly seen in public services like health and education, but may also be encountered in other in-kind public services such as housing or elderly care. The monetary value of these in-kind public services is now considered in household accounts in the System of National Accounts (SNA) at the aggregate level, but has not yet been incorporated at the individual distributional level of analysis (OECD, 2013a). Because a substantial number of the recent fiscal consolidation programmes have been implemented by making significant reductions in public spending, it seems natural to measure the effects of these programmes on the distribution of this extended household income. Throughout this paper, the 'crisis' refers to the period after 2007.

As we shall see, experiences among EU countries are highly diverse, and it is sometimes difficult to draw a single conclusion for the countries analysed.

The dispersion in **market income**, income from labour and capital, as measured by the Gini index, increased markedly in most European countries during the crisis. Figure 1 displays

the change in percentage points of the Gini index during the crisis, the period 2007–2012. For most of the countries represented in figure 1 the rise in market income inequality is substantial. The increment in this inequality is led by Spain, Ireland and Greece, countries that have been hit hard by the crisis, but substantial increases can also be observed in other countries such as Luxemburg, Portugal, Denmark, the United Kingdom or Italy. By contrast market inequality fell considerably in Poland and the Netherlands.

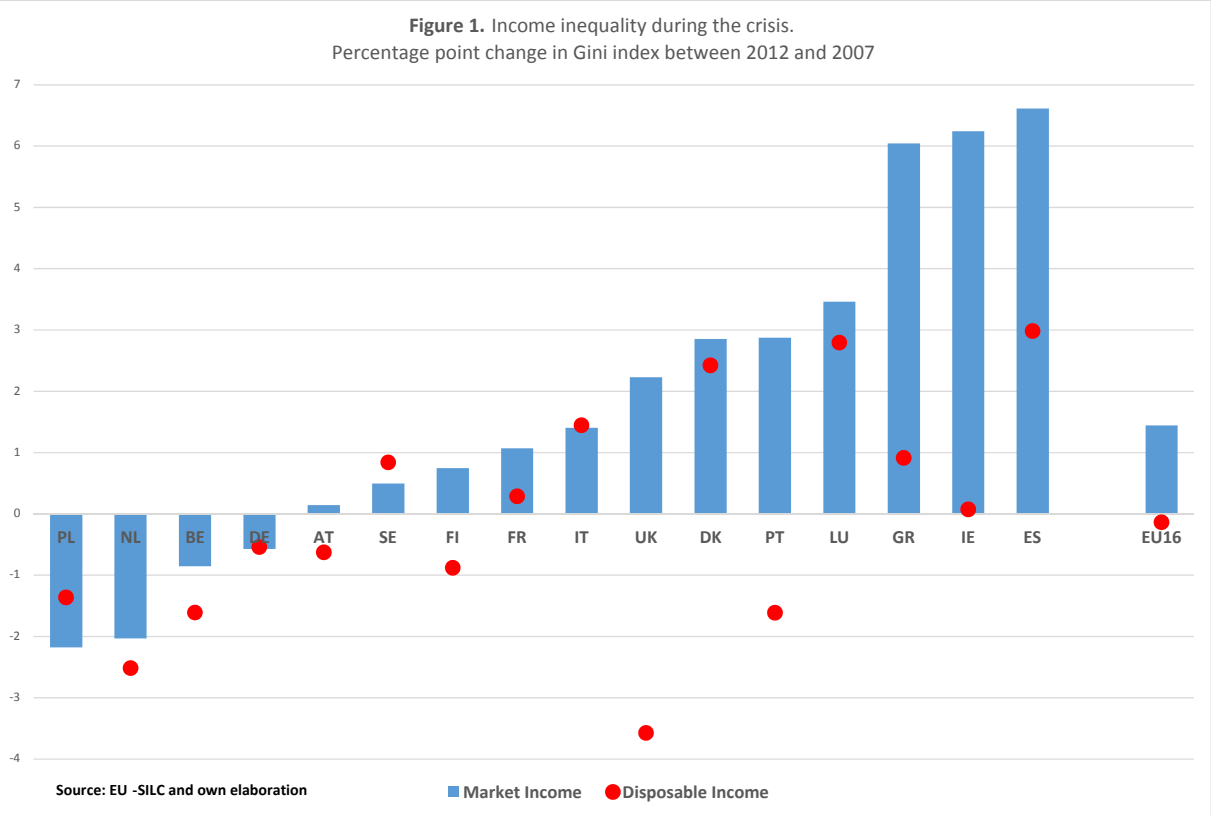


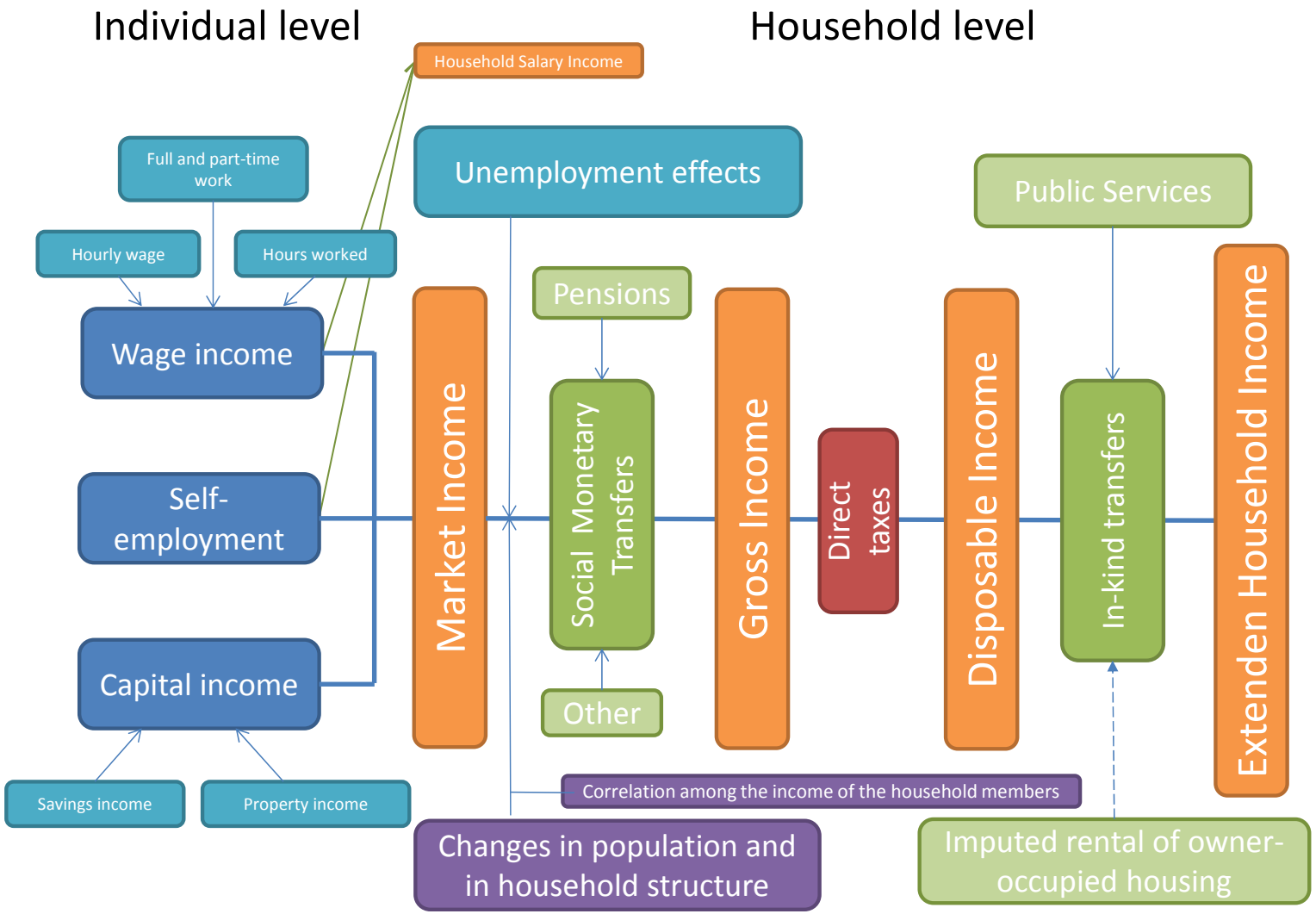
Figure 1 also displays changes in inequality in **household disposable income** throughout the same period. The tax-benefit system cushioned the steep rise in market income inequality during the crisis in most of the countries considered, Sweden being the only exception. After taking into account income taxes and cash benefits the rise in inequality is considerably less for disposable income than for market income. For our group of countries as a whole, EU16 in figure 1, inequality rose for market income, but remained stable for disposable income. To a great extent this redistribution effect of taxes and cash benefits is to be expected, as these policy instruments act as 'automatic' stabilisers. With progressive systems in place, greater inequality automatically leads to more redistribution, even if no policy action is taken (Lambert, 2001, Immervoll and Richardson, 2011).

Changes in inequality in disposable income are also more heterogeneous than in market income, reflecting the fact that tax-benefit systems vary considerable across countries and time, and also the variety of responses to combat the crisis across EU countries. The case of Spain is of particular note: market and disposable income inequality increased so sharply that while in the pre-crisis years it was below the EU average, by 2012 it was one of the countries with the most inequality, and certainly the European country that has shown the greatest increase (OECD, 2013b, 2014). In other countries that have also been hard hit by the crisis, like Ireland, Greece or Portugal, the tax-benefit systems have been able to smooth the increment in disposable income inequality quite considerably. In Portugal, disposable income inequality even fell, while market income rose by a significant amount.

The essential discrepancy between market income and disposable income is a result of public policy interventions in two major domains: (*i*) **monetary transfers** of various kinds: pensions, survivor benefits, school grants, household subsidies, unemployment benefits and so on, and (*ii*) **direct taxes**, mainly personal income tax. Although both taxes and cash benefits have been altered in various ways during the recent crisis, this is not the only channel by which public intervention has affected the distribution of household income as a consequence of fiscal consolidation policies. In developed countries, and certainly in the EU, governments supply in-kind services to households that indeed constitute part of their income, but given that they are not valued in monetary terms they are not included as part of household income as it is currently measured. These in-kind services may take a variety of forms, but as a minimum, health and education are the most relevant and important from a quantitative point of view.

This **extended income** should be the final object of distributional analysis however, since it reflects the well-being of citizens and households (Stiglitz, Sen and Fitoussi, 2009). Figure 2 illustrates the analytical framework of the income-generating process from market income to extended income. Given that most consolidation policies in many European countries have significantly reduced the funding of publicly provided services it seems natural to measure the distributional effects of consolidation policies on this income concept. This is precisely the object of the working paper. Obtaining **extended income** at the household level by taking into account the value of publicly provided services such as health or education is a challenging task, as we will see throughout the paper.

Figure 2. Analytical scheme for household income distribution



Source: Own elaboration

Throughout the paper the following definitions of income are of interest.

- **Market income**: labour and capital income obtained from the market by the individuals living in a household. Some people, even complete households, obtain no income from the market.
- **Life-cycle market income:** Market income plus pensions: old-age and survivors' benefits. This is an intermediate concept between market income and gross income. It includes pensions, which can be considered as deferred labour income.
- **Gross income**: Market income plus monetary transfers. It includes the first public intervention in household market income.
- **Disposable income**: Gross income minus direct taxes. Direct taxes are the second public intervention in household market income.
- **Extended income**: Adds to disposable income the monetary value of in-kind services provided by the public sector.

The annex provides detailed definitions of all these concepts and how are they related to the variables in the EU-SILC.

The paper is divided into six sections. Section 2 briefly describes the data used; as well as some key definitions, the data are documented in more detail in the annexes. The next section briefly examines what is behind figure 1, that is, the role of money transfers and direct taxes in shaping disposable income distribution before and during the crisis. Some attention will also be paid to income levels. Sections 4 and 5, the core of the paper, look at the distribution of the extended income and the consequences of fiscal consolidation policies on the level and distributional changes after 2007. A final section concludes.

2. Data used: Temporal and geographical scope and methodological choices.

The distributional analysis in this working paper uses the EU Survey of Income and Living Conditions (EU-SILC) for the maximum period available and the EU15 plus Poland. The countries included are therefore: Austria, Belgium, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxemburg, the Netherlands, Poland, Portugal, Sweden and the United Kingdom. For all of these countries the temporal coverage of the EU-SILC is 2004–2013, with the exception of Germany, the Netherlands, Poland and the United Kingdom, where the data begins in 2005. Note that income data in the EU-SILC is lagged one year with respect to the year of the survey.

This sample includes the core EU countries, which have been hit very differently by the crisis, and accordingly whose responses have also varied greatly. New member states are underrepresented because of lack of data.[1] We consider the countries where fiscal consolidation measures have been strongest, namely Greece, Ireland, Portugal and Spain, since the final aim of the exercise is to measure the effect of these policies on income distribution.

The value of the in-kind services provided by the public sector comes mainly from the *Classification of the Functions of Government* (COFOG) data provided by Eurostat, and supplemented with other minor sources as necessary.

How this aggregate data is imputed on the individual records in the EU-SILC for distributional analysis is dealt with in detail in Goerlich and Hernandez (2016). It suffices to mention here that, from aggregate statistics, we estimate an average value per user or per capita, depending on the function. This could be, for example, the average value of secondary education per student in a given year and country, or the mean value of hospital services per capita in a given year and country. These values are then imputed on individual records in the EU-SILC at the personal level given the available information within the survey. These individual imputed rents are finally aggregated at the household level.

All nominal data are deflated on the temporal dimension using the Harmonised Index of Consumer Prices (HICP) base 2012, and eventually adjusted, on the cross-sectional dimension, using Purchasing Parity Standards (PPS) for 2012. While this matters for levels of income, this adjustment is irrelevant for relative inequality measures, given that deflation is done at a country/year level. It also matters for absolute inequality measures and anchored poverty.

The distributional analysis uses household data, although the individual is the final object of analysis. This means that person weights are used in all calculations. In addition, to adjust for differences in needs and composition of households we use the modified OECD equivalence scale to compute household equivalent income. This is the standard equivalence scale used by Eurostat. The equivalent income is eventually attributed to each member of the household.

[1] See Leitner and Stehrer (2015) for an analysis of the evolution of public spending structures in the new member states as compared to the rest of the EU.

3. Income levels and inequality during the pre-crisis years, the crisis and the fiscal consolidation period.

This section looks briefly at the drivers behind the information in figure 1. Labour income is by far the largest source of income of working-age households, and thus drives market income inequality. On average, labour income represents about ¾ of total household income. Labour income can become more unequally distributed either as a result of employment changes (quantity effect) or changes in the distribution of wages (price effect).

It is true that changes in wage distribution played a key role in the upward inequality trend exhibited by many developed countries in the decades prior to the crisis. However, the main driver of inequality during the crisis was the employment effect through the rise in unemployment or inactivity. This is clearly shown in figure 3, which reports the changes in the Gini index for market income, as shown in figure 1, *versus* the changes in the unemployment rate for the period 2007–2012. The positive association is apparent, as is the strong relationship, with a coefficient of determination of 72%.[2] This is particularly evident for Spain and Greece, but also for Portugal and Ireland, the countries hit hardest by the crisis. There is also some evidence that in these countries earnings inequality fell, especially if we consider only workers in full employment. This is perhaps due to the fact that the crisis affected mainly workers with lower salaries, increasing equality among those still employed, and also due to reductions in public sector wages at the end of the period, which had larger effects in the upper part of the income distribution (Callan et al., 2011; Avram et al., 2013, Goerlich, 2015).

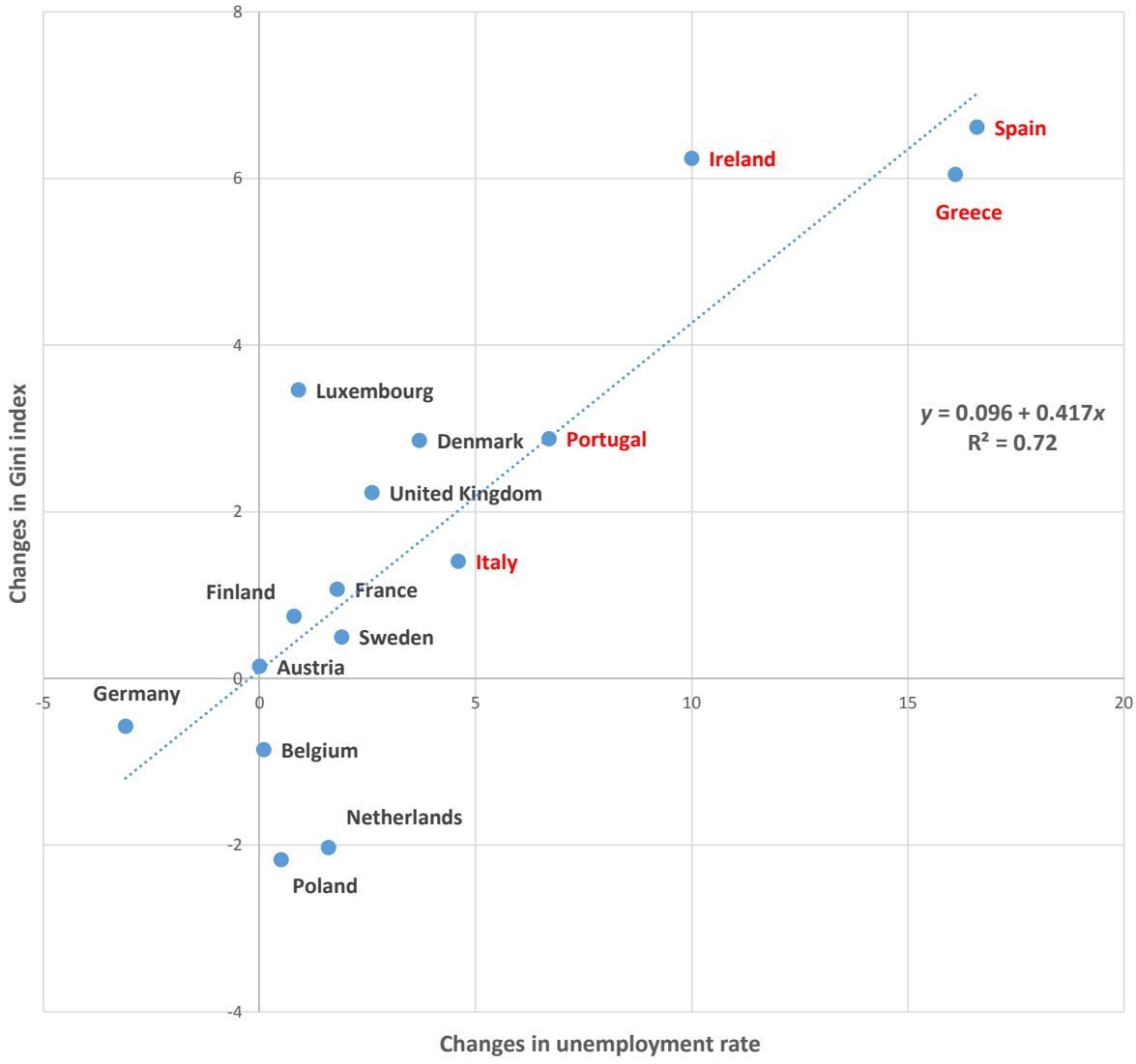
Figure 4 displays the annual change in equivalent per capita income for the median bottom and top quintiles between 2007 and 2012. For most countries, lower-income groups either lost more during the crisis or benefited less from the temporal recoveries than middle-income or rich groups. This is particularly so in the case of Greece, Spain, Italy, Luxemburg, Denmark and Luxemburg. The fall in real disposable income for all groups is dramatic in Greece, as is the differential fall by quintiles in Spain.

In going from market income to disposable income (figure 1) two major public interventions take place: (*i*) **social monetary transfers**, including old-age pensions, survivors' benefits, and unemployment benefits; and (*ii*) **direct taxes** (figure 2). We measure the

[2] Adding pensions to market income, thus considering the life-cycle market income concept, still shows a positive association, but the relation is much weaker, with a coefficient determination of 37%, a fact that relates to the redistributive effect of pensions.

redistribution effect of any public intervention by means of the difference in the Gini coefficient between the two income concepts involved.

