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ELDERLY PROSPERITY AND HOMEOWNERSHIP IN THE EUROPEAN UNION: NEW EVIDENCE FROM THE SHARE DATA

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Abstract

Strictly monetary income measurement of old-age welfare shows high rates of old-age poverty. Survey findings show that a substantial amount of the elderly population combines very low household income with home ownership. When adding a notional property return to the income of old-age home owners the poverty rate reduces significantly, especially in Southern and Central European countries. As housing is an asset that is often undividable as well as subject to regulation, the “cash poor / house rich” elderly face problems making profit of their redundant housing capacity. We take home equity into account by simulating a reverse mortgage, moving to a smaller dwelling and adding imputed rent to income. In the SHARE dataset, imputed rent is calculated straightforwardly as a fixed percentage of home value. We prefer the calculation method for imputed rent to reflect real-life opportunities, as our simulations do. This way, the value of imputed rent comes closer to the economic reality of the elderly household.

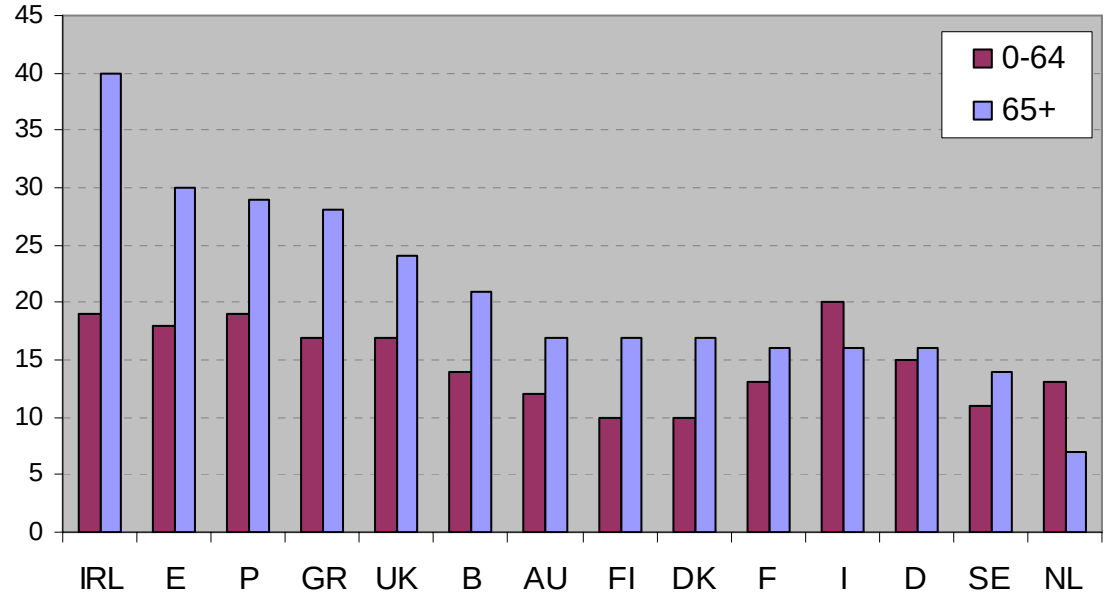
We find that the impact of home equity conversion is related to welfare state typologies. On the one hand, poverty declines the most in the Southern welfare states, where about 80% of the population is home owner. Also in Nordic and Continental states we find important poverty reductions, but to a much smaller extent. Our results show that also inequality among the elderly in Europe decreases significantly if elderly home-owners would convert parts of their home equity to support consumption. Both the within group and between group inequality lowers after simulation. Controlling for relevant socio-economic determinants of poverty, we find that the intragenerational inequality remains stabile after home equity conversion.

Home equity conversion has a sizable potential for poverty reduction and consumption support for the elderly. The reason why such operations are not more frequent is unclear. It suggests that there is a low demand for additional consumption among the elderly as most retired households prefer low disposable income above dissaving. Additionally, many elderly are probably more reluctant to support consumption with converted home equity than more liquid forms of equity.

Introduction

Elderly prosperity is subject to debate, both academic and political. The elderly are, of course, a very heterogeneous population group, so that it is in any case hard to make general statements about them. They diverge considerably, not only in terms of income and wealth, but also in regard to spending. Clearly, though, elderly homeowners are better off than elderly persons on a comparable income who do not own a home. Recent poverty figures for the entire population group draw a rather pessimistic picture of the prosperity of elderly persons as compared to that of the working population.

Figure 1: Poverty in the European Union (EU15) by age groups, 2003



Source: SILC 2004[1], European Commission (2006)
Poverty line 60% of median national equivalent income

In many industrialised countries, poverty rates among the elderly are high. In 2003, no fewer than 13 of the 15 countries of the former EU15 recorded a higher poverty risk for the over-65s than for the under-65s. Even in the Scandinavian countries, which are often praised for their low poverty rates, poverty rates among the elderly are between 15% and 17% (European Commission, 2006). These data, taken from the new Survey on Income and Living Conditions (SILC), confirm the pattern observed in the 1990s on the basis of the European Community Household Panel (ECHP): the elderly face high poverty risks in most European countries. The difference in poverty between the elderly and the young varies from region to region: it is

[1] Income data refer to the previous year.

most outspoken in the southern European countries (except Spain) and is least pronounced in the Nordic countries[2] (except the UK) (Tsakloglou, 1996).

These poverty data are based on income and take no account of in-kind benefits, homeownership and other aspects that may influence the level of prosperity of households and individuals, as argued by Smeeding et al. (1993). The level of prosperity enjoyed by households is, after all, determined not only by (earned) income, but also by in-kind benefits, free services or assistance from third parties. The fact that these aspects are disregarded results in a re-ranking of subgroups in the distribution of wealth: people with adequate living standards can be defined as poor merely on the bases of their income.

Table 1: Poverty by country and tenure status

	Non Poor		Poor		Total
	No owner	Owner	No owner	Owner	
Austria	44%	39%	11%	7%	100%
Germany	48%	37%	9%	6%	100%
Sweden	30%	56%	8%	6%	100%
The Netherlands	57%	35%	4%	4%	100%
Spain	18%	52%	6%	24%	100%
Italy	34%	50%	6%	11%	100%
France	31%	52%	9%	8%	100%
Denmark	31%	53%	8%	8%	100%
Greece	19%	52%	6%	22%	100%

Source: SHARE 2004

One of the most significant underestimations of "real" household income occurs among homeowners. If their home is not mortgaged, then homeowners find themselves in an entirely different position than households on a similar income but with housing costs. A substantial proportion of older homeowners are mortgage-free, so that the prosperity of this group is easily underestimated in terms of disposable income. Table 1 shows that in Southern countries, among the poor there are more homeowners than elderly who do not own a home. In the Continental and Northern countries, there are about as much owners as non-owners among poor elderly.