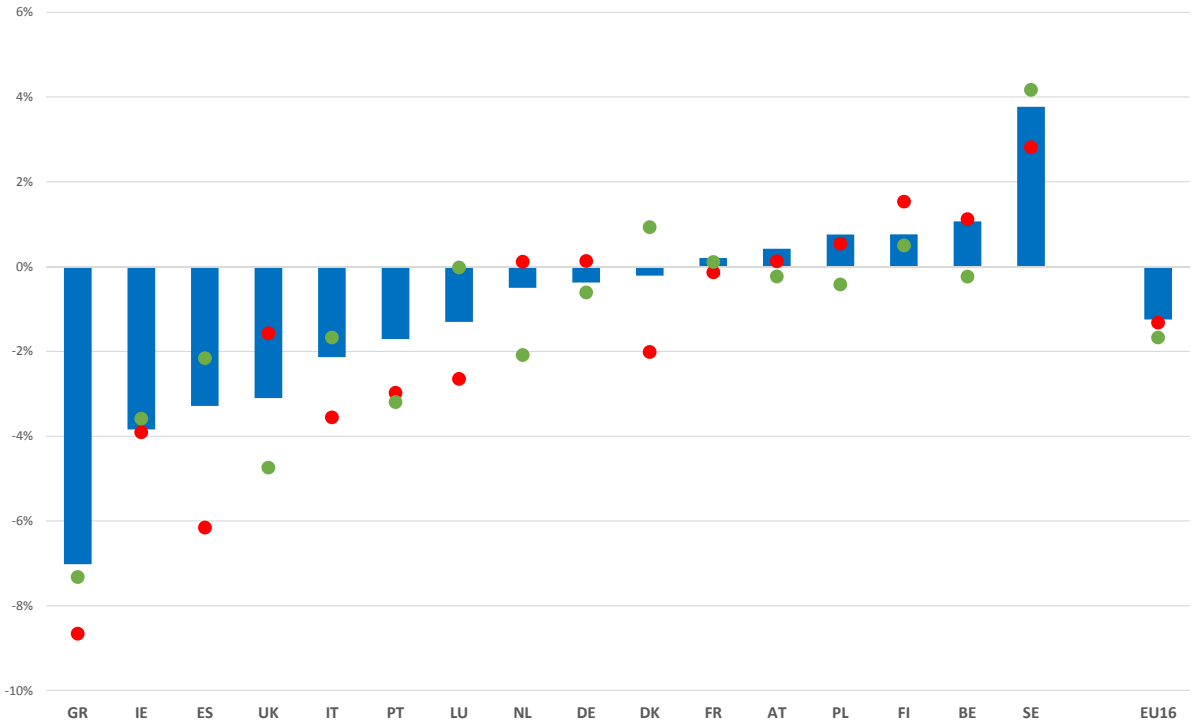
Figure 3 - Changes in inequality in market income (Gini) *versus* changes in unemployment rate - 2007-2012



Source: Eurostat, EU-SILC and own elaboration

Hence, to measure the redistribution effect of social monetary transfers we look at the difference in the Gini coefficient between market income and gross income = market income plus social monetary transfers. We do this for each country in both pre- and post-2007 periods, as well as for the EU16 as a whole.

Figure 4. Anual percentage change (2007 - 2012) in household real disposable income by quintile group



Source: EU-SILC and own elaboration

Figure 5 represents the redistributive impact of social monetary transfers as the difference in Gini points for market income and for gross income. Here we represent in a scatter plot these differences in Gini points in $t + 1$ against t, for all countries analysed, and $t = 2003$, 2007 and 2012. This gives us a quick visual impression not only of the importance of the redistribution due to the particular public policy intervention, but also of whether the magnitude of the redistribution has increased or decreased through time. For example, points above the 45º line on the scatter plot mean a higher redistribution impact in $t + 1$ than in t, so the redistribution effect increased through time; on the other hand, points below the 45º line on the scatter plot mean a lower redistribution impact in $t + 1$ than in t, so the redistribution effect decreased through time. If a particular country remains on the 45º line, the magnitude of the redistribution effect remains unaltered in the two periods.

Figure 5 shows that the redistributive effect of social monetary transfers is substantial, as it is never less than a reduction of 10 percentage points in the Gini index; for some countries, like Sweden or Germany, this figure rises to almost 20 points. This is an expected result since most households do not receive earnings from the market, and social monetary transfers include old-age pensions and survivors' benefits, which account for more than half of the monetary transfers. Hence adding them to household income greatly reduces inequality,

since many more households that were at the bottom of the income distribution are now receiving income.

More important than the magnitude of the redistributive impact itself are the changes we observe during the crisis. The redistributive effect was quite stable across countries previous to 2007, but has altered substantially for some, although not all, countries during the crisis. In particular, social transfers have smoothed the income distribution by a substantial amount in the so-called *PIIGS* countries:[3] Portugal, Ireland, Italy (only slightly), Greece and Spain, but also in the United Kingdom and to a lesser extent in Denmark and Finland; they have therefore acted as a powerful automatic stabiliser.

Because of the importance and also the different nature of pensions as social monetary transfers it seems natural to split the redistributive effects of pensions from the rest of social transfers. This is shown in figure 6, for pensions alone, and figure 7, where the remaining social monetary transfers are added.

Inspection of figures 6 and 7 reveals some interesting facts. First, from a quantitative point of view the redistributive impact of pensions is much higher than the rest of social monetary transfers. In addition they are less dispersed across countries. This increment in the smoothing effect of pensions is responsible for the fact that the poverty rate of people above 65 was lower in recent years than the population average (OECD, 2014). Second, countries' rankings are not constant across different types of transfers. Interestingly, Ireland shows the lowest redistributive effect for pensions, but the highest for the rest of monetary transfers. Third, the countries where pensions have an increased redistributive effect during the crisis are the same as before: Greece, Portugal, Spain, the United Kingdom, Denmark, Finland and Ireland. Fourth, the countries where social monetary transfers other than pensions increase the redistributive effect during the crisis are Ireland, Spain, the United Kingdom, Luxemburg, and to a lesser extent Italy and Greece. In the case of Spain and Ireland this effect can be traced back to unemployment benefits due to the increase in unemployment during the crisis (figure 3).

Figure 8 shows the redistributive impact of direct taxes according to the EU-SILC. This is the next big public intervention in going from market income to household disposable

[3] *'PIIGS'* is a pejorative acronym to refer to the five Eurozone nations, which were considered to be economically weaker following the financial crisis: Portugal, Italy, Ireland, Greece and Spain.

income. Direct taxes play many roles, and redistribution is certainly not the main one, but if the tax system is progressive it will have an impact in terms of reducing inequalities.

Figure 8 shows that the redistributive impact of direct taxes oscillates between a reduction of 2 and 5 percentage points in the Gini index of gross income, with an average for the EU16 of 3 points. This is considerably lower than the redistributive effect of pensions (figure 6). Again there are wide differences between countries. The least redistributive systems are found in Poland, France and Spain, while the highest redistributive tax systems are those of Ireland, the Netherlands and Austria. There are far fewer changes after the crisis than for social monetary transfers. Specifically, significant increments in the redistributive effect of direct taxes are only found in Ireland and the United Kingdom, and to a lesser extent in Portugal, France, Belgium and Finland. It is worth mentioning that despite being hit very hard by the crisis, neither Spain, nor Greece, nor Italy shows a significantly higher redistributive effect in 2012 than in 2007. Hence for these countries the tax system has not contributed more to smoothing the increase in market income inequality after the crisis (figure 1). In fact for most countries, including Spain and Greece, the tax system had a lower redistributive impact than in the years previous to the crisis.

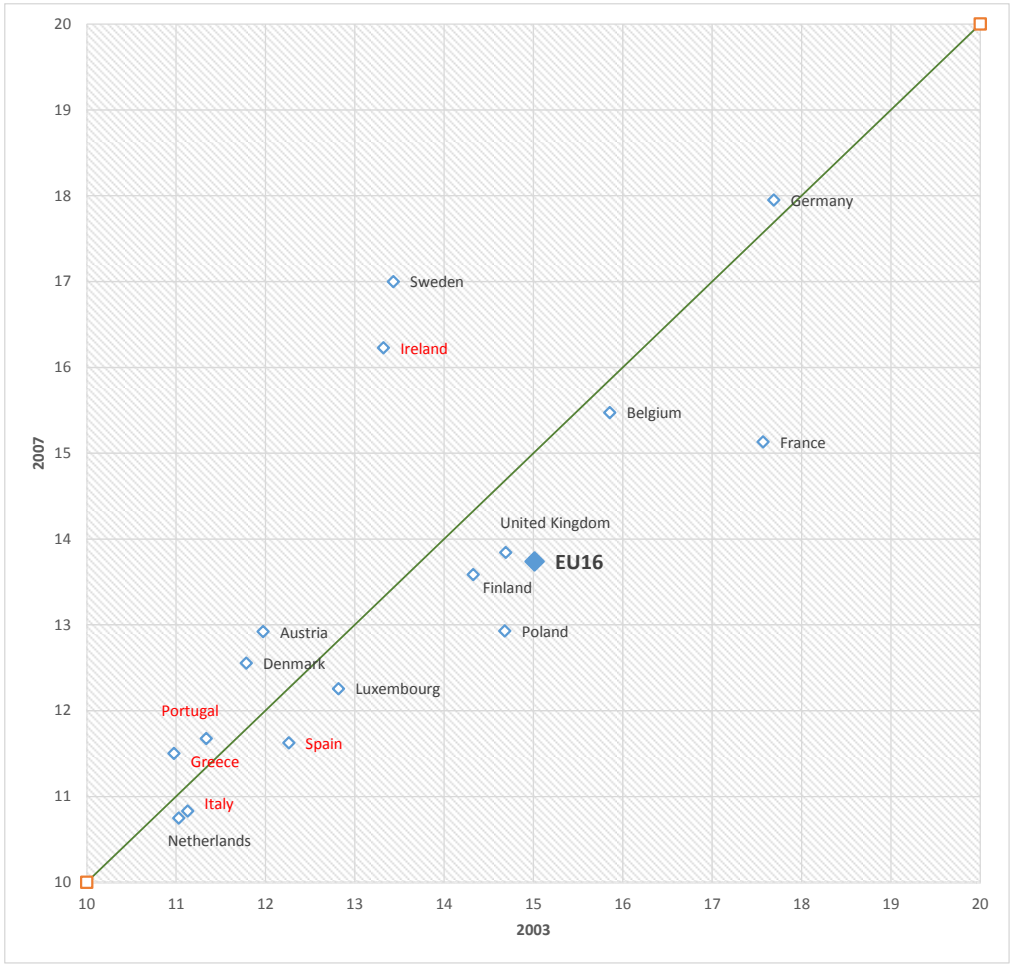
Figure 9 considers the joint effect of taxes and monetary benefits, figures 6 and 8 combined, so it explains the difference in inequality between market income and household disposable income shown in figure 1. The result is clear: significant increases in public expenditure on pensions, other social benefits and lower direct taxes prevented inequality in disposable income from rising as much as disparities in market income during the crisis.

This is in fact what should be expected from these policies, even in the absence of any specific policy measure. For example, public spending on social benefits typically increases as more people claim unemployment or other safety-net benefits. In this way, direct taxes and monetary benefits act as automatic stabilisers, offsetting a significant amount of the income losses resulting from the economic downturn after 2007.

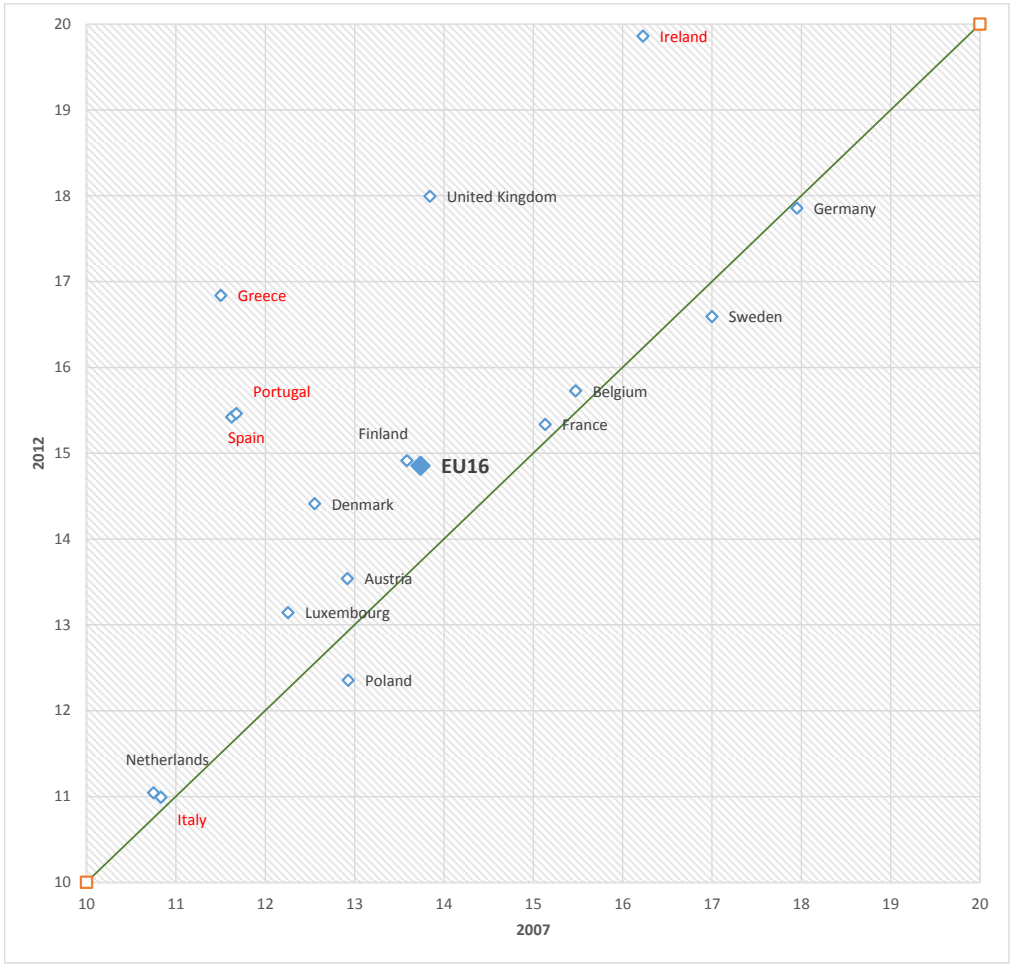
Figure 9 also shows that the overall redistribution effect of public intervention increased in the crisis years, which is not generally true for the period 2003–2007, and that the countries showing a higher redistribution impact are the ones most affected by the crisis: Spain, Greece, Portugal, the United Kingdom and Ireland; Italy is an exception in this case.

Figure 5. Redistributive impact (percentage point reduction in Gini index) of Social Monetary Transfers: From Market Income to Gross Income.

(a) 2007 versus 2003



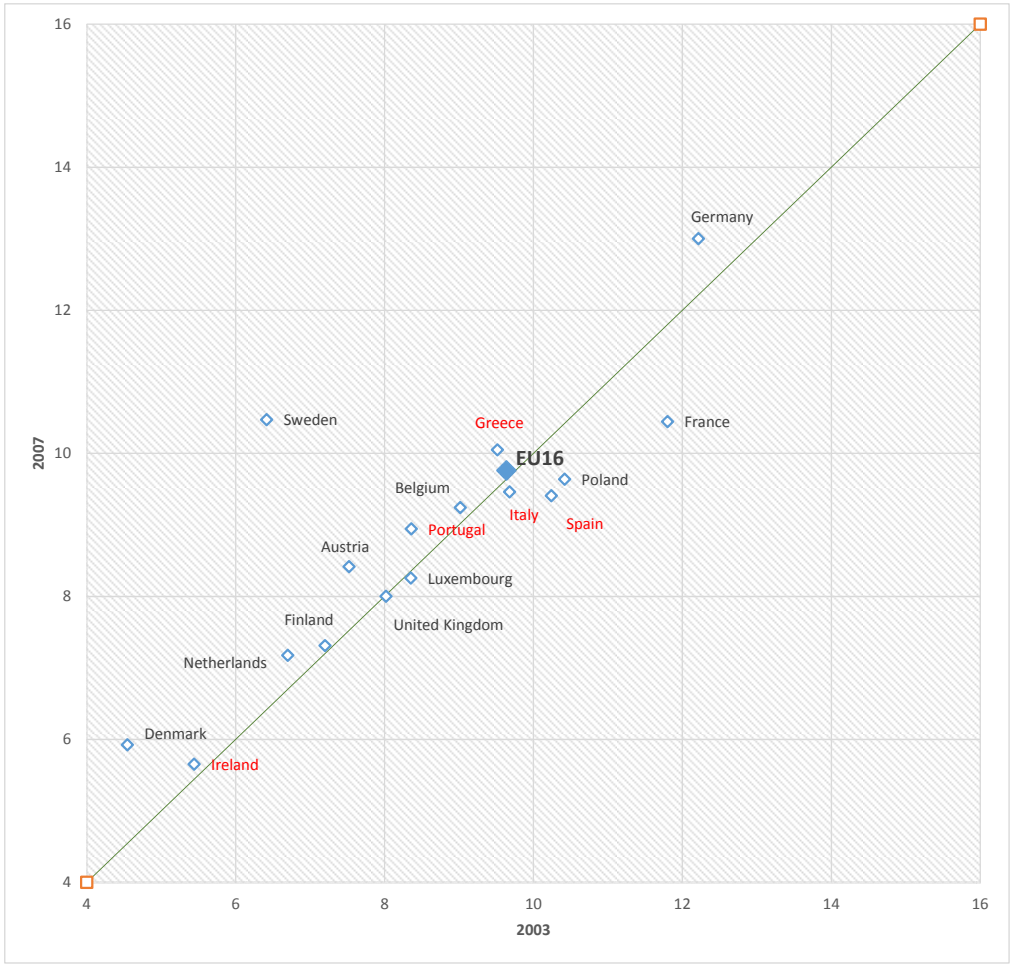
(b) 2012 versus 2007



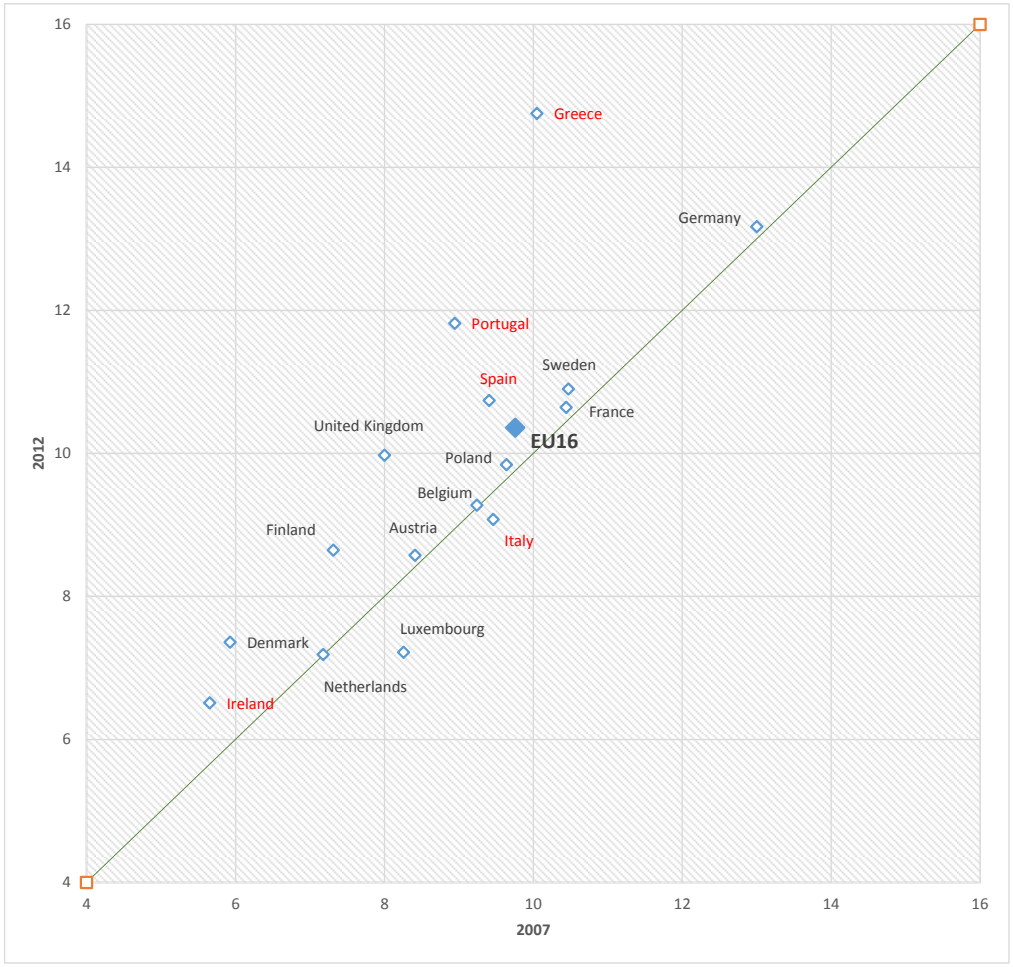
Source: EU-SILC and own elaboration.

Figure 6. Redistributive impact (percentage point reduction in Gini index) of pensions –*old-age and survivor´ benefits*–: From Market Income to Life Cycle Market Income.

(a) 2007 versus 2003



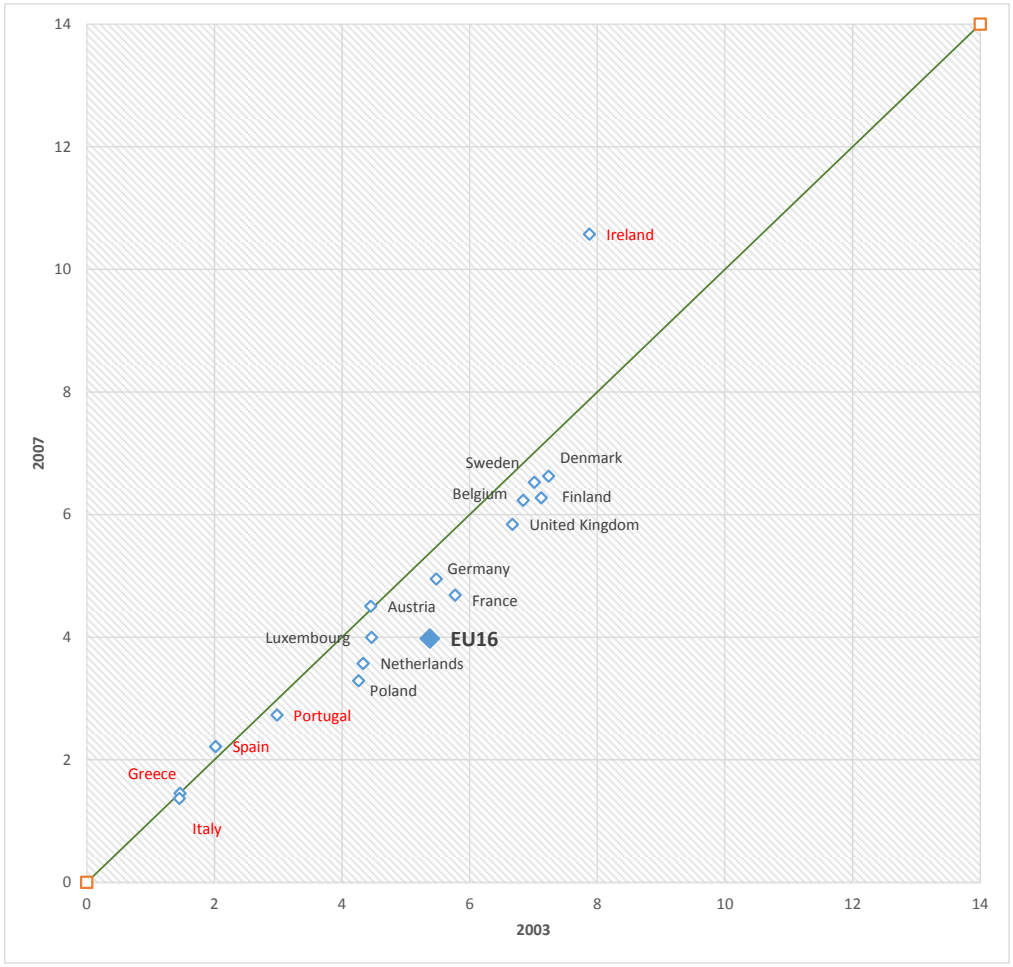
(b) 2012 versus 2007



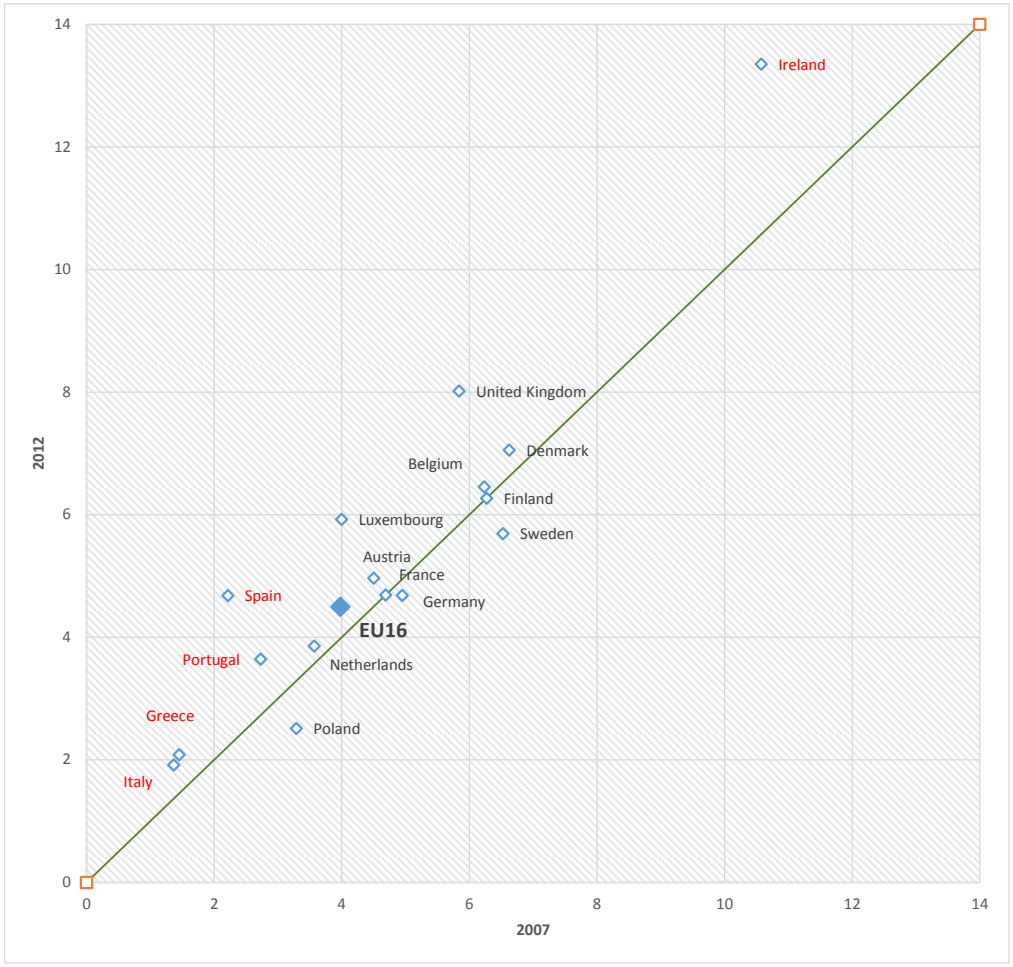
Source: EU-SILC and own elaboration.

Figure 7. Redistributive impact (percentage point reduction in Gini index) of Social Monetary Transfers other than Pensions: From Life Cycle Market Income to Gross Income.

(a) 2007 versus 2003



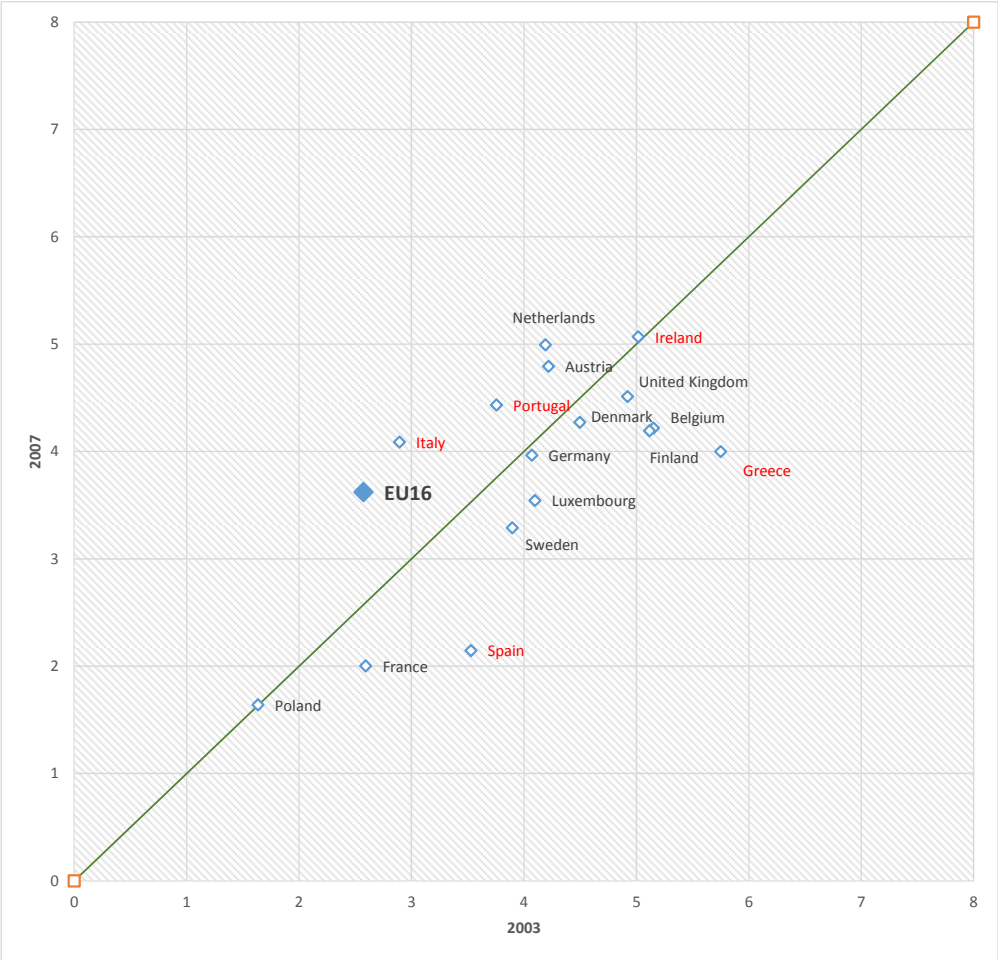
(b) 2012 versus 2007



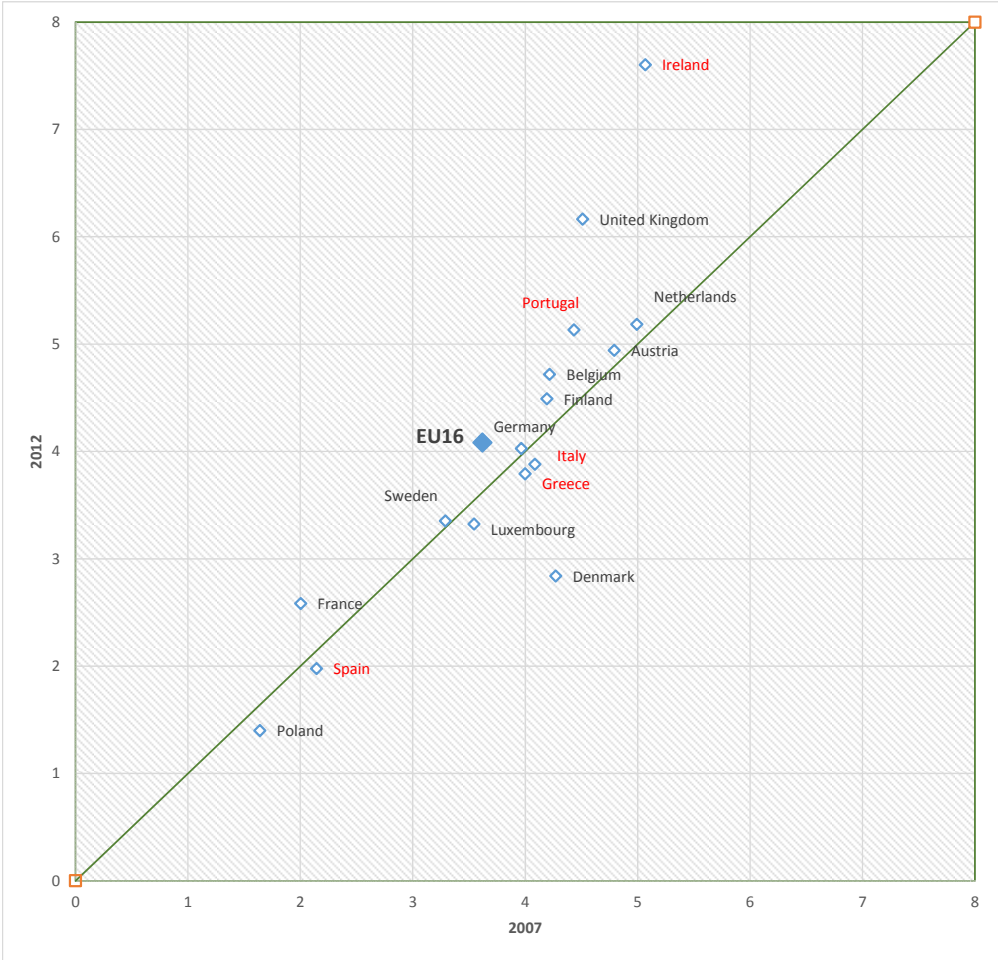
Source: EU-SILC and own elaboration.

Figure 8. Redistributive impact (percentage point reduction in Gini index) of Direct Taxes: From Gross Income to Disposable Income.

(a) 2007 versus 2003



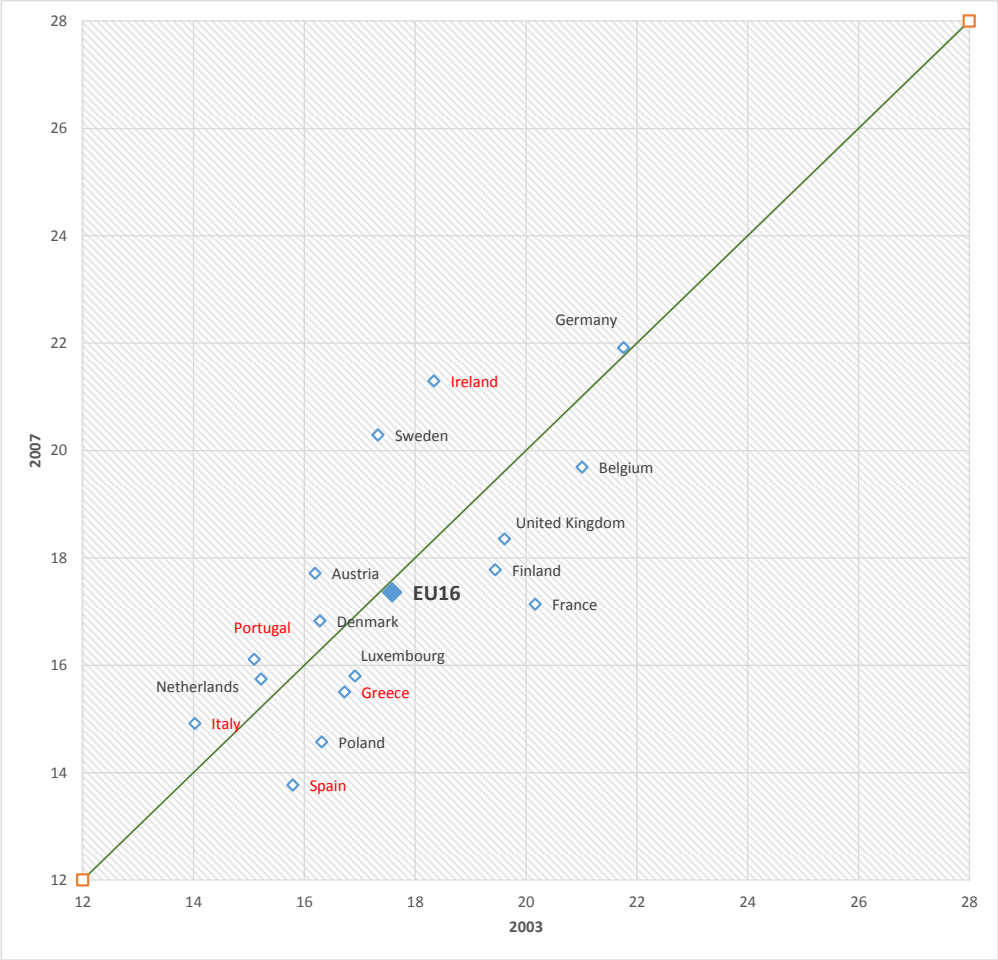
(b) 2012 versus 2007



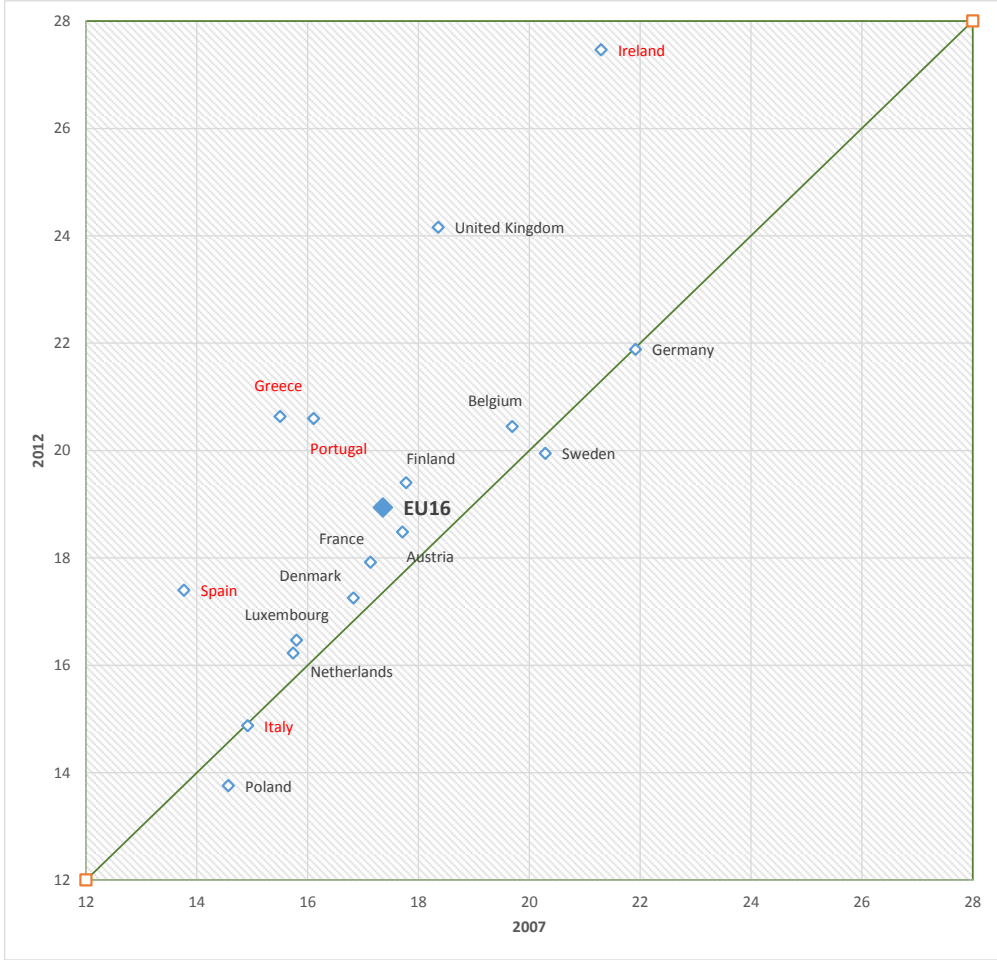
Source: EU-SILC and own elaboration.

Figure 9. Redistributive impact (percentage point reduction in Gini index) of Social Monetary Transfers and Direct Taxes: From Market Income to Disposable Income.

(a) 2007 versus 2003



(b) 2012 versus 2007



Source: EU-SILC and own elaboration.