Accurate welfare measurement is not only important to academics. It is also essential for the legitimacy of academic poverty research that the academic operationalisation of the concept

[2] The new SILC data suggest that the poverty level among the elderly in Scandinavia is evolving towards the Central European level. The differences between the Scandinavian and the Central European countries are smaller than in the ECHP data for the second half of the 1990s.

should tie in with the general public's perception of poverty (Amiel & Cowell, 1998). In this sense, the pragmatic choice for a relative poverty standard on the basis of income measurement, as in the figure above, is not always appropriate[3]. After all, those who are called poor should be financially deprived in some way.

In this paper, we consider various alternatives for the operationalisation of housing costs in welfare research: a control for housing costs by means of imputed rent, a partial or complete reduction in home equity, and finally the use of reverse mortgages. In the case of imputed rent, a theoretical income value for the house is added up to household income. In the SHARE data, this is done by adding 4% of home value to the yearly household income. The reduction of home equity is simulated as older people selling the house and purchasing a cheaper dwelling. This has the advantage that elderly can reduce their housing consumption, as they often still live in homes that are spacious enough for families with children.

The most complex of our simulations is the reverse mortgage. This type of financing allows older people to turn the value of their home into cash by obtaining a loan that maximally amounts ±90% of the estimated value of the home. The advantage of this system is that the elderly can keep living in their house and do not have the (psychological) cost of moving to another neighborhood. Such an operation has considerable impact on headcount poverty (Van Den Bosch, 1998). American research on the basis of SIPP data has shown that poverty under the elderly population in the US would decline by three percentage points if all elderly homeowners were to make use of reverse mortgages (Kutty, 1998). In the next paragraphs, we shall deal in some greater detail with the impact of homeownership on poverty and prosperity. First, we go in deeper on age related aspects of income, savings and consumption.

Wealth, housing and bequeathals

In the life-cycle hypothesis of Modigliani and Brumberg (1954), it is assumed that individuals try to spread consumption over their lifetime in accordance with lifetime earnings and the stage reached in the earnings cycle. This theory predicts that elderly persons who have retired enter into a phase of dissaving. As their income declines, they will want to convert wealth into consumption in order to keep consumption at the same level. However, most researchers

[3] Research by Heinrich (2000) has shown that poverty rates among the elderly in Denmark depend strongly on the measurement method applied. Poverty measurement based on spending data yields a poverty rate of 7.5%, compared to a poverty rate of 27% if measured on the basis of income data.

conclude that elderly persons do not dissave after retirement, and that, in some cases, their wealth actually continues to increase (Fisher et al., 2006). One important explanation for this observation is people's desire to leave an inheritance to the next generation. Recent research has found this so-called bequest motive to play an important role in the accumulation of wealth by elderly persons. It accounts for about half of the wealth bequeathed (Kopczuk & Lupton, 2005). In the literature, a distinction is made between accidental (e.g. Davies, 1981) and intentional (e.g. Moore, 1979; Ricardo, 1817) bequest. The majority of parents have an intentional bequest motive (Fink & Redaelli, 2005), whereby income is purposely divided between consumption and wealth accumulation. Such intentional bequest motives are an important factor in intergenerational and intragenerational distribution.

In the case of an intentional, altruistic bequest motive, parent's utility is derived partially from children's wellbeing. We know that many elderly keep consumption low after retirement age and save as much as possible for their bequest. This gets illustrated as persons on a high income - who have a smaller need to save for bad times - do not spend a larger share of income on consumption. Likewise, the consumption need of the elderly has little impact on their savings behaviour; elderly persons who have good pensions provisions and medical cost insurance – and who can thus release more wealth for direct consumption – do not save less than elderly persons who do need to worry about an inadequate retirement income or high future medical expenses. Even persons who indicate that they are concerned about high future medical expenses do not save more than those who are less concerned (Kopczuk & Lupton, 2005).

The most important wealth component for elderly persons is the possession of an own home (Feinstein & McFadden, 1987; Fisher et al., 2006; Sheiner & Weil, 1992; Van Den Bosch, 1998). In the SHARE dataset, housing wealth accounts for between 54% and 86% of total household wealth.

Table 2: Percentage of total household wealth[4] accounted for by home value

Austria	60%
Germany	54%
Sweden	66%
The Netherlands	59%
Spain	86%
Italy	82%
France	72%
Denmark	68%
Greece	85%

Source: SHARE 2004

While in the economic literature homeownership is commonly considered to be a (specific) form of wealth, the perception of homeowners is often quite different. Retired homeowners do not treat their homes as an asset. Instead, elderly persons wish to live in their own home as long as possible and show very little interest in optimising the distribution between home equity, consumption and wealth (Venti & Wise, 1987, 1989, 1991, 2001).

This would appear to indicate that homeownership is not only the most important possession of the elderly, but also the most important consumption good (Fisher et al., 2006; Henderson & Ioannides, 1983). Housing consumption may be regarded as an opportunity cost of capital whereby the owner pays himself a fictitious rent that is proportional to the value of the home. If elderly persons move to a cheaper home, their housing consumption drops. As many elderly persons still live in a spacious home – which they often use only partially – the question arises to what extent housing consumption on the part of the elderly coincides with a declining marginal utility or even dissipation. Consequently, many persons on a low income and with a substantial home equity, the so-called house-rich/cash-poor, opt voluntarily for a high housing cost. These elderly persons are in the possibility to look for less spacious housing and, by doing so, obtaining greater disposable income. Apparently the house-rich/cash-poor derive little utility from direct consumption after reaching retirement age and substantial utility from living in their own home.

It is not always possible or permissible to sell off only part of one's home. Because of legal and practical objections, selling the entire property and buying a smaller dwelling is often the only option for converting home equity into disposable income. Often, the high transaction

[4] Total household wealth includes bank accounts, government bonds, stocks, mutual funds, individual retirement accounts, contractual saving, life insurances, firms owned, cars and estates. Debts are deducted.

costs involved are cited as an explanation for the low housing mobility of the elderly. This refers not only to people's emotional bond with their home, but also to the geographical situation, e.g. the fact that they might have to move further away from their children. However, moving house within the same neighbourhood – which involves lower transaction costs – hardly ever occurs. In other words, it would seem that elderly persons have very little interest indeed in moving house (Venti & Wise, 1989).

Various studies have indicated that housing mobility does increase as a result of drastic changes in the lives of elderly persons (Feinstein & McFadden, 1987). Household demographic factors in particular would appear to have an impact on housing mobility, especially among women (Walker, 2004). Elderly persons whose partner has recently passed away or been admitted to a rest home also exhibit greater housing mobility than other elderly individuals. However, even in such extreme circumstances, housing mobility remains rather limited (Venti & Wise, 2001).

It is often assumed that an optimisation of the relationship between home equity and wealth at old age implies a reduction in the former. However, empirical evidence suggests that elderly persons who decide to move often do so in order to increase rather than to decrease the value of their homeownership. The most significant determinant for a reduction in home equity by the elderly is their economic situation. Older households with a large capital and a modest home equity are inclined to move into larger dwellings, while older households with a modest capital and a large home are more likely to move to a smaller dwelling (Venti & Wise, 2001).