The fact that the redistribution effect of the tax-benefit system increased during the crisis years for countries where fiscal consolidation policies were tighter suggests that, in relative terms, these policies benefited the lower part of the distribution more than the upper part. We can therefore say that they show a progressive effect. This general conclusion coincides with microsimulation studies of fiscal consolidation policies (Paulus at 2013; Avram et al., 2013; Matsaganis and Leventi, 2014). Hence the tax-benefit system served to support lower-income households which, had there been no change in policy, would be worse off.

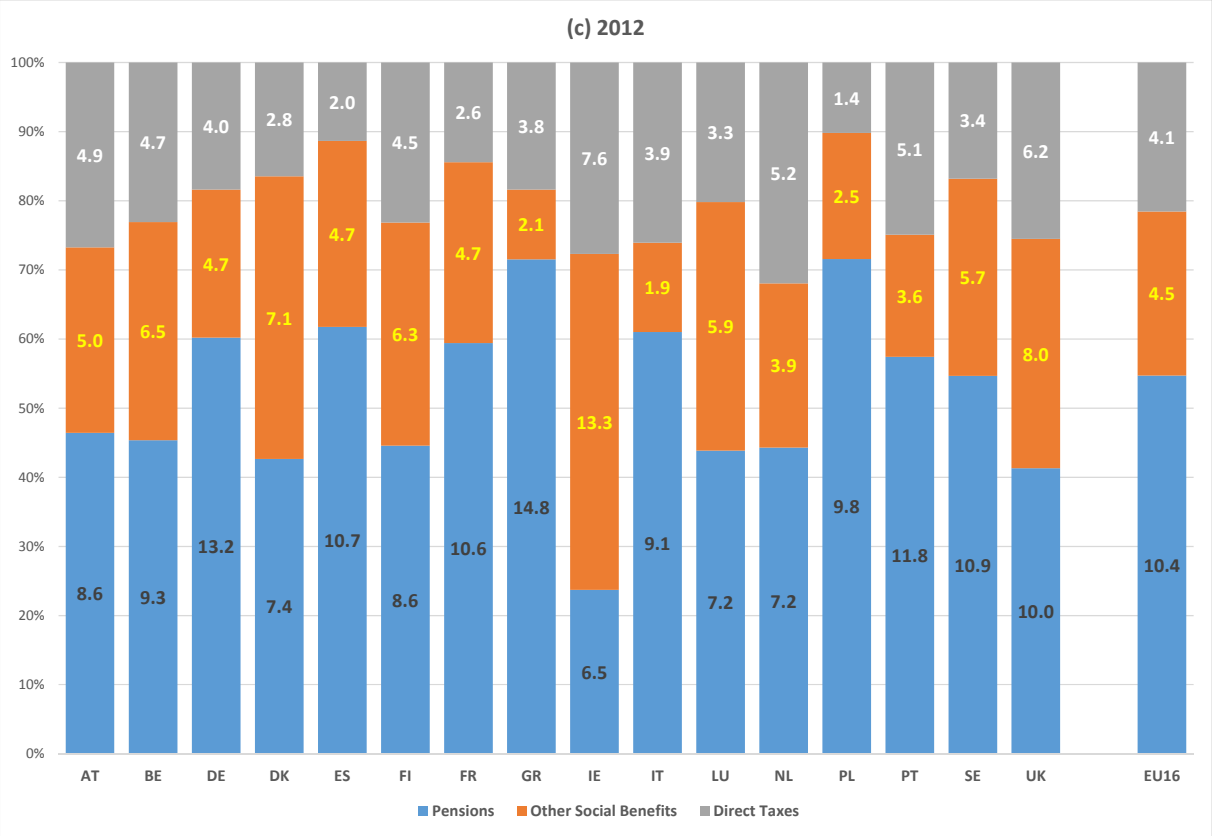
Notwithstanding, the scale of the reduction in income over time is large, especially for low-income families (figure 4). The conclusion should be clear by now that the main driver of growing inequalities (figure 1) appears to have been the recession, especially rising unemployment, rather than austerity policies per se.

If we decompose the reduction in inequality in going from market income to disposable household income according to its components –pensions, other social benefits and direct taxes– we can see that for the majority of countries around half of this reduction is due to the cushion effect of pensions and the importance of other cash benefits, and direct taxes are more heterogeneous among countries (figure 10). This pattern has a clear exception, Ireland, where the main redistributive effect is due to other social monetary transfers, which seem to play a minor role in Greece and Italy.

In some cases, despite fiscal consolidation measures, cash benefits have not fallen in recent years. Because of higher unemployment levels, other social protection measures were needed to avoid extreme poverty and governments were reluctant to reduce pensions. This is the case of Spain, where recent increases in tax rates have been unable to increase tax levels because of the fall in taxable income.

Figure 10. Relative importance of the redistributive effects of public policy interventions: From market income to household disposable income: 2003, 2007 and 2012.

Figure 10. Relative importance of the redistributive effects of public policy interventions: From market income to household disposable income: 2003, 2007 and 2012 (cont.).



Source: EU-SILC and own elaboration.

In other countries like Greece, Portugal or Ireland, social benefits other than pensions increased in the first years of the crisis up to 2009, but started to fall in 2010. In Greece and Portugal social cash benefits in 2012 were below pre-crisis levels. But pensions rose in Portugal until the last year for which figures are available, 2012, when they began to fall. In Ireland, the tax level increased continuously after 2009, so on average taxes in 2012 were well above pre-crisis levels.

All this shows a great deal of heterogeneity across countries along with heterogeneous policy responses, so we do not have just one crisis, but many. This makes it extremely difficult to find patterns.

4. The distributive impact of publicly provided services.

The previous section of this paper has looked briefly at the drivers of growing inequality in household disposable income from the perspective of the income-generating process (figure 2). The analysis excludes other important factors which are relevant for household's well-

being and consumption, in particular in-kind services provided directly by public bodies, national and regional governments or local authorities, such as education, health, social housing or elderly care. These in-kind services can be considered as an imputed rent for households, forming an extended income concept that goes beyond disposable income, which can be readily measured. It should be obvious that in-kind services affect the distribution of resources, and should be the ultimate object of distributional analysis (Stiglitz, Sen and Fitoussi, 2009).

Even though this question has prompted an emerging and growing body of literature in recent years (Marical et al., 2006; Tsakloglou et al., 2009; Vaalavuo, 2011; OECD, 2011) no study has examined the effects of fiscal consolidation policies on the distribution of this extended income. This working paper is an initial attempt to fill this gap.

There are several reasons to include publicly provided services in distributional studies, not only because they affect the resources available to households, but given that taxes reduce households' income by significant amounts it is important to account for the benefits of services funded through taxes. To some extent, the progressive or regressive nature of a tax system relies not only on the progressivity of the tax rates, but also on the beneficiaries of the services funded with the taxes collected.

How does inequality change once in-kind publicly provided services are taken into account? The general conclusion of this recent literature (Paulus, Stutherland and Tsakloglou, 2010; Verbist and Matsaganis, 2012) is that public services significantly reduce income inequality in all countries. The amount of reduction depends heavily on the public service considered: health and education are by far the largest contributors to reducing inequality. Other social services provided in kind, such as social housing, elderly or child care have less overall impact for society as a whole, though they make a great difference to beneficiaries. As we shall see the redistributive impact of public services is quite stable through time, even after 2007.

Methodological aspects

Including in-kind publicly provided services in the analysis of inequality raises a number of conceptual and methodological issues that have to be sorted out in any practical exercise. Without going into technical details, the main questions on which we have to take a decision are: (*i*) how to value government services provided to individuals and households,

(*ii*) how this valuation should be allocated to individuals and households, and (*iii*) how difference in needs should be taken into account in this extended income setting.

On the first question, (*i*) how to value government services provided to individuals and households, the only real practical alternative, given the present state of national accounts, is to use a production cost approach (Smeeding et al., 1993; Aaberge and Langørgen, 2006; Marical et al., 2008). This means that the transfer to the beneficiaries is assumed to equal the average cost of providing or producing these public services. In other words, one € spent on services is assumed to be worth one € to individuals or households.

It is important to keep in mind two important limitations of this approach. First, the production costs do not necessarily match consumers' subjective valuations of these services. Introducing subjective valuations in an exercise of this type is extremely difficult, and can lead to nonsensical results. Second, this approach neglects differences within and across countries in the quality and efficiency of provision of these services. A simple example illustrates the importance of this point. Imagine that a given country increases efficiency in providing a health care treatment, so provision costs decrease by 20%, but the quality of the service remains unchanged or even increases. With our valuation rule, the imputed health income to households due to this treatment will decrease by 20%, but obviously the benefits to households remain unchanged or even increase. Some European projects such as SERVICEGAP or INDICSER have dealt with these valuation problems in the context of public services and national accounting, but their recommendations are still in experimental phases and have not yet been incorporated in national accounts. To be operational, the only real practical choice for valuing services is to use the production cost approach.

On the second question, (*ii*) how this valuation should be allocated to individuals and households, the literature has used two quite different approaches depending on the type of public service analysed, namely, the **actual consumption approach** and the **insurance value approach**.

The actual consumption approach allocates the value of public services to the individuals that are actually using the service. For most public services, this is the natural allocation rule as long as the beneficiaries can be clearly identified. For example, educational services fall naturally within this category because only households with students benefit directly from public expenditure in education. Of course, this requires being able to identify students in the survey in order to impute the corresponding value at household level.

The insurance value approach may be applicable in other cases, or even preferable in particular situations. This approach imputes the 'insurance value' of coverage to each person based on specific characteristics, such as age or sex, or even socio-economic position determined by a given criterion. This is based on the assumption that all individuals with similar characteristics benefit from the service by knowing that they would have access to it if they needed it. The insurance value is the amount that an insured person would have to pay for a third party provider, in this case the government, to have just enough revenue to cover all claims for such persons (Smeeding, 1982). It is based on the notion that what the government provides is equivalent to funding an insurance policy where the value of the premium is the same for everybody sharing the same characteristics, such as age or sex (Marical et al., 2008). Health care is the typical example where imputation more naturally uses the insurance value approach.[4]

Of all the services considered in this paper, **education**, **social housing** and **early childhood education care** are allocated using the **actual consumption approach**, whereas **health** and **elderly care** are allocated using the **insurance value approach**.

On the third question, (*iii*) how difference in needs should be taken into account in this extended income setting, the theoretical literature has not yet reached a consensus, and this is currently an area of active research (Aaberge et al., 2010a; Paulus et al., 2010). Approaches differ considerably, as do empirical results according to the equivalence scale used (Verbist and Matsaganis 2012; Förster and Vaalavuo, 2012). Even if it is true that equivalence scales for cash and in-kind benefits may differ, and this problem is widely recognised in the literature, the standard approach in most empirical studies is to apply the same equivalence scale for both cash and extended income. Some authors defend this approach with some theoretical justification (Garfinkel et al., 2006): on the one hand, in-kind benefits exhibit no economies of scale, so even if they are imputed at the individual level, they should be divided by household size when aggregated at household level; however, on the other hand, in-kind benefits are not shared equally among family members, which suggests that they should be added to equivalent cash income on an individual basis. Hence, using the same equivalence of scale for both cash and in-kind income seems a sensible middle-of-the road solution.

[4] Note that the *actual consumption approach* applied to health data would imply that sick people are better off than otherwise similar healthy persons because they receive more health care services, which clearly makes no sense.

Besides these theoretical arguments, keeping equivalence of scale constant across cash and in-kind income is a natural way to isolate the effects of public services on the distribution of disposable income, otherwise it is very difficult to know which changes are due to in-kind services and which are due to the application of a different equivalence scale to in-kind income. We therefore keep the same equivalence scale across both income types –cash and in-kind– which coincides with standard practice in applied studies.

Overall, in-kind benefits are fairly evenly distributed over different income groups, and, with a few exceptions, most of the public services are not oriented towards lower incomes. This is quite rational since the prime aim of education or health, for example, is not redistribution, but the provision of a decent education, basic health care, and acceptable living standards for all the population. Despite the main goal of these services, they are in fact redistributive, so measuring this effect and its variation over time is important.

This pattern is very similar across countries and time. The amount to be redistributed varies with time, especially in some countries in the crisis years due to fiscal consolidation policies, but generally in-kind benefits are not especially pro-poor.

On the other hand it is important to realise that benefits of equal size, *ceteris paribus*, translate into larger proportional increases in incomes at the lower end of the income distribution. The first step is therefore to analyse the increase in household disposable income resulting from the imputation of public services by income groups. Income rankings are built on the basis of equivalent disposable household income before accounting for in-kind services and are kept fixed in subsequent analyses.

The fact that benefits are of equal size across the income scale implies that all types of public services considered here account for a much higher share of disposable income among lower-income than among higher-income households. This has implications for measuring inequality in that relative inequality indexes should decrease. It is important to keep this in mind when analysing the results below.[5]

Given the large shares of in-kind services in disposable income, especially for lower-income groups, the second step is to see how the income distribution changes once public services are taken into account. Distributional analysis will mainly use the Gini index and quintiles. We analyse in the sequel the overall distributive impact of all public services –

[5] Another question would be to see what happens with absolute inequality, whose indexes are not scale invariant but translation invariant (Kolm, 1976a, 1976b).

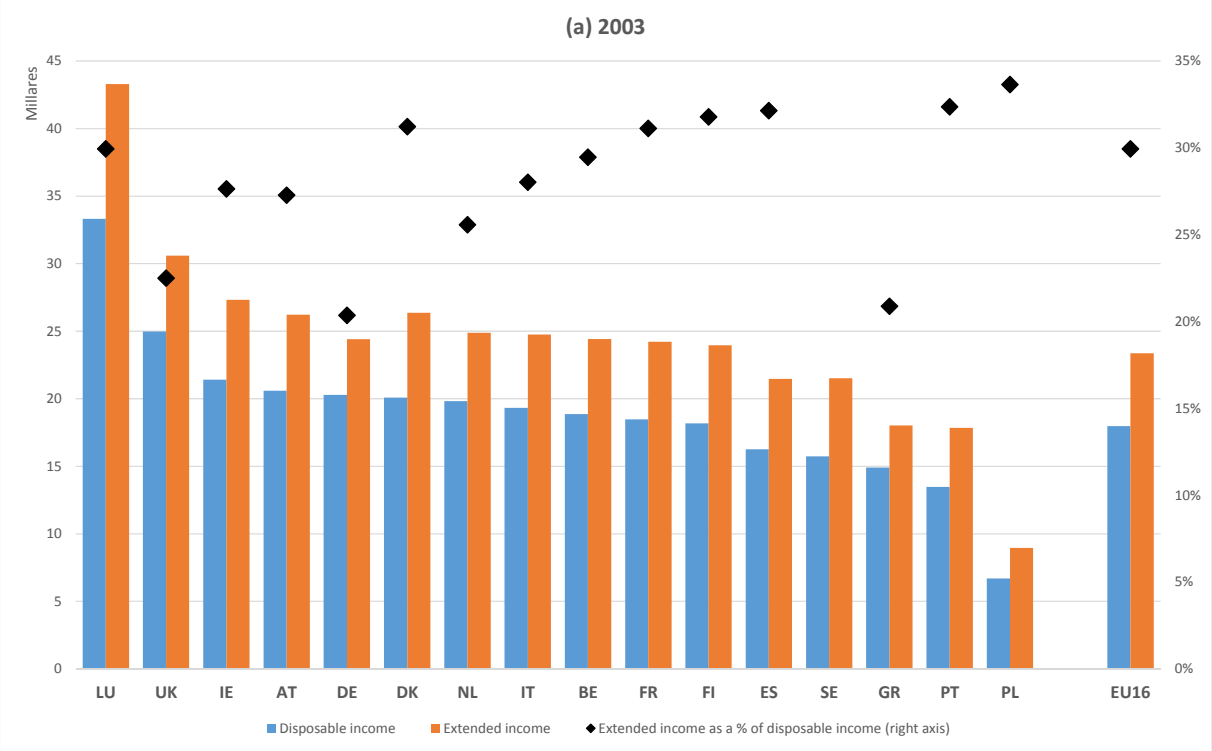
Education, *Health*, *Social Housing*, *Elderly Care* and *Early Childhood Education and Care Services*– and, given its importance, the next section looks at health and education separately.

Overall distributive impact of publicly provided services

The impact of these services, taken jointly, is far more important, from a quantitative perspective, than the impact of cash transfers and direct taxes analysed in the previous sections. Additionally, in-kind public services have not been widely studied from a quantitative point of view. We look first at the effect on the level of household disposable income and next on redistribution when we add the value of in-kind public services.

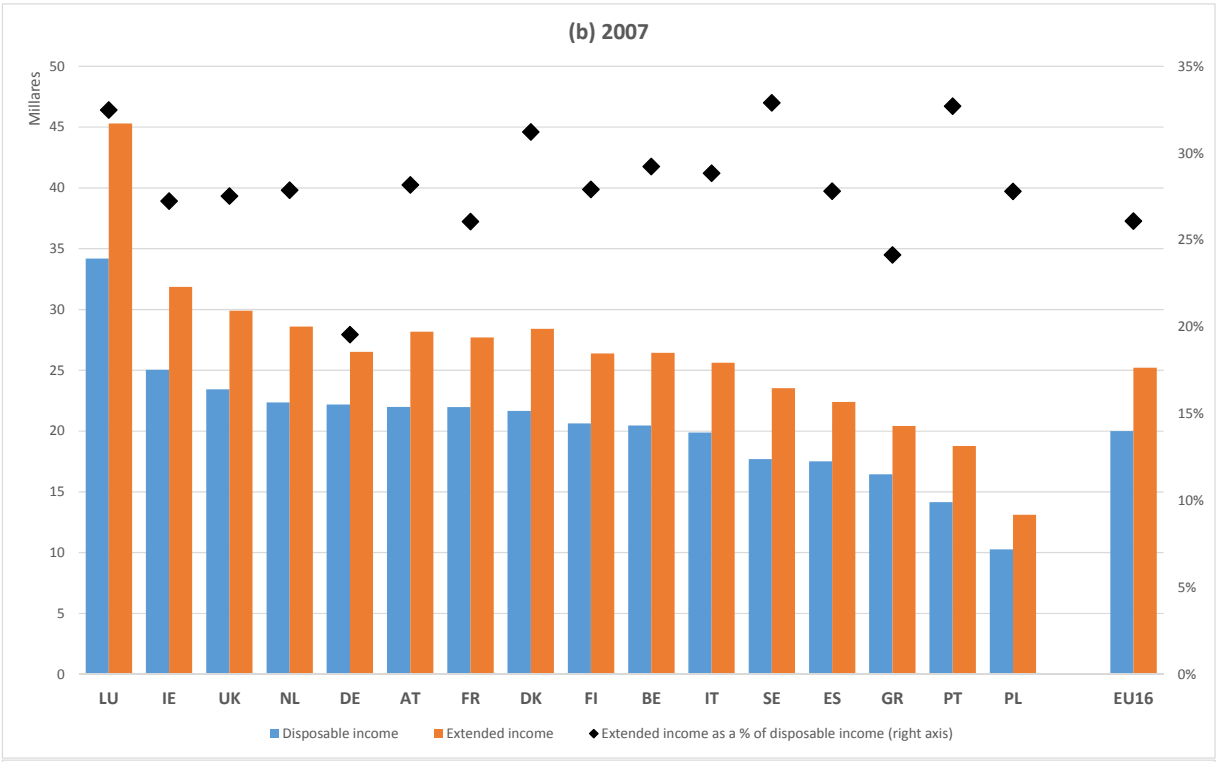
Figure 11 shows the income increasing effect on the level of household income for three years: 2003 or the first available year,[6] 2007 and 2012. On average, accounting for the value of in-kind public services increased disposable income by as much as 30% in 2003, and slightly less in 2012, about 27%. Looking at individual countries the effect oscillates between 20% and 40%, depending on the year. This income-increasing effect is highest in some Nordic countries –Sweden and Denmark– and lowest in Germany, around 20%. These figures are comparable to the ones reported in other studies (OECD, 2011).

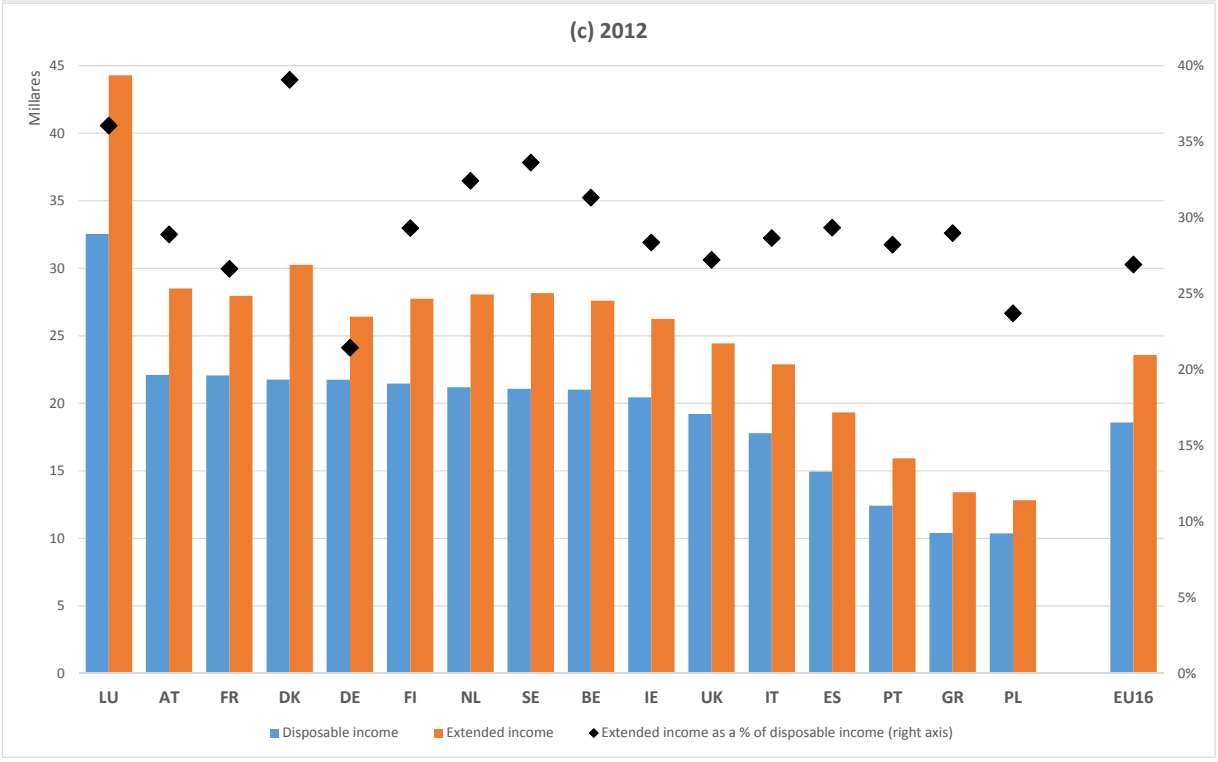
Figure 11. Income-increasing effects of in-kind benefits from other social protection services.



[6] The first available year is 2004 for Germany, the Netherlands, Poland and the United Kingdom.

Figure 11. Income-increasing effects of in-kind benefits from other social protection services. (cont.)





A first step in looking at the distributional impact of public services is to analyse the overall increase in household income resulting from imputation of public services by income groups. This analysis is presented in table 1 for income quintiles.

Table 1 - Income increasing effects of in-kind benefits from public expenditure.

		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
	2003	66.5%	41.7%	29.2%	22.0%	13.3%	27.3%
Austria	2007	73.3%	43.9%	32.8%	22.2%	12.7%	28.2%
	2012	76.7%	45.5%	31.5%	23.2%	13.0%	28.9%
	2003	71.9%	45.1%	32.9%	24.7%	13.5%	29.5%
Belgium	2007	74.9%	44.3%	33.6%	24.8%	12.8%	29.2%
	2012	77.0%	47.2%	34.3%	25.2%	15.3%	31.3%
	2003	46.5%	31.3%	23.3%	17.6%	9.2%	20.4%
Germany	2007	52.3%	31.7%	23.1%	16.3%	8.7%	19.5%
	2012	52.7%	35.6%	25.8%	18.0%	9.7%	21.4%
	2003	77.4%	46.0%	33.0%	24.7%	14.5%	31.2%
Denmark	2007	76.4%	45.8%	34.4%	25.6%	14.5%	31.2%
	2012	95.8%	56.4%	43.7%	34.5%	19.2%	39.1%
	2003	90.9%	53.6%	40.8%	26.4%	13.0%	32.1%
Spain	2007	98.7%	46.6%	30.9%	20.8%	11.9%	27.8%
	2012	112.2%	50.6%	35.3%	23.4%	12.5%	29.3%
	2003	71.9%	50.1%	35.5%	27.6%	13.6%	31.8%
Finland	2007	65.7%	44.1%	31.9%	22.8%	12.7%	27.9%
	2012	66.2%	45.8%	32.7%	24.1%	14.0%	29.3%
	2003	78.2%	47.6%	35.7%	26.0%	14.7%	31.1%
France	2007	67.4%	40.6%	30.2%	21.6%	12.3%	26.1%
	2012	65.8%	40.5%	31.0%	23.6%	12.9%	26.6%
	2003	70.5%	34.5%	23.3%	16.3%	9.8%	20.9%
Greece	2007	75.5%	41.2%	27.6%	20.4%	10.8%	24.1%
	2012	99.0%	50.6%	33.1%	24.4%	12.6%	29.0%
	2003	84.8%	50.7%	32.2%	20.9%	10.7%	27.6%
Ireland	2007	74.9%	47.1%	31.7%	20.9%	11.6%	27.2%
	2012	78.7%	46.5%	33.8%	22.1%	12.3%	28.4%
	2003	89.8%	49.0%	32.9%	22.5%	11.7%	28.0%
Italy	2007	87.4%	46.4%	33.0%	23.0%	13.0%	28.9%
	2012	90.0%	47.3%	33.0%	24.2%	12.5%	28.7%
	2003	72.8%	44.5%	34.0%	24.8%	14.3%	29.9%
Luxembourg	2007	79.5%	47.9%	37.6%	28.1%	15.1%	32.5%
	2012	100.2%	62.6%	40.9%	28.6%	15.4%	36.1%
	2003	70.1%	40.3%	28.7%	19.6%	10.5%	25.6%
Netherlands	2007	71.7%	43.5%	31.7%	22.9%	12.1%	27.9%
	2012	73.8%	46.3%	36.3%	27.7%	16.1%	32.4%
	2003	106.7%	54.0%	40.5%	30.3%	15.9%	33.6%
Poland	2007	76.6%	45.1%	32.3%	24.2%	12.8%	27.8%
	2012	67.5%	38.7%	27.7%	19.5%	10.4%	23.7%
	2003	117.4%	61.9%	39.4%	26.7%	13.0%	32.4%
Portugal	2007	106.4%	59.3%	40.7%	26.5%	13.6%	32.7%
	2012	91.7%	49.1%	34.7%	23.2%	11.5%	28.2%
	2003	82.8%	55.9%	41.0%	28.3%	17.3%	36.8%
Sweden	2007	73.2%	51.7%	37.0%	26.4%	15.2%	32.9%
	2012	79.4%	50.0%	34.9%	29.6%	16.2%	33.6%
	2003	75.8%	43.2%	27.2%	17.3%	8.3%	22.5%
United Kingc	2007	93.7%	51.4%	33.1%	21.1%	9.8%	27.5%
	2012	77.1%	48.9%	31.9%	20.7%	10.9%	27.2%
	2003	83.0%	48.9%	35.0%	24.4%	13.1%	29.9%
EU16	2007	75.4%	43.0%	30.3%	21.0%	11.3%	26.1%
	2012	73.2%	43.9%	31.3%	22.4%	12.0%	26.9%

Source: EU-SILC, COFOG, SOCX and own elaboration

It can be clearly seen that taken as a whole, all the public services considered account for a much higher share of disposable income among lower-income than among higher-income households. On average, in 2003 this share was around 83% for the poorest 20% compared to 13% for the richest 20%. These shares fall slightly in 2012 to 73% and 12% respectively, but they reflect an obvious pro-inequality-reduction pattern.

There are cases of individual countries in which the value of public services is equal to disposable income for the first quintile, for example Spain or Portugal, highlighting the importance of these public services for some population groups.

Given the large shares of in-kind services in the extended disposable income concept, especially for poorer groups, it is interesting to see how the income distribution changes once these services are taken into account. This information is shown in figure 12, and can be anticipated to a large extent from table 1. On average, inequality as measured by the Gini index falls from 32.7 to 26.9 (17.6%) in 2012, a significant drop although slightly less than in previous years.

The redistributive effect is quite important in all countries, and in 2012 ranges from a 4 percentage point reduction in the Gini index in Sweden, the country with the lowest inequality, to an 8-point reduction in Spain and Portugal. The reason for such a large reduction in these two countries is clear: the economic crisis led to an enormous increase in market income inequality due to the massive increase in unemployment, but public policy, through the provision of in-kind services, plays a key role in smoothing distributional market outcomes, despite reductions in public expenditure in these services.

A positive association can be seen between the magnitude of the redistributive effect and the level of inequality in disposable income in a given year. Note the positive slope trend on the Gini index reduction in figure 12, which implies that in general the higher the inequality in disposable income, the greater the redistributive effect of in-kind public services. This association exhibits a decreasing tendency, with a correlation coefficient of 0.85 at the beginning of the period and 0.79 at the end.

Finally, figure 13 shows the distribution of in-kind public expenditures –panel (a)– and beneficiaries –panel (b)– by income quintiles, and shows the general pro-inequality-reducing effect of both, expenditure and beneficiaries, although expenditure is more evenly distributed across income groups than beneficiaries. These are heavily concentrated in the poorest 20% of households in most of the countries, Greece being an exception.

Figure 12. Inequality-decreasing –Gini index– effects of in-kind benefits from publicly provided services.

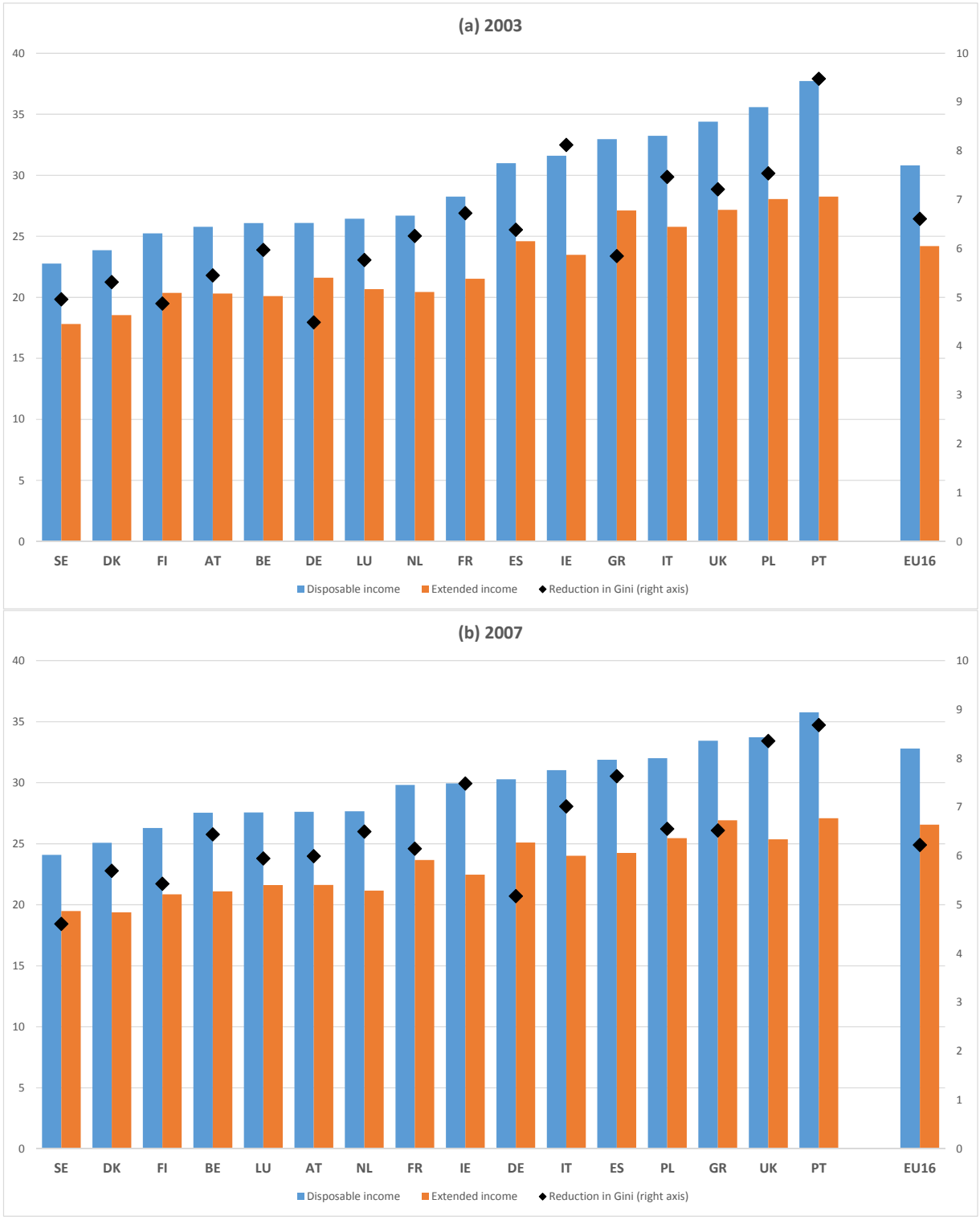


Figure 12. Inequality-decreasing –Gini index– effects of in-kind benefits from publicly provided services. (cont.)

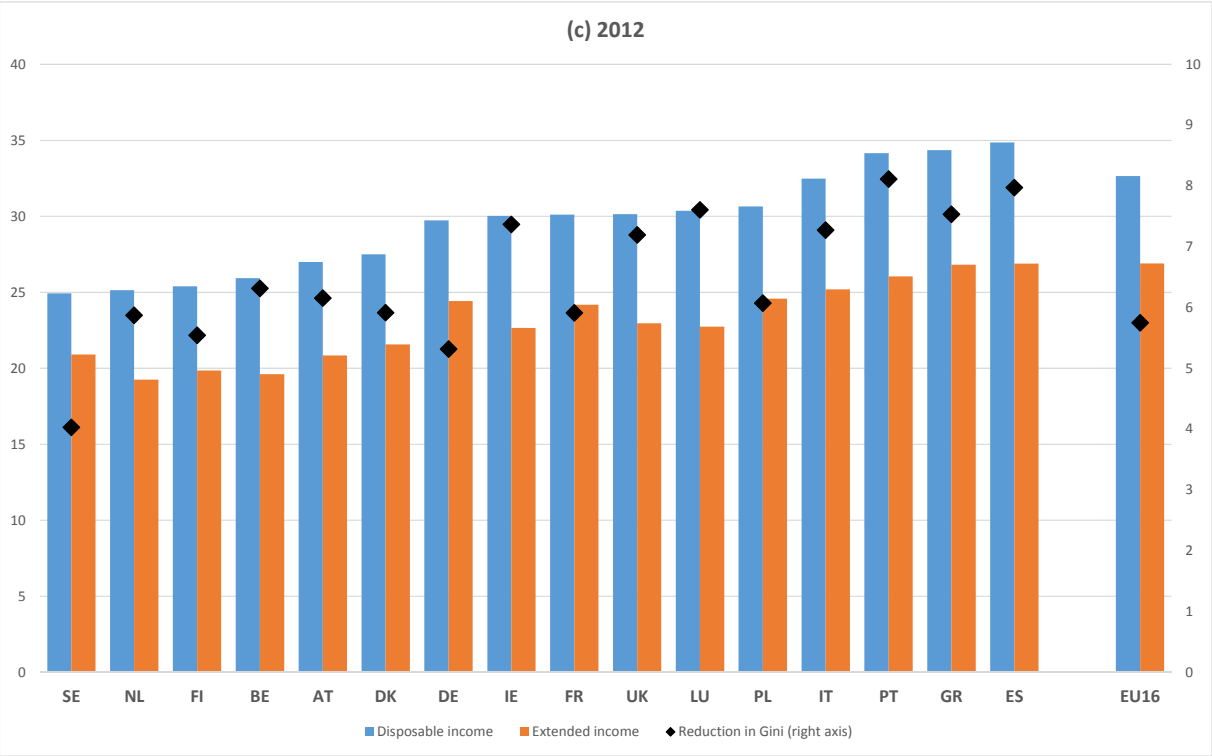
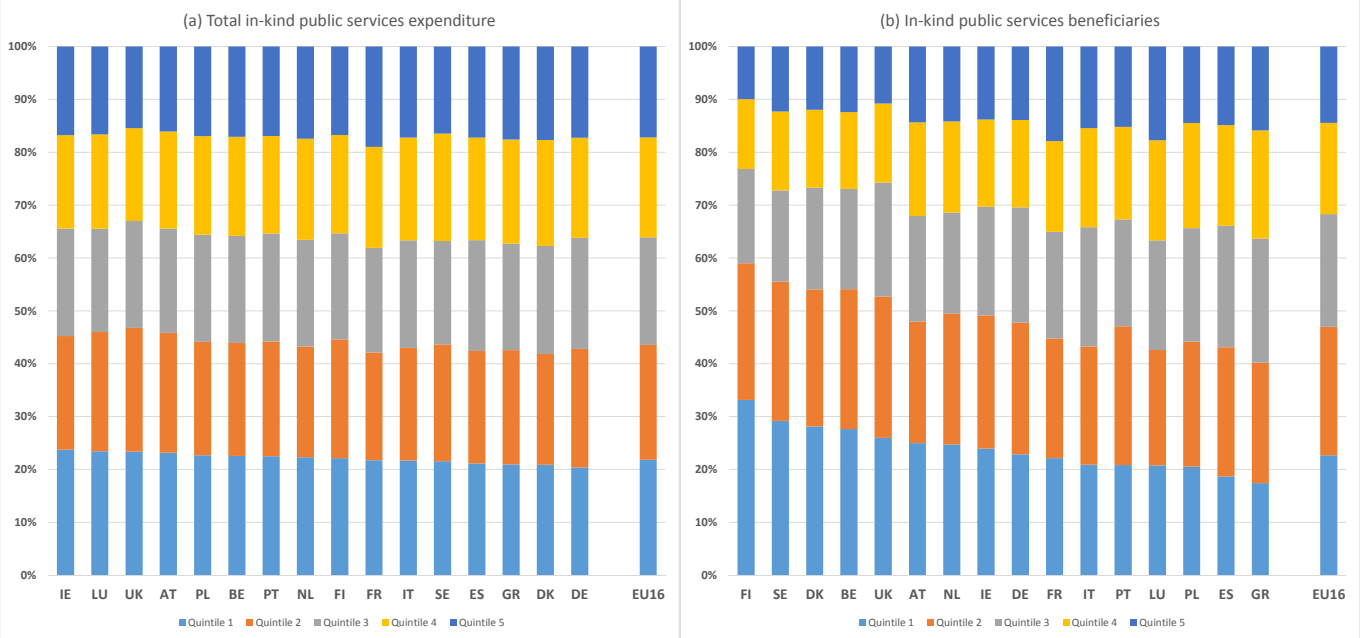


Figure 13. Distribution of in-kind public services expenditures and beneficiaries over income quintiles, 2012.



Source: EU-SILC, COFOG, SOCX and own elaboration.

5. Distributive impact of particular publicly provided services: Health and Education.

Education

This sub-section looks at the distributional impact of in-kind public education previous to and during the crisis. Public education data comes from the *Classification of the Functions of Government* (COFOG) statistics by Eurostat, from which cash transfers, mainly grants, are deducted. We distinguish three types of education: *Pre-primary & Primary*, *Secondary* and *Tertiary*. Most primary and secondary education is compulsory in the majority of EU countries. However, we offer here results for aggregate education expenditure only.

First, we look at the income-increasing effect of in-kind educational services and then we examine distributional effects. Accounting for public services in education increases disposable household income by 12% on average in 2003, but this figure falls by up to around 10% in 2012. The country heterogeneity exhibited in education expenses is reflected in the income-increasing effect at individual country level. As shown in figure 14, there is a difference of about 10 percentage points between the country with the lowest effect, Germany, which has an income-increasing effect of about 7% in all years, and the countries with highest effect, Sweden, Luxemburg and Denmark.