In a number of countries, including the US, France and the UK, there are alternative ownership structures that allow one to liquidate home equity. One such system is that of reverse mortgages. Under this type of agreement, one "sells[5]" one's own home while retaining the right to continue to live there until one dies. However, the success of the system has been rather limited. In the present paper, we shall not dwell further upon the reasons behind low housing mobility among the elderly and the limited success of alternative ownership structures. Suffice to refer to the words of Steven Venti and David Wise (2001), who assert that "home equity is not liquidated to support general non-housing consumption needs as households age".

[5] The sale does not take place until the mortgage is due. Homeowners thus remain owner as long as they occupy the house.

In the next section, we consider the income of the elderly, whereby we take due account of the aspect of homeownership. We look at the effect of various types of simulated home equity conversions and corrections for housing costs on the intragenerational distribution of wealth among the elderly.

Methods

We make use of the first wave[6] of the Survey on Health, Ageing and Retirement in Europe (SHARE), a microdataset on health, socioeconomic status and social and family networks of some 22,000 European individuals over the age of 50. They are a balanced representation of the various regions in Europe, ranging from Scandinavia (Denmark and Sweden) through Central Europe (Austria, France, Germany, Switzerland, Belgium, and the Netherlands) to the Mediterranean (Spain, Italy and Greece). The current SHARE release is preliminary and may contain errors that will be corrected in later releases.

Persons whose household income exceeds 10 times the median income are excluded from the analysis as outliers. Similarly, negative incomes are excluded. Household income is standardised using the square root equivalence scale.

Since SHARE relates only to individuals over the age of 50, a relative poverty standard is not appropriate. As argued in Lyberaki and Tinios (2006), to allow comparison with other research findings, the ability to participate fully in the life of society should refers to the entire society, not only to the part over 50. To assess poverty, we take the proportion of poor individuals according to the latest SILC[7]-based EUROSTAT figures and transfer this percentage to the SHARE sample. We determine the poverty line at the amount of the highest income in the percentile that matches the poverty rate of SILC. The SILC poverty line is

[6] This paper uses data from the early release 1 of SHARE 2004. This release is preliminary and may contain errors that will be corrected in later releases. The SHARE data collection has been primarily funded by the European Commission through the 5th framework programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life). Additional funding came from the US National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Fund, FWF), Belgium (through the Belgian Science Policy Office) and Switzerland (through BBW/OFES/UFES) was nationally funded. The SHARE data set is introduced in Börsch-Supan et al. (2005); methodological details are contained in Börsch-Supan and Jürges (2005).

[7] Survey of Income and Living Conditions

calculated as 60% of median equivalent national income. We continue only with the countries that are included in both SHARE and SILC, thus excluding Switzerland.

In SHARE, the valuation of homes is left to the owners themselves. However, the accuracy of owners' valuations is debatable. It is generally assumed that owners tend to overvalue their property. Kiel and Zabel (1999) compared reported house values with the selling prices of houses in the same neighbourhood in various parts of the US in the period 1978-1997. They concluded that owners' tendency to overvalue their properties is rather limited. The average overvaluation amounted to 5.1%, while among persons with longer tenure it amounted to 3.3%. Most studies report overvaluations of the same order (Dipasquale & Somerville, 1995; Kain & Quigley, 1972; Robins & West, 1977), though a study by Ihlanfeldt and Martinez-Vazquez (1986) found evidence that owners overvalue their homes by as much as 16%.

To control poverty for housing, we use the imputed rent provided by SHARE and two simulations. We simulate the sale of the house followed by the purchase of a smaller dwelling and, finally, the closing of a reverse mortgage. The capital that is released is transmuted into an annuity and added to income[8].

Reverse mortgages allow older people to turn the value of their home into cash by obtaining a loan that maximally amounts the full value of the home. The advantage of this system is that the elderly can keep living in their house and do not have the (psychological) cost of moving to another neighborhood. Depending on the formula, either a lump sum or an annuity is paid out, either for a previously determined length of time or for the entire period that one continues to occupy the home. When the mortgage has run its full course, the debt needs to be repaid, generally through the sale of the home. Any value increase of the home in the period between the moment that the loan is contracted and the sale of the dwelling are for the benefit of the homeowner. For the reverse mortgage simulation, we determine the size of the loan on the basis of the principal limit factor[9], at an interest rate of 5%. The reverse mortgage is

[8] We take no account of the costs associated with annuities. The annuities (a) are calculated as follows:

$$a = c * \frac{i}{1-(1+i)^{-l.e.}}$$

where c is outstanding capital, i is the interest rate (4%) and l.e. is the life expectancy per country, age and gender.

[9] The principal limit factor indicates which percentage of the value of the house may be taken into account in determining the maximum size of the loan. The size of the factor depends on the age of the

determined in accordance with the method applied in the Home Equity Conversion Program (HECM[10]). The income after reverse mortgage consists out of the base income, with the annuitized loan sum added up.

The reference value of the smaller dwelling is computed as the value of the dwelling of the 20th percentile in the ranking of all dwellings from cheap to expensive in the respective countries. We assume that the home equity of the over-65s is representative of the housing stock of a given country. The income after moving house consists out of the annuitized value of the difference between current home value and the value of a reference dwelling, added up to base income. Persons where the current value of the house is lower than the value of the reference house do not move in this simulation.

Table 3: Reference value (PPP) for new homes used in the simulation, by country

Austria	72673
Germany	115000
Sweden	41393
The Netherlands	172000
Spain	60101
Italy	60000
France	99092
Denmark	73937
Greece	35000

Source: SHARE 2004

Finally, we use the imputed rent[11] as provided by SHARE. It is calculated as 4% of the net value of the house (which is home value minus outstanding mortgage).