A consistent pattern revealed in figure 14 is that countries with a lower disposable income tend to exhibit a higher proportional increase in educational extended income, with a few exceptions. Moreover this effect did not decrease in the crisis years, but remained mainly constant. This fact has a simple explanation: disposable income and educational services have evolved roughly in line with each other in a given country, so in relative terms we do not see an adverse effect on the income-increasing effect of public education. For example, expenditure in education in the *PIIGS* countries falls around 20%-25% between 2007 and 2012, whereas household disposable income falls between 11%-12% in Italy and Portugal and 37% in Greece in the same period. Despite public sector cuts, education seems to support household income by a similar amount.

Table 2 shows that the increase in disposable income shown in figure 14 at the aggregate level is far more important for lower- than for higher-income groups, and this is the case for all countries, even though heterogeneity across countries appears to be the rule once again. Imputing all education expenditures would increase income of the poorest 20% by as much as 50% in some countries and years. For some countries with strong consolidation policies, like Spain or Greece, education as a percentage of disposable income in 2012 is

much higher than in 2007, suggesting a supporting effect of education; for others, like Italy or Portugal, the pattern is somewhat different. This is due not only to the evolution of education expenses, but also to what happened with primary –labour– income throughout the period.

Figure 14. Income-increasing effects of in-kind benefits from education.

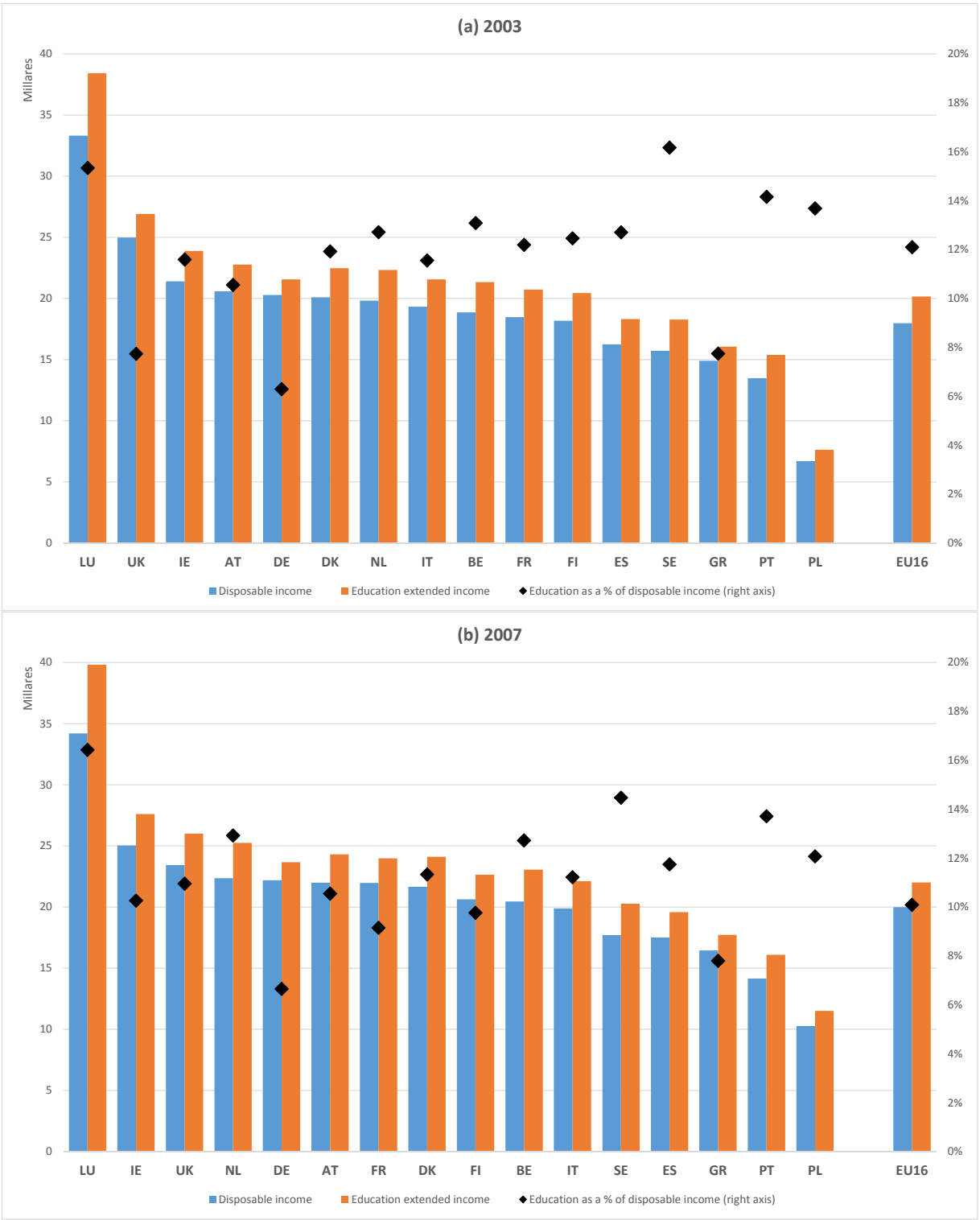
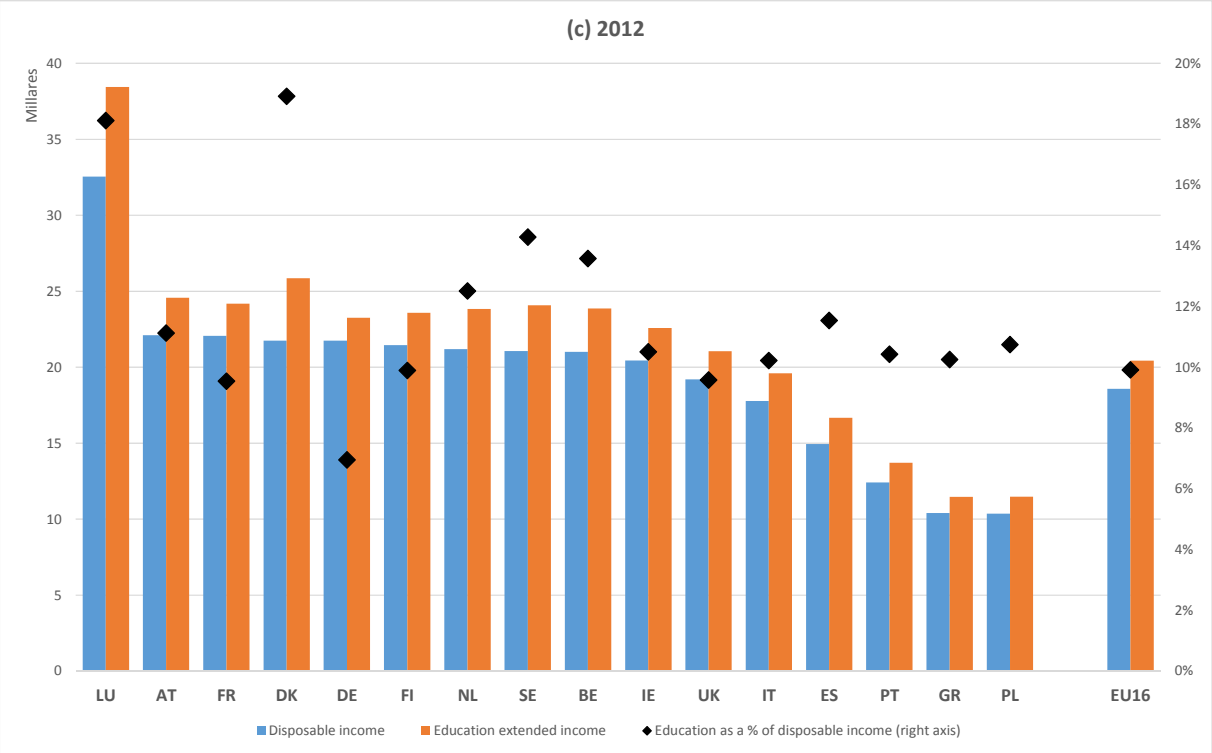


Figure 14. Income-increasing effects of in-kind benefits from education (cont.).



Source: EU-SILC, COFOG and own elaboration.

The increase for the middle class, the 3rd quintile, is quite stable over time within a given country, at around 12%-14%. The increase for the top quintile is much lower, usually below 5%, with an average of 4% and a decreasing trend over the period.

The general pattern that emerges from table 2 is clear: educational expenditures are strongly redistributive, in terms of reducing relative inequalities, for all countries and years analysed. This conclusion has also been reached by other authors (Paulus, Stutherland and Tsakloglou, 2010; OECD, 2011; Verbist and Matsaganis, 2012), but it is encouraging to confirm that this is also the case in the crisis years, even for countries with a strong fiscal consolidation.

Given the pattern observed in table 2, figure 15 shows the inequality-decreasing effect of in-kind benefits from education for years 2003, 2007 and 2012 using the Gini index. On average inequality falls from 32.7 to 30.2 (7.5%) in 2012, and slightly more in previous years. Individual countries oscillate between a reduction of 6% in Germany and 15% in Luxemburg.

Table 2 - Income increasing effects of in-kind benefits from education by quintile. Education as a % of disposable income

		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
	2003	27.5%	18.3%	11.3%	8.0%	4.1%	10.6%
Austria	2007	29.4%	17.4%	12.6%	7.4%	4.3%	10.5%
	2012	33.5%	19.8%	12.1%	8.2%	3.6%	11.1%
	2003	31.7%	19.6%	15.4%	11.7%	5.3%	13.1%
Belgium	2007	32.0%	17.8%	15.6%	12.0%	5.0%	12.7%
	2012	33.5%	19.1%	15.7%	11.4%	6.4%	13.6%
	2003	15.8%	10.5%	7.3%	5.1%	2.3%	6.3%
Germany	2007	20.2%	10.5%	7.9%	5.4%	2.6%	6.7%
	2012	18.6%	11.9%	8.4%	5.9%	2.7%	7.0%
	2003	29.0%	17.6%	14.4%	9.8%	4.5%	11.9%
Denmark	2007	28.4%	15.0%	14.4%	10.4%	4.0%	11.3%
	2012	48.2%	23.5%	22.0%	18.7%	8.7%	18.9%
	2003	39.2%	21.9%	15.3%	9.4%	5.3%	12.7%
Spain	2007	45.5%	19.2%	12.7%	8.1%	5.1%	11.7%
	2012	54.8%	18.8%	13.0%	8.5%	4.6%	11.5%
	2003	29.6%	20.5%	14.5%	10.6%	4.4%	12.5%
Finland	2007	22.9%	15.8%	11.8%	8.2%	3.8%	9.8%
	2012	25.9%	15.4%	11.0%	8.1%	3.8%	9.9%
	2003	32.7%	19.8%	14.6%	10.0%	4.6%	12.2%
France	2007	27.8%	14.9%	10.5%	6.5%	3.8%	9.2%
	2012	30.3%	15.0%	10.6%	7.5%	3.7%	9.5%
	2003	25.9%	12.2%	8.3%	6.4%	3.8%	7.7%
Greece	2007	26.6%	13.6%	7.9%	6.9%	3.3%	7.8%
	2012	47.0%	19.4%	9.7%	7.9%	3.5%	10.3%
	2003	33.6%	20.8%	15.5%	8.9%	4.0%	11.6%
Ireland	2007	29.5%	18.2%	13.4%	7.2%	3.7%	10.3%
	2012	34.3%	17.3%	12.5%	7.3%	4.0%	10.5%
	2003	40.9%	21.3%	13.4%	8.6%	4.3%	11.6%
Italy	2007	38.2%	18.4%	12.4%	8.7%	4.5%	11.2%
	2012	37.2%	18.0%	11.0%	8.3%	3.7%	10.2%
	2003	40.3%	25.0%	15.6%	12.7%	6.6%	15.3%
Luxembourg	2007	46.0%	23.8%	17.7%	14.6%	6.7%	16.4%
	2012	60.4%	32.4%	19.7%	12.7%	6.6%	18.1%
	2003	42.2%	20.2%	14.2%	8.8%	3.9%	12.7%
Netherlands	2007	38.8%	19.7%	15.2%	10.1%	4.5%	12.9%
	2012	36.6%	17.4%	14.1%	9.7%	4.7%	12.5%
	2003	59.1%	24.1%	15.3%	10.1%	5.1%	13.7%
Poland	2007	41.4%	20.5%	12.9%	9.4%	4.8%	12.1%
	2012	35.5%	18.0%	12.4%	7.9%	4.1%	10.7%
	2003	52.7%	26.1%	17.3%	11.4%	5.8%	14.2%
Portugal	2007	50.8%	25.0%	16.8%	9.9%	5.3%	13.7%
	2012	39.0%	18.1%	13.2%	7.9%	3.6%	10.4%
	2003	38.1%	24.1%	19.0%	12.9%	6.4%	16.2%
Sweden	2007	33.1%	23.9%	16.8%	11.9%	5.4%	14.5%
	2012	36.5%	21.1%	15.7%	12.7%	5.7%	14.3%
	2003	26.2%	14.4%	9.7%	6.2%	2.7%	7.7%
United Kingd	2007	38.1%	20.5%	14.0%	8.4%	3.4%	11.0%
	2012	31.9%	18.4%	10.6%	6.4%	3.3%	9.6%
	2003	35.8%	20.5%	14.3%	9.5%	4.7%	12.1%
EU16	2007	32.3%	16.7%	11.8%	7.8%	3.9%	10.1%
	2012	31.8%	16.5%	11.2%	7.8%	3.7%	9.9%

Source: EU-SILC, COFOG and own elaboration

In all years there is a positive association between the redistributive effect and the level of inequality in disposable income –correlation coefficient around 0.6– with little variation across years. There is also a clear relation between the magnitude of the income-increasing effect of public education and the magnitude of the inequality-decreasing effect, although this effect appears to be weaker at the end of the period.

It is worth remembering that benefits of equal size will, *ceteris paribus*, translate into larger proportional increases in the income of poorer households (table 1), so the way in which the imputation was done, independently of income and according to the actual consumption approach, is redistributive by nature, unless poorer households have fewer students. An inspection of the distribution of students by income quintile suggests that this not the case; on the contrary, students are more concentrated in the lower-income distribution quintiles, which helps to explain the redistributive nature of the public education service. To summarise, this result suggests that the redistributive effect of in-kind benefits in education should be largely attributed to their size.

We detect no changes in the redistribution patterns during the crisis years, even for the fiscal consolidation countries, for which the redistributive effect seems to be approximately the same in 2012 as in 2007. A formal statistical test of constant redistributive effects between 2003 and 2007, and between 2007 and 2012, does not reject the null of identical redistributive effects in all cases, indicating that, on average across countries, inequality reduction of educational in-kind services has remained remarkably stable throughout the period.

Educational expenditure seems to be a good instrument to promote equality. In fact if public cuts in education had not taken place in the last years in Spain, Greece, Ireland, Italy, Portugal and the United Kingdom, the redistributive effect would have been higher for these countries, compensating much more the increase in disposable income inequality.

Total education expenditures tend to be allocated slightly more to lower-income groups than to top income groups. In 2012, the first quintile received on average 26% of all education expenditures, compared to 15% in the fifth quintile. This trend is found in all countries, from the Netherlands, with the highest share in the bottom quintile (29%), to Denmark, with the lowest share (22%); this country shows the most even distribution of educational expenditure, with the highest quintile receiving 17% of expenditure. Hence education expenditure exhibits a clear redistributive pattern, reflected in figure 15.

Figure 15. Inequality-decreasing –Gini index– effects of in-kind benefits from education.

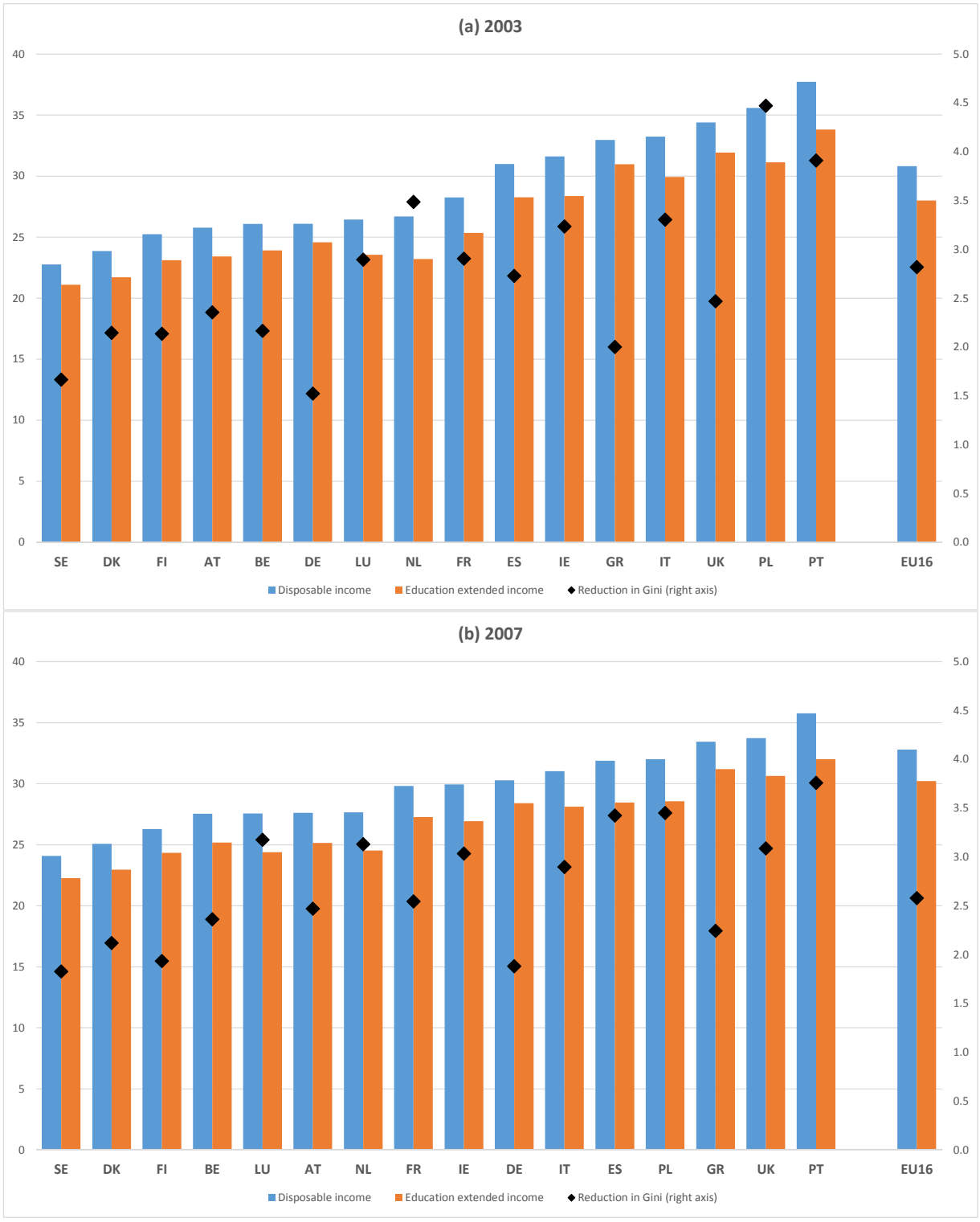
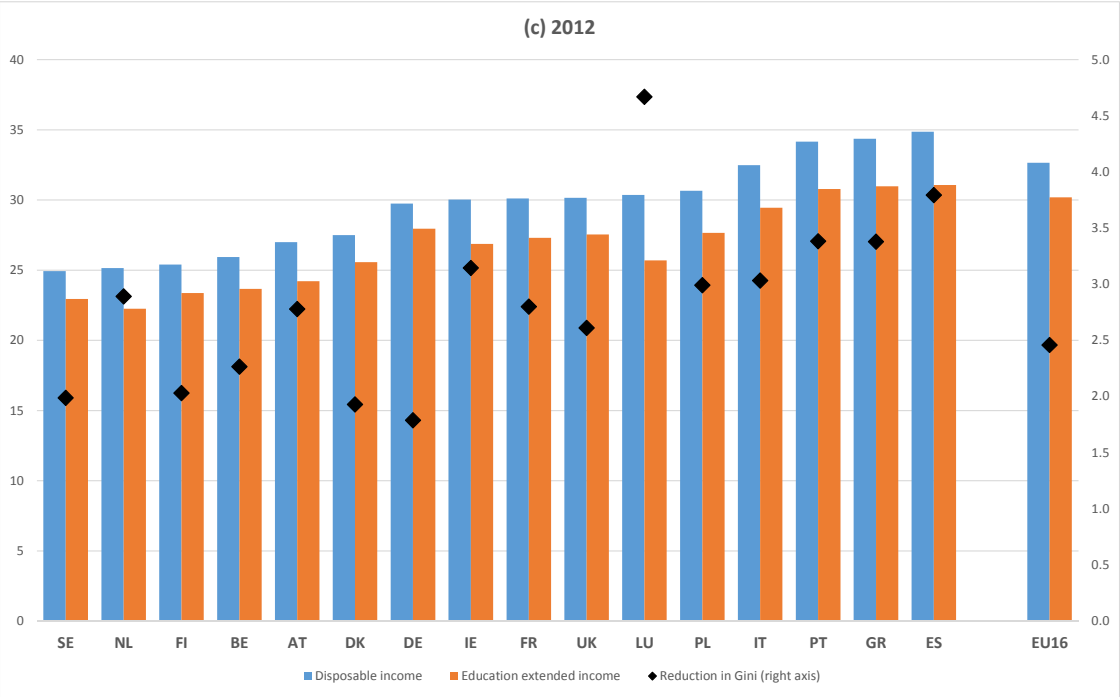


Figure 15. Inequality-decreasing –Gini index– effects of in-kind benefits from education (cont.).