Homeownership and prosperity in the EU

As expected, poverty rates for the elderly are lower when controlled for homeownership. As shown by Paccagnella and Weber (2005), imputed rent has the strongest effect on household

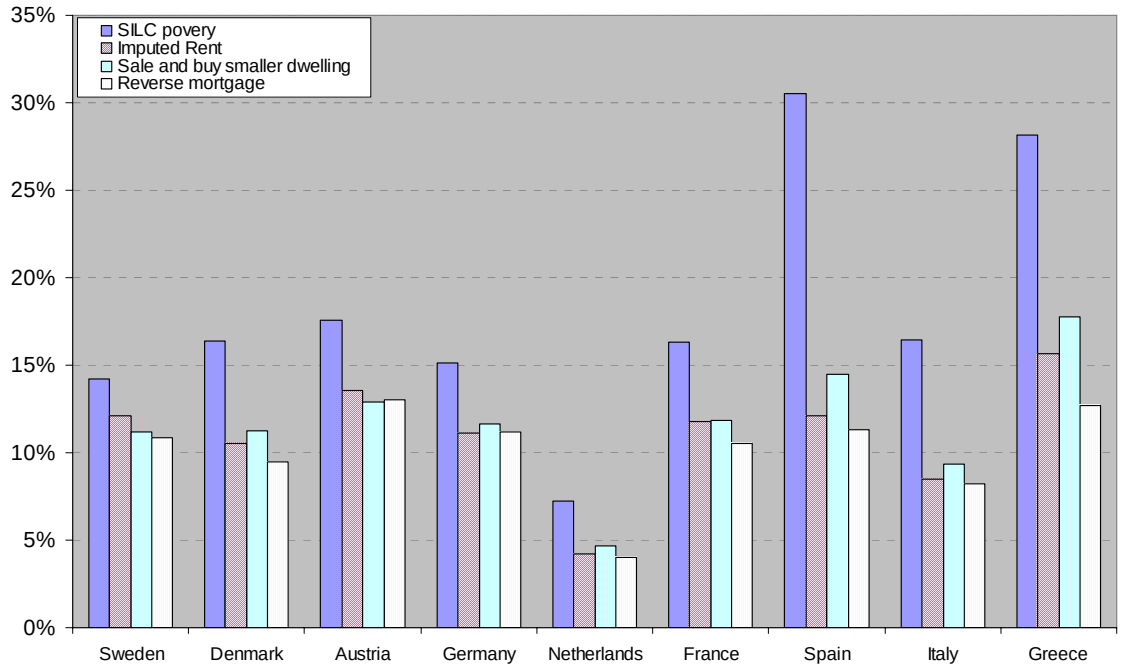
youngest borrower and the expected average mortgage interest rate ± 2% (United States Department of Housing and Urban Development, 1991). No additional costs are incorporated into the simulation.

[10] For additional information, see http://www.hud.gov/offices/hsg/sfh/hecm/hecmhome.cfm

[11] Controls for homeownership by means of imputed rent do not take into account the cyclicality of the economy. Temporal and national differences in the price-to-rent ratio of dwellings and interest rate evolutions are ignored in the calculation. In some countries, a uniform price-to-rent ratio of 4% of house value seems to exaggerate the income value of owner occupied dwellings.

income in southern countries, a moderate effect in Continental[12] welfare states and a small effect in the Nordic countries. In the southern countries, poverty among the elderly is halved, while in the Continental welfare states it is reduced to a level that is comparable to or even lower than that for the working population.

Figure 2: Poverty after home equity conversion in the EU among the elderly (65+), 2004



Source: SHARE 2004, SILC 2004

The poverty reduction is closely related to the proportion of income poor/house rich elderly in a country. Table 4 shows that poverty rates among homeowners is highest in the South before housing costs are taken into account. When we compare the results obtained through imputed rent with other forms of home equity conversion, we notice a similar north-south division. In the Nordic countries, there is little difference between the results obtained from different simulations. In the Continental welfare states, controls for imputed rent yield lower poverty rates than the other methods do, while in the southern countries we notice a substantial difference between the calculation with imputed rent and the other calculations.

[12] The Netherlands occupies a special position as far as its housing market and poverty among the elderly are concerned. Poverty among the elderly in the Netherlands is much lower than elsewhere in Europe, while house prices are very high because of the exceptional fiscal regime.

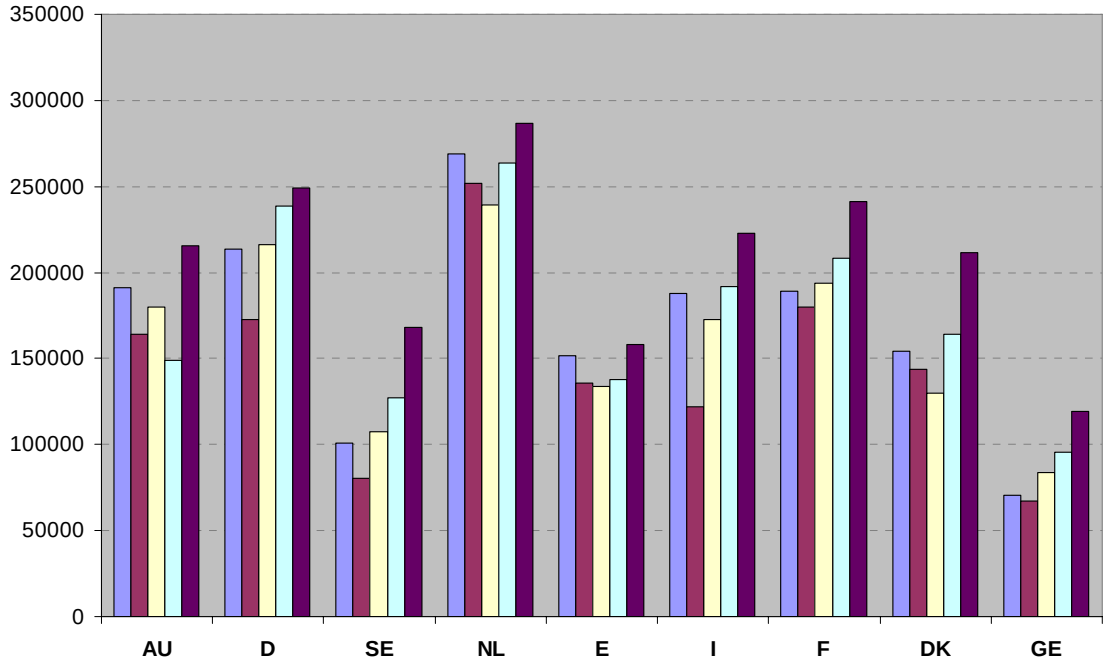
Table 4: Poverty among elderly homeowners before and after home equity conversion

	Base income	Imputed rent	Moving	Rev. Mortgage
Austria	15%	7%	5%	5%
Germany	14%	4%	5%	4%
Sweden	10%	7%	5%	5%
Netherlands	9%	1%	3%	1%
Spain	32%	7%	11%	6%
Italy	18%	4%	6%	4%
France	13%	5%	5%	3%
Denmark	13%	3%	5%	2%
Greece	29%	12%	15%	8%

Source: SHARE 2004

We find that selling one's house and purchasing a smaller dwelling has a remarkable impact on the poverty figures for Europe. Poverty among the elderly would decline by 10 to 30% if the cash-poor/house-rich were to move into a smaller dwelling. Many people attach great importance to owning their own home, which remains the case in this simulation. The decision not to reduce home equity and thus not to release capital – as most elderly do - is indicative of a strong preference not to move house and a low need for extra income. This confirms that the unfavourable income position of the elderly is in part attributable to the preferences within this group, as argued above.