Source: EU-SILC, COFOG and own elaboration.

The redistributive impact is, however, likely to be different for the different levels of education considered. Primary and secondary education tend to be more redistributive than higher education. The reason should be clear: primary and secondary education is for the most part compulsory, and it is supposed to benefit all school-age children equally, while tertiary education does not benefit everyone in the same age group. This is in fact the case in all countries, with the exception of Denmark, where tertiary education shows the highest redistributive effect (Goerlich y Hernandez 2016).

Primary and secondary education are indeed more oriented towards low-income groups and differences across countries are not very pronounced. In contrast, the allocation pattern of tertiary education varies much more across countries. These differences increased continuously over the period, as measured by the coefficient of variation, so average expenditure per student in higher education shows a diverging pattern across countries. Consolidation policies are partly responsible for this, since expenditure per student in tertiary education fell more than for other types of education in these countries.

Note however that tertiary education still exhibits a progressive pattern, with 30% of expenses allocated to the first quintile, a pattern that is not common across countries, since for

example in Portugal only 16% of tertiary educational expenses are allocated to the bottom quintile in the income distribution. Hence the lowest redistributive impact of tertiary education is due to the lower amount devoted to this type of education in comparison with primary and secondary education.

Health

This sub-section looks at the distributional impact of in-kind public health expenditure prior to and during the crisis. Health expenditure data comes from Eurostat's *Classification of the Functions of Government* (COFOG). We distinguish three types of health services: *Pharmacy*, *Primary Care and Outpatient Services*, and *Hospital Services*. However, we offer here results for aggregate health expenditure only.

As in the education case we first look at the income-increasing effect of in-kind health services and then examine distributional effects. Accounting for public health services increased disposable household income by 15% on average in 2003, a figure that remained stable throughout the period. Hence the income-increasing effect of in-kind public health is greater than the income-increasing effect of in-kind public education. The country heterogeneity exhibited in health expenditure translates into the income-increasing effect at individual country level. Figure 16 shows there is a difference of about 6 percentage points between the country with the lowest effect, Poland, which has an income-increasing effect of about 10% in all years, and the countries with the highest effect, Sweden, Portugal and the Netherlands.

In contrast to the case of education, figure 16 shows that the income-increasing effect of health expenditures seems to be more or less constant across income levels in the countries analysed. However, as with education, this effect did not decrease in the crisis years, but remained mostly constant or even increased slightly. As in the previous case, these findings have a simple explanation: disposable income and health expenditure evolved roughly in line with each other in a given country, so in relative terms we do not see an adverse effect on the income-increasing effect of public health on household disposable income. Hence, despite public sector cuts, health expenditure seems to support households by a similar amount.

Figure 16. Income-increasing effects of in-kind benefits from health expenditures.

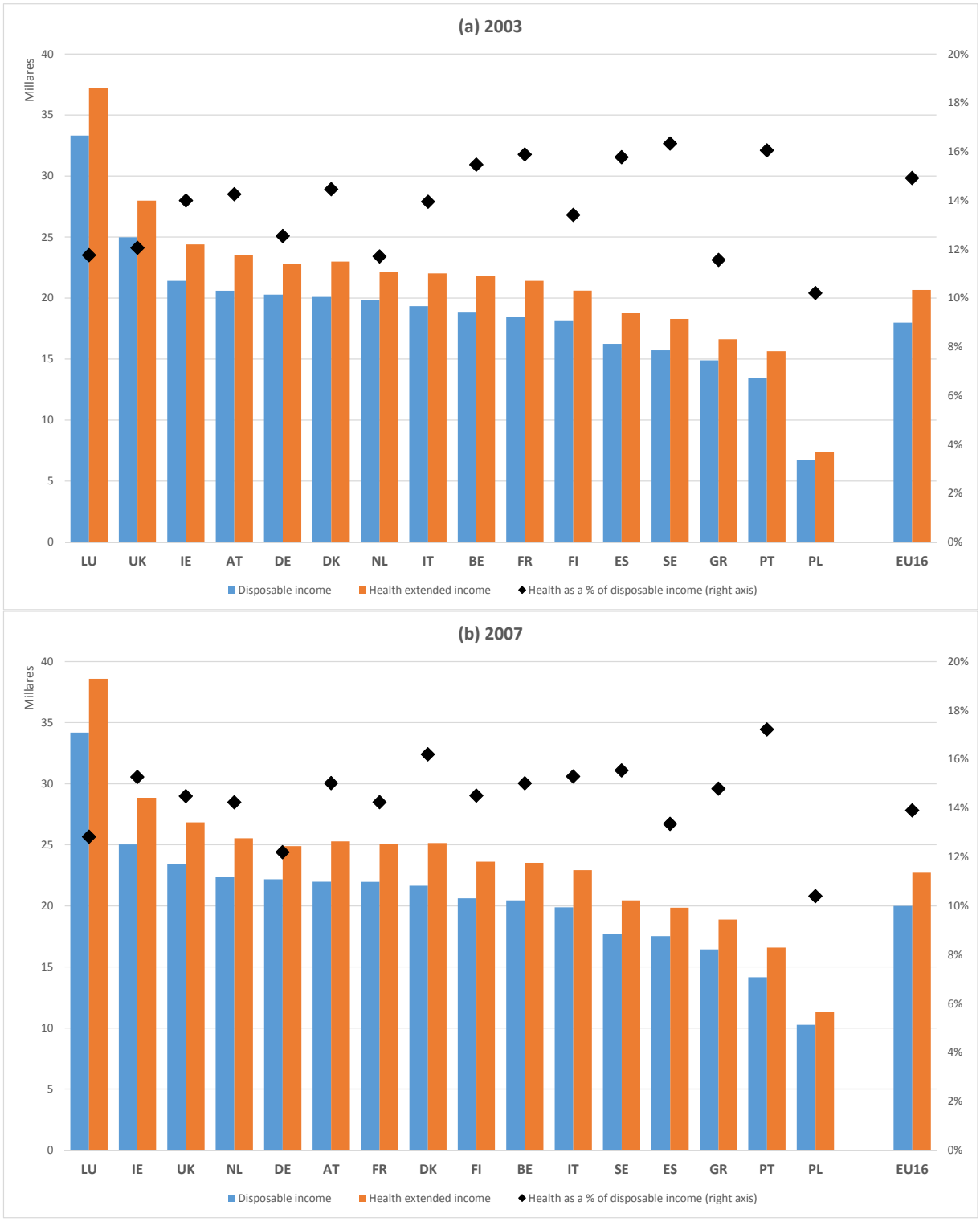
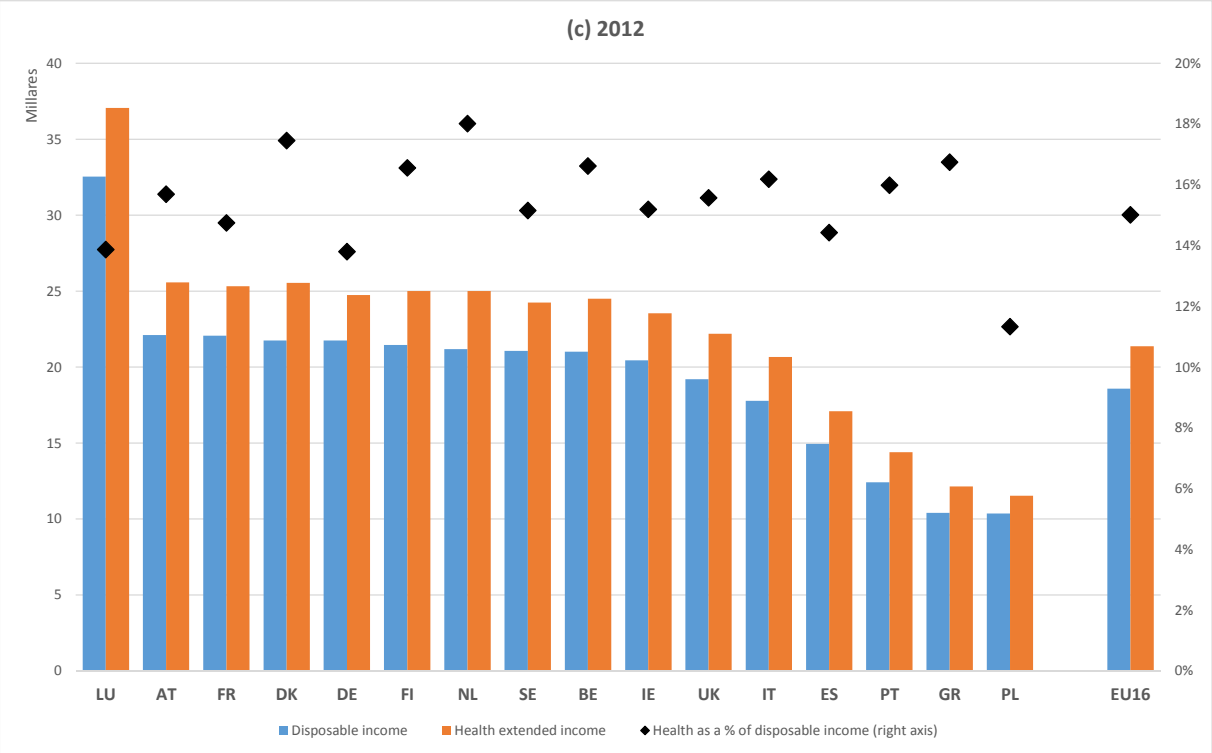


Figure 16. Income-increasing effects of in-kind benefits from health expenditures. (cont.)



Source: EU-SILC, COFOG and own elaboration.

Table 3 shows that the increase in disposable income seen in figure 16 at the aggregate level is far more important for lower- than for higher-income groups, and this is the case for all countries. A relatively common pattern emerges: imputing health expenditures increases the income of the poorest 20% by as much as 40% in some countries and years. The increase for the middle class, the 3rd quintile, is quite stable over time within a given country at around 15%-20%. The increase for the top quintile is much lower, but higher than that observed for education (table 2).

The general pattern that emerges from table 3 is clear: health expenditures are strongly redistributive, in terms of reducing relative inequalities, for all countries and years analysed. This conclusion has also been reached in previous research (Marical et al., 2006, 2008; Paulus, Stutherland and Tsakloglou, 2010; OECD, 2011; Verbist and Matsaganis, 2012), but it is encouraging to confirm that this is also the case in the crisis years, even for countries with a strong fiscal consolidation.

Table 3 - Income increasing effects of in-kind benefits from health services by quintile. Health as a % of disposable income

		Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total
	2003	31.5%	19.5%	15.6%	12.3%	8.1%	14.3%
Austria	2007	35.7%	22.6%	16.6%	12.8%	7.8%	15.0%
	2012	36.1%	22.0%	17.4%	13.6%	8.6%	15.7%
	2003	37.2%	24.1%	16.8%	12.4%	7.6%	15.5%
Belgium	2007	37.5%	24.2%	16.6%	11.7%	7.2%	15.0%
	2012	38.2%	26.3%	17.9%	13.1%	8.6%	16.6%
	2003	26.6%	18.1%	14.3%	11.3%	6.4%	12.5%
Germany	2007	29.4%	19.8%	14.5%	10.5%	5.9%	12.2%
	2012	31.5%	22.4%	16.7%	11.7%	6.9%	13.8%
	2003	34.2%	20.8%	14.5%	11.0%	8.1%	14.5%
Denmark	2007	39.2%	24.5%	16.1%	12.4%	8.9%	16.2%
	2012	40.8%	28.0%	18.8%	13.9%	9.2%	17.5%
	2003	38.4%	25.8%	20.7%	14.4%	6.6%	15.8%
Spain	2007	42.1%	22.7%	15.2%	10.7%	5.9%	13.4%
	2012	45.3%	25.2%	18.0%	12.2%	6.7%	14.4%
	2003	28.4%	20.3%	14.6%	11.2%	7.1%	13.4%
Finland	2007	33.6%	22.4%	15.6%	11.9%	7.4%	14.5%
	2012	34.4%	25.8%	18.4%	13.6%	8.8%	16.6%
	2003	36.6%	23.3%	17.7%	13.6%	8.7%	15.9%
France	2007	31.8%	21.3%	16.4%	13.1%	7.6%	14.2%
	2012	30.8%	22.3%	17.4%	13.4%	8.1%	14.7%
	2003	39.1%	19.8%	13.3%	8.8%	5.2%	11.6%
Greece	2007	45.0%	25.5%	18.2%	11.7%	6.7%	14.8%
	2012	45.0%	28.4%	21.2%	15.2%	7.8%	16.7%
	2003	37.8%	24.7%	15.6%	11.5%	6.5%	14.0%
Ireland	2007	36.2%	25.9%	17.2%	13.1%	7.4%	15.3%
	2012	32.9%	24.6%	18.2%	13.6%	7.7%	15.2%
	2003	39.3%	23.2%	16.6%	12.0%	6.6%	13.9%
Italy	2007	40.6%	24.5%	17.9%	12.8%	7.6%	15.3%
	2012	43.3%	25.8%	19.4%	14.1%	8.1%	16.2%
	2003	24.5%	16.6%	14.2%	10.0%	6.4%	11.8%
Luxembourg	2007	25.1%	19.4%	16.4%	11.2%	6.6%	12.8%
	2012	29.3%	21.6%	16.9%	12.8%	7.2%	13.9%
	2003	25.4%	17.8%	13.1%	10.0%	6.2%	11.7%
Netherlands	2007	31.0%	22.3%	15.8%	12.4%	7.4%	14.2%
	2012	35.0%	26.7%	19.7%	15.9%	10.1%	18.0%
	2003	28.6%	17.0%	13.1%	9.6%	4.7%	10.2%
Poland	2007	25.3%	16.8%	12.8%	9.5%	4.9%	10.4%
	2012	27.1%	18.0%	13.5%	10.3%	5.5%	11.3%
	2003	54.8%	31.2%	19.5%	13.6%	6.6%	16.0%
Portugal	2007	49.6%	30.8%	21.3%	15.4%	7.7%	17.2%
	2012	43.3%	27.9%	19.3%	14.2%	7.5%	16.0%
	2003	33.7%	23.6%	16.8%	13.1%	9.6%	16.3%
Sweden	2007	34.1%	22.7%	16.0%	12.6%	8.8%	15.5%
	2012	32.4%	22.5%	15.7%	12.4%	8.9%	15.2%
	2003	37.1%	22.7%	14.8%	9.5%	4.9%	12.1%
United Kingd	2007	44.5%	25.7%	17.1%	11.9%	6.1%	14.5%
	2012	38.0%	25.9%	19.1%	13.0%	7.2%	15.6%
	2003	37.4%	23.5%	17.4%	12.8%	7.3%	14.9%
EU16	2007	35.9%	22.5%	16.1%	11.8%	6.7%	13.9%
	2012	35.4%	24.0%	17.8%	12.9%	7.6%	15.0%

Source: EU-SILC, COFOG and own elaboration

Given the pattern observed in table 3 it should be clear that relative inequality indexes will indicate a fall when health expenditures are added to disposable income. This is observed in figure 17, which shows the inequality-decreasing effect from public health expenditures for years 2003, 2007 and 2012 using the Gini index. On average, inequality falls from 32.7 to 29.5 (9.8%) in 2012, and slightly more in previous years. Individual countries oscillate between a 10% reduction in Poland and a 15% reduction in Belgium. The inequality-reducing effect of health care services is therefore higher than that of educational services.

We find a positive association between the magnitude of the redistributive effect and the level of inequality in disposable income in a given year. This association decreases over time, with a correlation coefficient of 0.7 at the beginning of the period and 0.6 at the end.

Figure 17. Inequality-decreasing –Gini index– effects of in-kind benefits from health expenditures.

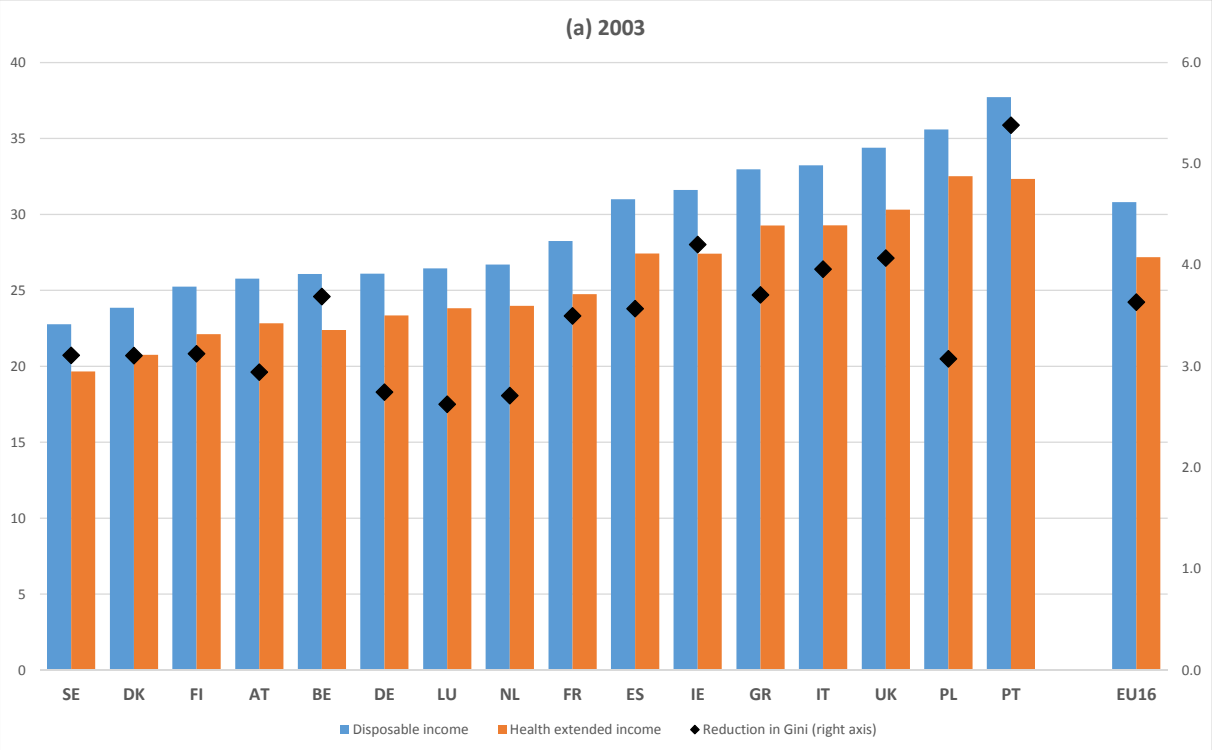
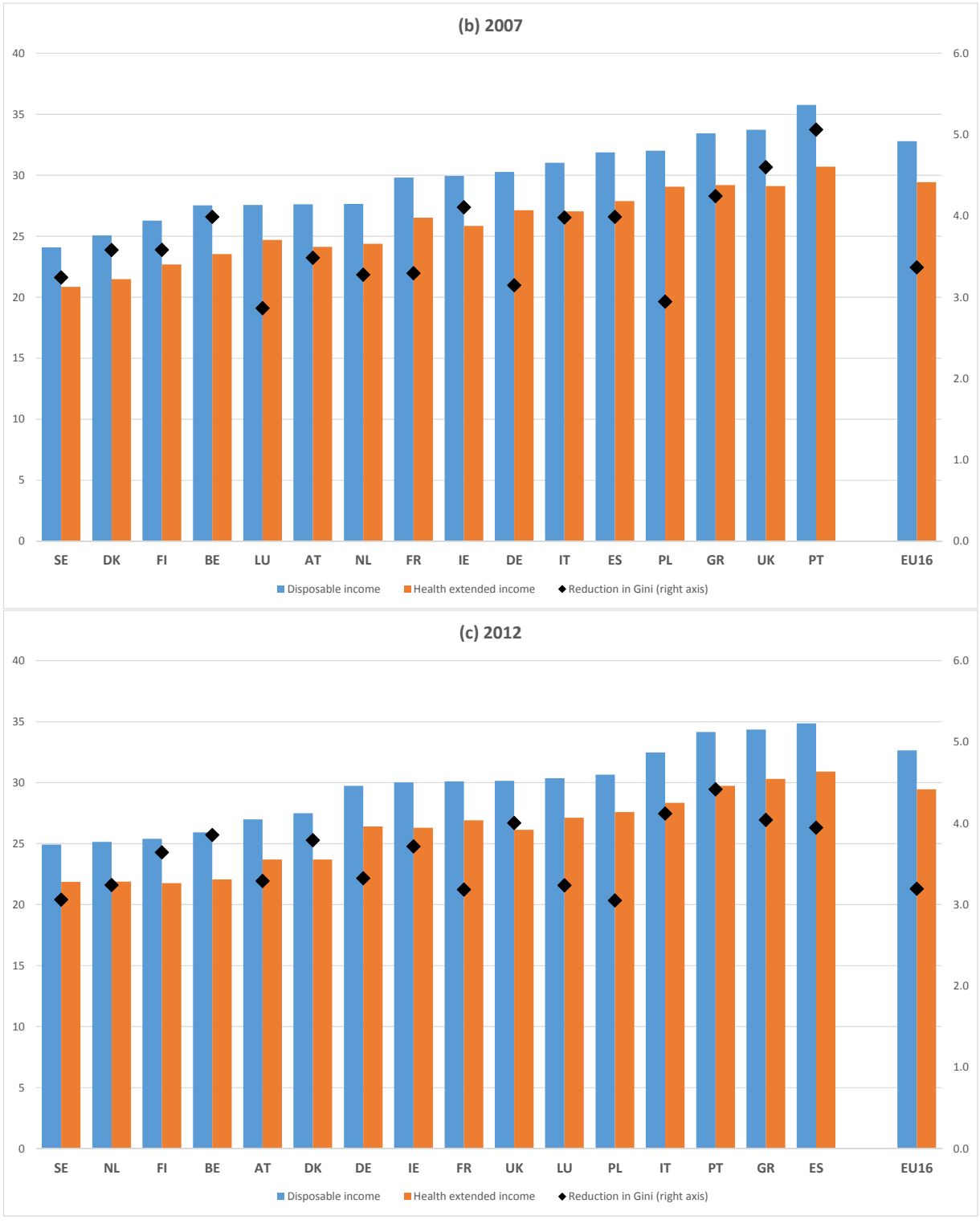