Figure 3: Mean home value per income quintile



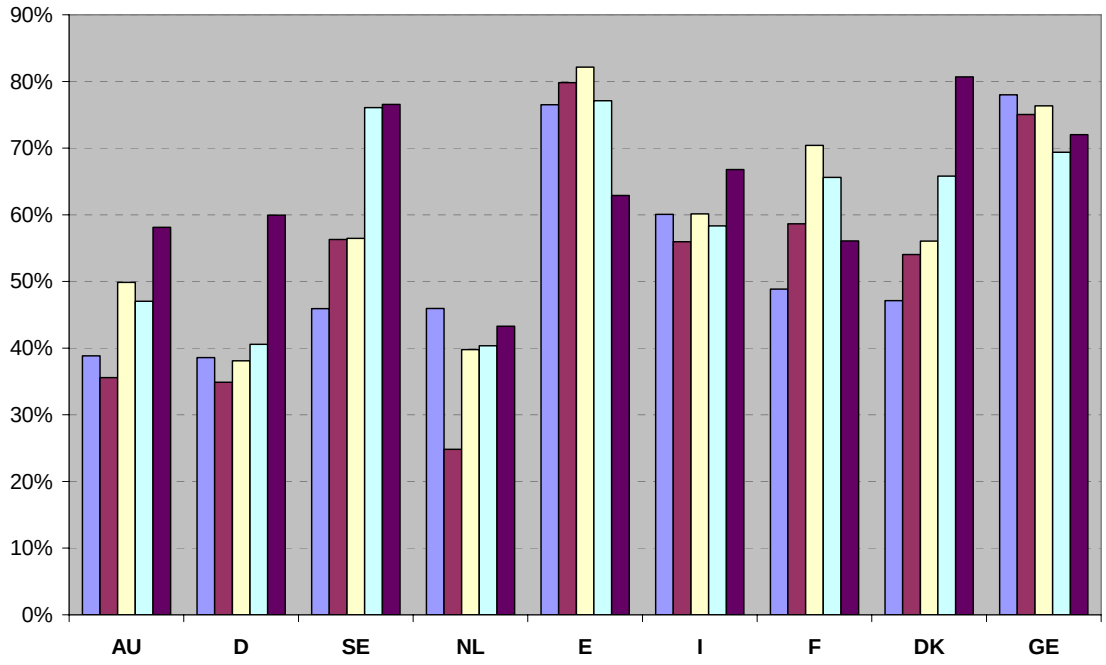
Source: SHARE 2004

Figure 3 shows that home value is correlated with the income quintile. In most countries, home value is rises in the higher income groups. The lowest income group among the elderly is a heterogeneous group. Old age income is determined by income on active age, but the

strength of the relation varies for different professional groups. For civil servants and –to a lesser extent- employees there is a close relation between earned wage and pension benefit. For the self-employed, this relation is much weaker. The lowest income groups on old age thus include employees and civil servants with low earnings during active life and high income self-employed. This might explain the unexpected height of average home value in the lowest income group.

The relation between home ownership and income depends on welfare state typology. In the Southern states, home ownership rates are high in all income quintiles. In the Nordic and Continental states, home ownership rates are higher in the top quintiles. The weak relation between home ownership and income in the Southern countries helps understanding why the decline in elderly poverty after home equity conversion is so spectacular.

Figure 4: Percentage homeowners per income quintile



Source: SHARE 2004

The impact of home equity conversion on the poverty rate varies depending on the social category concerned. In most countries, the relative decline in poverty[13] is stronger among men than among women, stronger among couples than among single persons, and stronger

[13] New poverty level expressed as a percentage of the original poverty level within the same socioeconomic group.

among the over-75s than among those aged 65 to 74. There are, however, some national differences which cannot be attributed to welfare state type.

Poverty structure

In comparing different income distributions, the researcher is provided with numerous welfare-, inequality- and poverty indices. Although the use of indices allows *complete* rankings, different indices often rank the same set of income distributions in different ways, simply because of their differing sensitivity to incomes in different parts of the distribution. This was pointed out by e.g. Blackorby and Donaldson (1978).

Since the groundbreaking work of Atkinson (1970), however, theoretical inequality research has focused on these issues. Instead of concentrating on a particular inequality-index, Atkinson's theorem provides the researcher with a graphical tool, namely the *Lorenz curve*. More in particular, the Atkinson-theorem states that if the Lorenz curve for a distribution *A* lies everywhere above that for another distribution *B*, then any inequality-index that satisfies *symmetry*, *mean independence*, *population homogeneity*, and the *Dalton-Pigou principle of transfers*, will rank the income inequality of distribution *A* lower than that of *B*. See e.g. Lambert (2002) and Duclos & Araar (2006). These authors address these and many other methodological issues in poverty measurement.

Jenkins and Lambert (1997) came up with a similar dominance criterion for poverty measurement, by introducing the CPG-curve, which plays the same role in poverty analysis as the Lorenz curve does in inequality analysis.

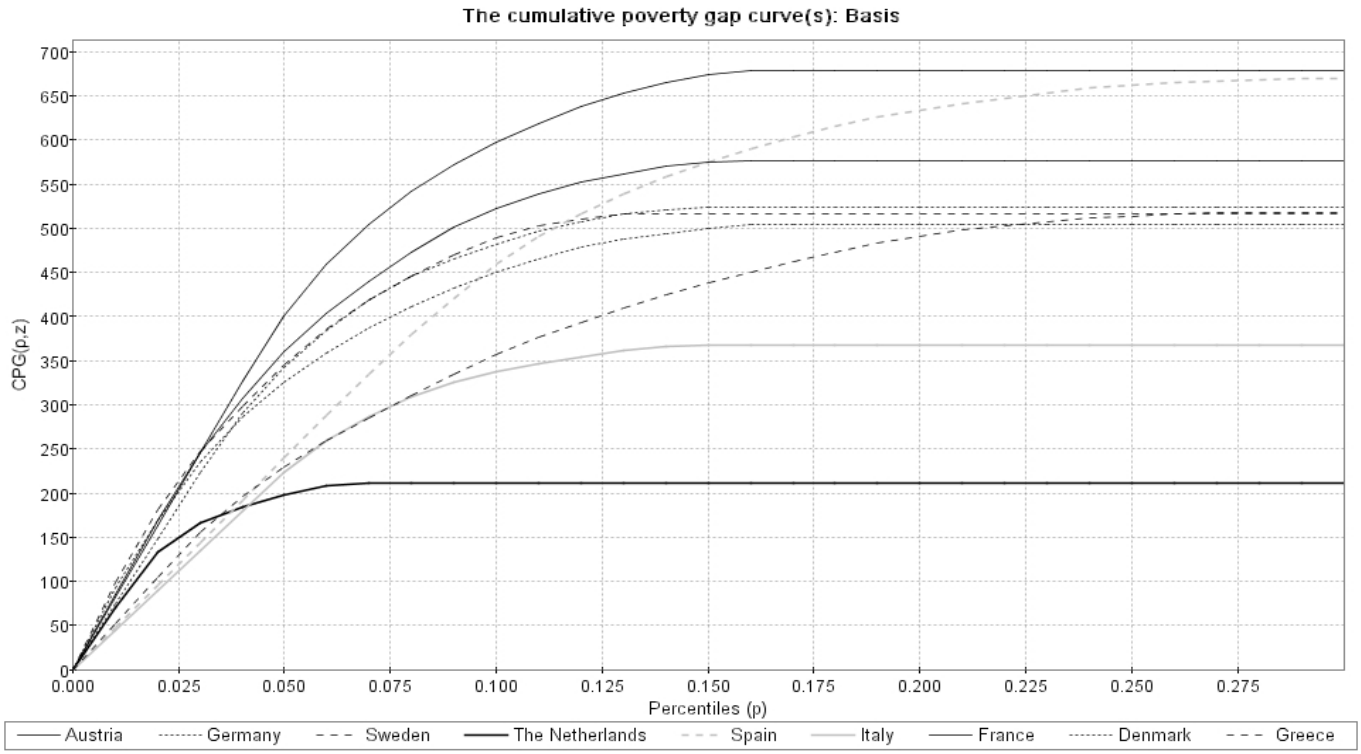
CPG-curves are based on distributions of poverty gaps. They simultaneously reveal the incidence, intensity, and inequality dimensions of poverty. Moreover, rankings of distributions by non-intersecting CPG-curves correspond to unanimous poverty orderings according to a wide class of poverty indices. Another interesting feature of the CPG-curve is its direct link with the well-known Foster-Greer-Thorbecke poverty measures (hereafter denoted as FGT). In fact, the CPG-curve is a graphical representation of the FGT poverty measures.

Figure 4 plots the CPG-curves for our base-income distribution for each of the 9 EU-countries. These poverty gap curves, denoted by *CPG(p,z)* where $0 < p < 1$, plots against the percentiles *(p)*, the sum of the first 100*(p)*% of poverty gaps, divided by the total number of income-receivers. *CPG(p,z)* is an increasing concave function of the percentiles *(p)*, with the

slope at a given percentile *(p)* equal to the poverty gap for that percentile *(p).* So the curve becomes horizontal at all values for (*p)* corresponding to incomes at or above the poverty line.

The three poverty dimensions can easily be derived from the CPG-curve. Firstly, the abscissa at which the CPG-curve becomes horizontal, is the headcount-ratio: *FGT(0)* (*incidence*). Secondly, the ordinate at which the CPG curve is horizontal, is the average poverty gap, *FGT(1), (intensity).* Finally the *curvature* of the CPG-curve reveals the *inequality* amongst the poor. As stated above, the slope of the CPG-curve at a given percentile equals the poverty gap for that percentile, so the greater the curvature, the more uneven the poverty gaps are spread.

Figure 5: Cumulative Poverty Gap curves for base household income

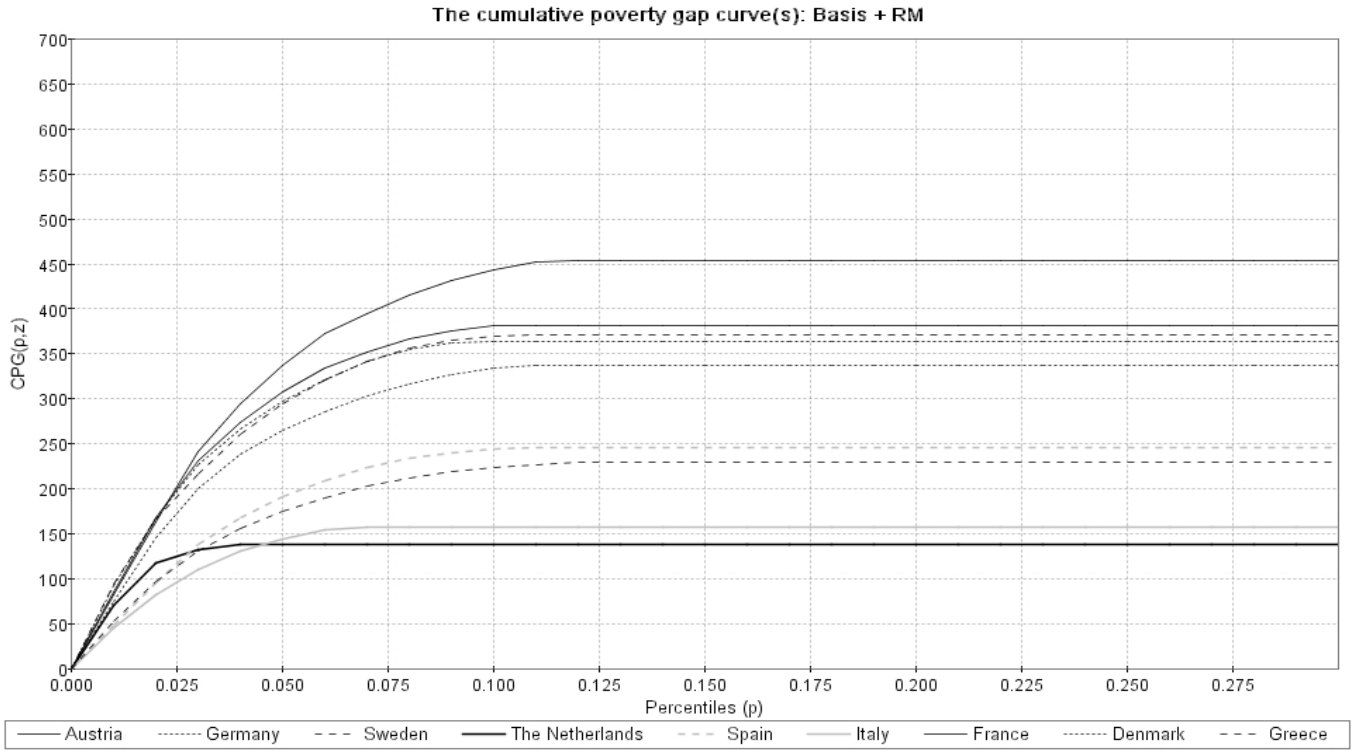


Source: SHARE 2004

Taking a closer look at the CPG-curves for base income in Figure 5, we can draw a few preliminary conclusions. Firstly, poverty in Germany, Sweden, France and Denmark is more or less the same on the above-mentioned dimensions: *incidence*, *inequality* and *intensity*, while the other countries reveal a rather different poverty-structure. Secondly, poverty in the Southern countries (namely in Italy, Greece and Spain) displays similarities as well. In these three countries, the curvature is much less manifest then in the Nordic or Central European countries. From this can be derived that in the Southern countries the poverty gaps are relatively more equally distributed then in the Nordic countries. Although the poverty gaps are undoubtedly more equally distributed the South then in the North, the Southern countries

show a great discrepancy in headcount-ratios (ranging from 15% in Italy to 28% in Spain) and average poverty gaps (Ranging from 370 EUR in Italy to 670 EUR in Spain).