Figure 17. Inequality-decreasing –Gini index– effects of in-kind benefits from health expenditures. (cont.)



Source: EU-SILC, COFOG and own elaboration.

Recall that our approach to measure inequality is relative (scale invariant), so benefits of equal size will, *ceteris paribus*, translate into larger proportional increases in the income of poorer households (table 3). The way in which the imputation was done, independently of income and following the insurance value approach, is redistributive by nature, unless old people, who are imputed a higher health income are heavily concentrated in richer households. An inspection of the distribution of people aged 75 years old and over across income quintiles suggests that this not generally the case. However the distribution of old people across income distribution varies greatly across the countries analysed. For example, more than 40% of old people is in the first quintile of the income distribution in Finland and Sweden, but for Luxemburg this share is lower than 10%.

As in the case of education, the redistributive effect of health care services should be attributed, to a great extent, to their size and to the even distribution of health expenditure across the population. This explains why the most redistributive health type expenditure is hospital services.

The redistribution pattern seems to reflect a slight decrease over time, but no significant differences are detected. For the countries with fiscal consolidation policies the magnitude of the redistribution effect is around 4 percentage points of the Gini index in 2007, and about the same magnitude in 2012. A formal statistical test of constant redistribution effects between 2003 and 2007 is significant at 1%, indicating a higher redistributive effect in 2007. The same test for the period 2007 and 2012 does not reject the null hypothesis of identical redistributive effects in the two years, indicating that, on average across countries, inequality reduction through health care services has remained remarkably stable over the crisis years.

As with education, public health seems to be a good instrument to promote equality. In fact, if there had been no cuts in health care services in the last years in Spain, Greece, Ireland, Italy, Portugal and the United Kingdom, the redistributive effect would have been higher for these countries, which would have compensated much more the increase in disposable income inequality.

Total health care expenditures tend to be allocated much more evenly across income groups than education. This is particularly true for total expenditure, where almost every quintile receives the same share.

A similar pattern is seen for the different health expenditure types, so health is more uniformly distributed than education. Despite this, the redistributive effect, in terms of the

reduction in the Gini index, is higher for health care than for educational services. This is partly due to the higher amount spent on health than on education per person. The reason is again our focus on relative inequality, and the fact that benefits of equal size will cause relative inequality indexes to fall since the income of the poor will increase, *ceteris paribus*, proportionally more than that of the rich. Overall, the qualitative effects of health care services are very similar to the effects of education, but they are quantitatively more important.

6. Summary.

The key findings emerging from this working paper are highlighted below.

- Inequality experiences for European countries during the Great Recession are very diverse. No single pattern emerges (figure 1). In some countries, like Spain, inequality has increased substantially and is now at record levels. In others, like Poland or the Netherlands, inequality in disposable incomes actually fell during the crisis years.
- There are also wide differences between the evolution of market income inequality and the evolution of disposable income inequality, although market income inequality seems to be an important determinant of household disposable income inequality (figure 3). In some countries such as Italy, Denmark, Luxembourg or Spain, the evolution of the two income concepts goes hand in hand; in others like the United Kingdom or Portugal, they followed opposing trends during the crisis.
- A useful way to analyse the determinants of inequality is to study the income-generating process, starting with market or primary income, then adding cash transfers to arrive at a concept of gross income, deducting direct taxes to obtain disposable household income –the income concept typically used in distributional studies–, and finally supplementing this income with the value of in-kind public services provided to citizens. This process disentangles the role of the public sector in shaping household income distribution.
- This paper focuses on the redistribution effects of fiscal consolidation policies, mainly related to the provision of in-kind public services. However, looking at the role of cash transfers and indirect taxes puts the redistributive impact of in-kind public services into context. Old-age pensions are by far the public intervention with the largest redistributive effect. This is a general fact for all countries (figure 6), although there are significant differences between countries.

- The rest of social cash transfers have the second most important redistributive effect, whereas as a general rule, direct taxes do not have a great redistributive impact (figure 10). This ranking, however, does not take into account in-kind public services.
- Broadening income to account for in-kind benefits from the public sector increases household disposable income by as much as 30% on average in 2003, and a little less in 2012, 27%, as a consequence of fiscal consolidation policies implemented in some but not all countries (figure 11).
- Because countries differ in their implementation of public services, this impact varies between almost 40% in the Nordic countries of Sweden or Denmark and a little more than 20% in other countries such as Germany or Greece.
- Although the main objective of social services like health or education is not redistribution, but to provide decent and acceptable living standards for all citizens and promote equality of opportunity, they do have important redistributive effects. This happens in two ways; first, some of these services, like health care, are provided (almost) universally and benefits of equal size, *ceteris paribus*, translate into larger proportional increases in the income of poorer households, hence reducing inequality. And second, services such as social housing are targeted to typically low-income groups, and hence have a direct effect on inequality and poverty.
- As a consequence, extending income to account for in-kind benefits has a considerable impact on inequality and poverty. On average, inequality measured by the Gini index fell by 6.6 percentage points in 2003 and slightly less, 5.7 percentage points, in 2012, which amounts to a reduction in inequality of about one fifth (figure 12).
- As with the income-increasing effect of in-kind benefits, the inequality-decreasing effects of these social policies are heterogeneous among countries. In 2012, the Gini index fell by 4 percentage points in Sweden, but by 8 points in Portugal and Spain. The reason is clear: in Sweden inequality is low, so there is less margin to reduce inequality by extending income with in-kind benefits than in the other countries mentioned. In these countries inequality is higher, it has increased more because of the increment in market income inequality, and there is more room for the public sector to smooth the distribution that arises from the market.
- As a summary of the redistributive effect of the different public policy interventions, figure 18 extends figure 10 by including the redistributive effect of in-kind public services. The highest redistributive effect is again due to old-age pensions –with the

exception of Ireland. But next in the ranking is now in-kind public services, followed by the rest of cash transfers, and finally direct taxes are the least redistributive policy intervention. This highlights the importance of taking the effects of in-kind public services into account in distributional analysis.

- Different services have different redistributive effects. Health especially and education make by far the greatest contribution to reducing inequality. Social housing, elderly care and early childhood and education care have less overall impact, although they make a great difference to beneficiaries. This result is largely due to the quantitative importance of the services. In fact, there is a strong link between changes in the relative size of health, education and other public services and changes in the effectiveness of these services to reduce inequality across countries.
- In general, the impact of public services has remained remarkably stable through time, although we detect a slight decreasing tendency in the last years, which may be associated with the consolidation policy implemented in some countries.
- This is true for the income-increasing effect, which increased on average by 30% in 2003, but only by 27% in 2012, and also for the inequality-decreasing effect, since the Gini index fell by 21.4% in 2003, but only by 17.6% in 2012.
- While the impact of fiscal consolidation policies on relative inequality can be described as moderate, this is by no means to say that the fiscal adjustment programmes have been a success in overall distributional terms. In some countries, the scale of the reduction in income levels is large, especially for people at the bottom of the distribution.
- Overall, these findings suggest that publicly provided services fulfil an important indirect redistributive role in developed societies. These effects are substantial in some European countries which record high levels of inequality on the basis of household disposable income, and public services play a role in smoothing market outcomes.

Figure 18. Relative importance of the redistributive effects of public policy interventions: From market income to extended household income: 2003, 2007 and 2012.

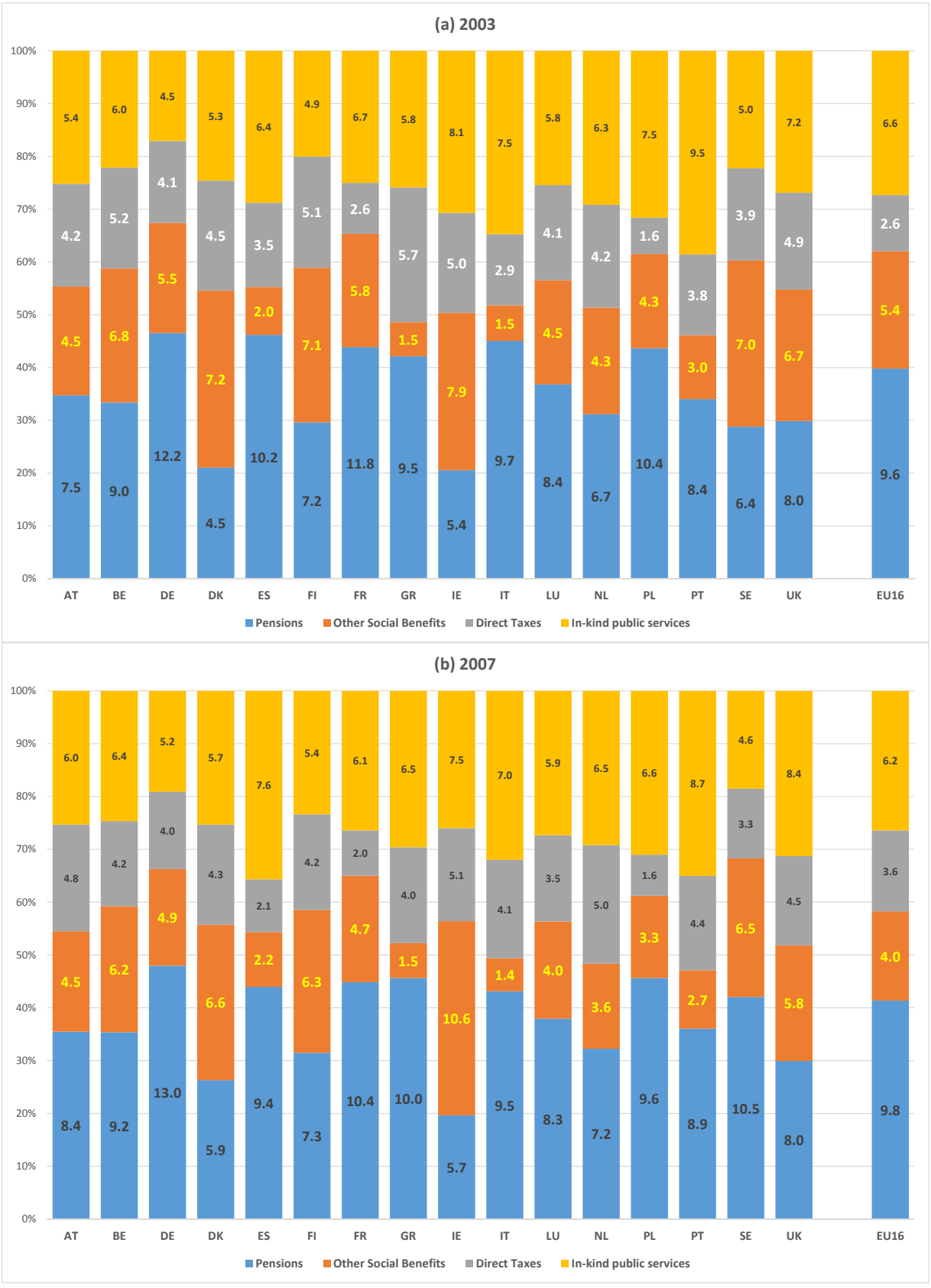
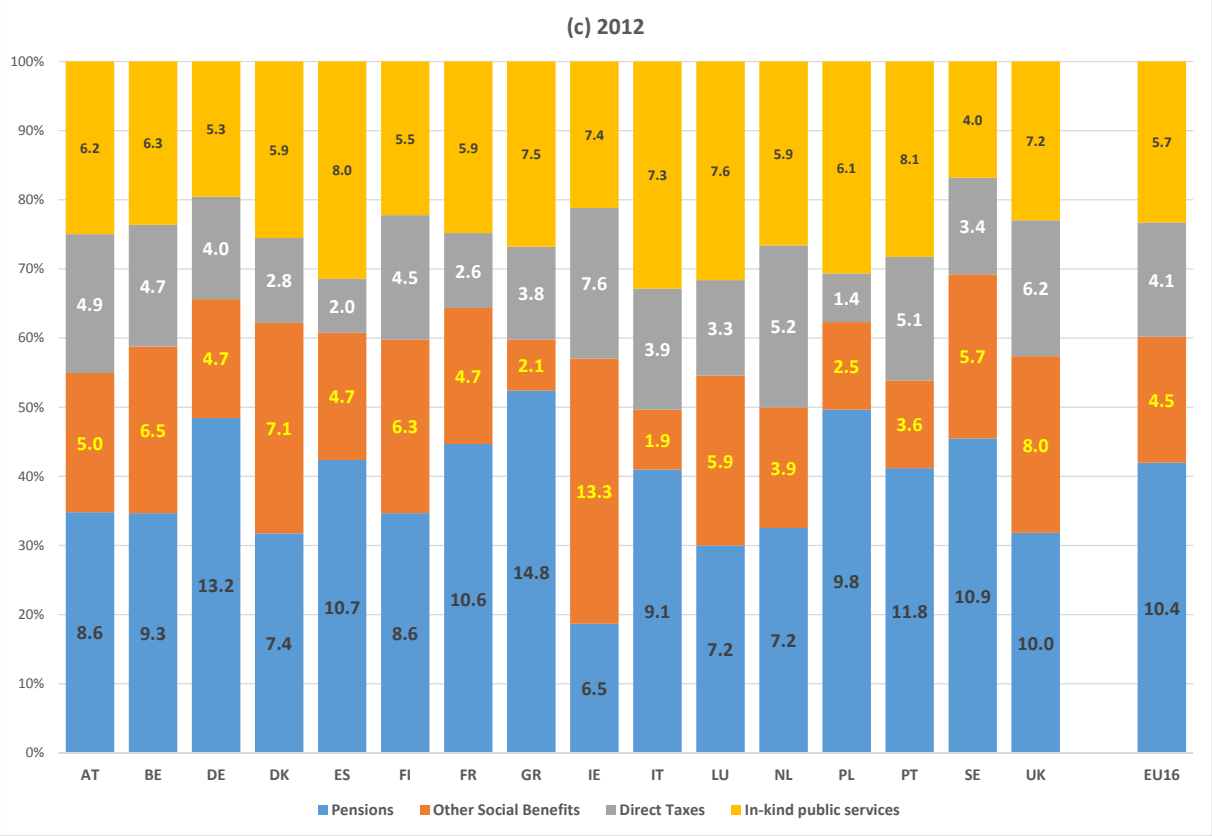


Figure 18. Relative importance of the redistributive effects of public policy interventions: From market income to extended household income: 2003, 2007 and 2012 (cont.).



Source: EU-SILC, COFOG, SOCX and own elaboration.

Annex: EU-SILC income variables and the analytical framework.

Four household income concepts are relevant: **Market Income**, **Gross Income**, **Disposable Income** and **Extended Income** (Figure 2). The EU-SILC contains several income variables at both, individual and household level, some of them agree with our definitions, like Gross Income or Disposable Income, but others have to be constructed. The goal of this annex is to describe the relations between our definitions and the variables in the EU-SILC.

As figure 2 makes clear:

Market Income = Income obtained in the market from all individuals in the household (earnings –including self-employment–, income from capital and savings).

At the aggregate level market income is dominated by labour income.

Gross Income = Market Income + Monetary Transfers

Because of its different nature, and the data structure in EU-SILC, it is convenient to split Monetary Transfers in two big components: Pensions, old-age and survivor´ benefits; and Other Transfers.

Monetary Transfers = Pensions + Other Transfers

Disposable Income = Gross Income – Taxes

= Market Income + Monetary Transfers – Taxes

= Market Income + Pensions + Other Transfers – Taxes

Extended Income = Disposable Income + Value of in-kind publicly provided services (health, education and other social services provided in-kind)

In the EU-SILC we find four concepts of household income, but only two correspond exactly to the concepts really relevant to this paper:

Gross Income = HY010

Disposable Income = **HY020 = HY010 – Taxes**

Disposable Income before social transfers other than pensions = HY022

= HY020 – Other Transfers

Disposable Income before social transfers = HY023 = HY020 – Monetary Transfers

From these definitions we get the following relations:

Taxes = Gross Income – Disposable Income = HY010 – HY020

Monetary Transfers = HY020 – HY023

Other Transfers = HY020 – HY022

Pensions = Monetary Transfers – Other Transfers

= HY020 – HY023 – HY020 + HY022 = HY022 – HY023

Market Income = Disposable Income – Monetary Transfers + Taxes

= HY010 – Monetary Transfers = HY023 + Taxes = HY010 – HY020 + HY023

Extended Income = HY020 + Value of in-kind publicly provided services.

Extended Income cannot be recovered from data in EU-SILC. The value of in-kind publicly provided services, obtained as detailed in Annex II, is attributed to each individual record in the EU-SILC according the to the method of imputation used depending on the type of public expenditure, and the household income is obtained by summing the individual incomes.

Whatever definition of income is used, if the distribution refers to household income this is weighted by the sampling weight in the EU-SILC (DB090). If the distribution refers to persons, we determined the equivalent income using the modified OECD equivalence scale, as given by the EU-SILC, and this equivalent income is attributed to each person in the household, so person weights –the product of the household size and sampling weights– are used in the calculations. For example, for disposable income, the equivalent disposable income (HY020) is computed as

$$\text{HX090} = \frac{\text{HY020} \times \text{HY025}}{\text{HX050}} \qquad (1)$$

where HY025 is the within-household non-response inflation factor, and HX050 are consumption units according to the OECD modified equivalence scales. This is weighted by $\text{DB090} \times \text{HX040}$. For any other income concept we substitute HY020 in (1) by the correspondent income concept.

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