Figure 6 : Cumulative Poverty Gap curves for household income after Reverse Mortgage



Source: SHARE 2004

Focusing on poverty after the various equity conversions, we observe a large decline in poverty rates as well as in average poverty gaps (see Figure 6 and annex). The magnitude of these drops in poverty rates and poverty gaps, however, appears to differ substantially between countries and regions. The most remarkable fall in poverty gaps is unquestionably in the South (Greece and Spain). This can partly be explained by the high ownership rate in those countries, (cfr. higher). For the Nordic and Continental welfare states, however, the poverty rates and poverty gaps evolve similarly, but the Nordic states witness smaller declines in poverty gaps as compared to the Continental states.

The cross-national variation in poverty rates after home equity conversion is much smaller than before. After reverse mortgage, poverty rates in most countries approximate 11%. Only the Southern countries and the Netherlands are exceptions. Despite large differences in tenure status, a similar percentage of elderly is left unsheltered after housing costs come in to play. In the Nordic and Continental states (except for the Netherlands), about 11% of the elderly have not managed to provide either sufficient old-age income or home equity for themselves. This becomes even clearer when comparing the results of the Southern welfare states, where

poverty rates are only little higher after reverse mortgage simulation compared to the other countries. Before housing costs, the Southern countries are distinguished by much higher poverty rates. Apparently, the distributive impact of the different welfare state policies on old age knows little variation as far as poverty alleviation is concerned.

We do see regional patterns regarding the intensity and depth of poverty. Poverty in the Southern countries has the lowest intensity and the lowest depth. The Nordic countries have the highest poverty gaps, and the highest poverty intensity. The Continental states follow a diffuse pattern, with Germany and France being close to the Nordic pattern and Netherlands and Austria with their own pattern.

Inequality

A different method of measuring the effects of home equity conversion on the income distribution within socioeconomic categories is by making a decomposition of inequality within groups. We find that inequality usually declines as imputed rents are incorporated into household income, while inequality often increases in the case of other types of home equity conversion.

The difference in inequality runs along a north-south divide. The Nordic, the Continental and the southern welfare states exhibit their own characteristic patterns. The only exception is the Netherlands, with its specific housing market. In the Continental and southern welfare states, inequality is the smallest if imputed rent is incorporated into household income. In the Nordic countries, the level of inequality is the smallest if we take no account of the income value of homeownership, irrespective of the method applied.

Figure 7: Changes in the hierarchy of inequality between countries

	DK	S	GR	ES	I	F	D	NL	A
DK							L		
S				l*			L		
GR									
ES	h*	h*			H	H	h*	L	L
I				L			h*		L
F							h*		L
D	H	H		l*	l*	l*		l*	
NL				H			h*		L
A				H	H	H		H	

H: country on left axis has significant higher inequality after simulation (IR) than country on top axis, before no significant difference
h*: country on left axis has no longer significant higher inequality after simulation (IR) than country on top axis, before significant difference
L: country on left axis has significant lower inequality after simulation (IR) than country on top axis, before no significant difference
L*: country on left axis has no longer significant lower inequality after simulation (IR) than country on top axis, before significant difference

The biggest changes clearly take place in the Southern countries, but inference tested international comparison shows that the Continental states are affected as much. When we compare inequality levels between countries, we notice that inequality in high inequality countries Denmark, Netherlands and France now is significantly higher than some of the medium inequality countries. Figure 7 shows that the Southern countries evolve towards the Nordic countries, and the sharp decline in inequality causes the inequality level of the Nordic and southern states to break away from the Continental inequality level.

The impact of our simulations on inequality differs between countries, but the trend is clearly downward. Inequality declines in all countries and for all socio-economic groups when we add imputed rent to income, as inequality rises in some countries when houses are sold and new dwellings are purchased. In all but the Nordic countries, the decline is significant. If we make a decomposition of inequality by gender, age and marital status, we can see a clear north-south difference in the pattern of inequality, regardless of the type of equity conversion we use. In the Nordic countries, inequality among the elderly is lowest after reverse mortgages are simulated, but not significant. In the Continental welfare states inequality is lower then base inequality and similar to inequality rates for imputed rent. In the Southern states, inequality after reverse mortgage is lower than base inequality but higher then after imputed rent.

Table 5: Atkinson (0.5) inequality indices before and after home equity conversion

	Base	Imputed rent	Sale + Buy	Rev. mortgage
Austria	0.177	0.168*	0.172	0.167*
Germany	0.125	0.124*	0.130	0.122*
Netherlands	0.181	0.162*	0.165*	0.159*
France	0.183	0.173	0.164*	0.156*
Denmark	0.113	0.118	0.124	0.109
Sweden	0.114	0.113	0.122	0.110
Greece	0.126	0.119*	0.135	0.113*
Spain	0.153	0.124*	0.138*	0.118*
Italy	0.165	0.152*	0.166	0.153*
Within group[14]	0.154	0.145	0.150	0.139
Between group	0.025	0.020*	0.015*	0.017*

Source: SHARE 2004
* = p<.001 compared to base inequality

The home equity conversions have limited effect on the intragenerational inequality within countries. The largest differences occur when controlling for household composition. The

[14] No inference test done on within group inequality.

inequality among couples declines more than among singles, especially in southern and Nordic states. Gender inequalities remain stabile after the different forms of home equity conversion.

Table 6: Atkinson inequality (A0.5) and income ratio by country and gender

		A(0.5)			
		Base	Imp.Rent	Sale+Buy	Rev.Mortg.
Austria	male	0.150	0.139	0.141	0.136
	female	0.193	0.186	0.191	0.187
	i.ratio[15]	1.19	1.15	1.15	1.13
Germany	male	0.103	0.104	0.112	0.104
	female	0.140	0.136	0.141	0.133
	i.ratio	1.13	1.18	1.23	1.22
Netherlands	male	0.179	0.160	0.162	0.156
	female	0.180	0.162	0.166	0.160
	i.ratio	1.16	1.16	1.17	1.18
France	male	0.176	0.165	0.151	0.141
	female	0.187	0.178	0.172	0.165
	i.ratio	1.13	1.18	1.18	1.16
Denmark	male	0.104	0.107	0.111	0.096
	female	0.119	0.124	0.131	0.117
	i.ratio	1.14	1.14	1.19	1.16
Sweden	male	0.115	0.113	0.121	0.110
	female	0.104	0.106	0.113	0.102
	i.ratio	1.33	1.30	1.35	1.33
Greece	male	0.129	0.118	0.132	0.112
	female	0.121	0.116	0.135	0.111
	i.ratio	1.24	1.20	1.19	1.17
Spain	male	0.155	0.122	0.126	0.099
	female	0.150	0.123	0.146	0.131
	i.ratio	1.22	1.19	1.12	1.12
Italy	male	0.154	0.144	0.165	0.150
	female	0.174	0.158	0.166	0.155
	i.ratio	1.07	1.10	1.16	1.14
Within group		0.153	0.144	0.148	0.137
Between group		0.027	0.021	0.017	0.019

Source: SHARE 2004

The decline in inequality among men is slightly larger than the decline in inequality among women, but insignificant. The inequalities between the old and the oldest old are the least sensitive to home equity conversion. Inequality declines for both the age group 65-74 and 75+ to a similar extent. These results show that home equity is rather equally divided. There is a general decline in inequality, although the relative differences in within-group inequality

[15] A ratio larger than 1 means average income is higher for men.

remain[16]. Because the between-group inequality does not distinguish if the differences between countries or the differences between socio-economic groups change, we additionally present income ratios for each country.

Table 7: Atkinson inequality (A0.5) and income ratio by country and marital status

		A(0.5)			
		Base	Imp.Rent	Sale+Buy	Rev.Mortg.
Austria	Single	0.223	0.214	0.221	0.216
	Couple	0.126	0.117	0.117	0.112
	i.ratio[17]	0.93	0.94	0.98	0.99
Germany	Single	0.140	0.143	0.146	0.139
	Couple	0.112	0.107	0.116	0.109
	i.ratio	0.89	0.86	0.83	0.85
Netherlands	Single	0.167	0.152	0.155	0.153
	Couple	0.189	0.167	0.169	0.162
	i.ratio	0.83	0.82	0.83	0.85
France	Single	0.203	0.193	0.198	0.186
	Couple	0.168	0.157	0.140	0.134
	i.ratio	0.83	0.78	0.84	0.87
Denmark	Single	0.108	0.120	0.135	0.118
	Couple	0.108	0.106	0.105	0.093
	i.ratio	0.73	0.73	0.73	0.75
Sweden	Single	0.141	0.144	0.158	0.144
	Couple	0.086	0.083	0.087	0.078
	i.ratio	0.80	0.80	0.79	0.82
Greece	Single	0.151	0.133	0.157	0.133
	Couple	0.105	0.106	0.115	0.094
	i.ratio	1.04	1.02	1.09	1.14
Spain	Single	0.147	0.103	0.145	0.120
	Couple	0.157	0.139	0.131	0.114
	i.ratio	0.95	0.87	1.04	1.11
Italy	Single	0.166	0.156	0.178	0.165
	Couple	0.165	0.148	0.156	0.143
	i.ratio	0.99	0.90	0.93	0.99
Within group		0.153	0.144	0.148	0.138
Between group		0.027	0.022	0.017	0.019

Source: SHARE 2004

[16] Relative difference is measured as the ratio of singles vs couples, women vs men, young vs old within a country.

[17] A ratio larger than 1 means average income is higher for singles

Table 8: Atkinson inequality (A0.5) by country and age group

		A(0.5)			
		Base	Imp.Rent	Sale+Buy	Rev.Mortg.
Austria	65-74	0.165	0.158	0.156	0.151
	75+	0.190	0.180	0.188	0.182
	i.ratio[18]	0.92	0.96	0.87	0.82
Germany	65-74	0.130	0.125	0.129	0.122
	75+	0.116	0.120	0.132	0.122
	i.ratio	1.12	1.12	1.06	1.00
Netherlands	65-74	0.187	0.167	0.169	0.163
	75+	0.173	0.155	0.160	0.155
	i.ratio	1.07	1.09	1.01	0.97
France	65-74	0.173	0.166	0.153	0.150
	75+	0.193	0.180	0.173	0.158
	i.ratio	0.95	0.96	0.88	0.84
Denmark	65-74	0.097	0.097	0.102	0.090
	75+	0.131	0.140	0.148	0.129
	i.ratio	1.10	1.09	1.05	0.98
Sweden	65-74	0.101	0.101	0.100	0.095
	75+	0.118	0.117	0.140	0.124
	i.ratio	1.33	1.35	1.23	1.17
Greece	65-74	0.119	0.108	0.117	0.105
	75+	0.136	0.133	0.161	0.123
	i.ratio	1.17	1.16	0.99	0.90
Spain	65-74	0.145	0.124	0.122	0.111
	75+	0.162	0.123	0.151	0.116
	i.ratio	1.05	1.09	0.86	0.76
Italy	65-74	0.163	0.151	0.149	0.147
	75+	0.167	0.151	0.190	0.161
	i.ratio	1.11	1.15	1.03	0.95
Within group		0.154	0.145	0.149	0.138
Between group		0.026	0.020	0.016	0.019

Source: SHARE 2004

When we look at the income ratios, we see the expected amelioration of the income position of the oldest age group after reverse mortgage. This is caused by the age dependency of the principal limit factor used in the calculation: the higher one's age, the larger the part home equity that comes available. Our results show that the investigated socio-economic groups are similarly affected by home equity conversion in different welfare regimes. Only the extent of the decline in inequality is correlated with welfare regime. The differences could be expected, as the welfare regimes vary considerably by tenure status. Southern countries have over 80% of households have owner-occupied dwellings, whereas Continental and Nordic states have much lower ownership rates (Norris & Shiels, 2004).

[18] A ratio larger than 1 means average income is higher for age group 65-74

The inequality between the groups is lowest when the most radical form of home equity conversion is simulated, e.g. when people actually sell their property and purchase a new dwelling. This shows that home ownership may be equally divided; also the value of the house is not correlated with age, marital status or gender. When a sale is simulated, overall within group inequality is higher than for other types of equity conversion but the between group inequality is the lowest.

In the same logic, the largest decline in inequality is found for reverse mortgages[19]. In this type of financing, only a part of the home equity is converted. The older people are, the more equity they can release, but never more than 80%[20] of the home value. At the same time, older people often have lower income than younger pensioners. Thus, the highest annuities from home equity are added to the lowest incomes while the higher incomes have lower annuities added up.

We should bear in mind that the different simulations of home equity conversion all assume that people transfer all available funds into annuities. Beyond a certain income level, it is more likely that people prefer their equity to be transferred into assets. By neglecting this, the income inequality in this simulation is exaggerated. Home equity conversion is the most useful for lower income groups, where it can be used as a strategy to attain a higher living standard or simply to avert poverty. In the last part of our analysis, we focus on the structure of poverty in the different countries and welfare state typologies.

Conclusion

This paper aims to estimate the effect of home ownership on the welfare distribution. We took our analysis beyond the concept of imputed rent by simulating different forms of home equity conversion. Our findings regarding inequality are in line with the results for the United States, Great Britain and Germany by Frick & Grabka (2003). We find that the welfare distribution after the implementation of housing becomes more equal in all countries, except the Nordic states. Also, poverty rates and poverty depth among the elderly can be diminished considerably if they opt for home equity conversion. Our analysis covered 9 European countries from three welfare state typologies. We find that the impact of home equity

[19] Except for Southern countries, where imputed rent inequality is lowest.

[20] Dependent on the relevant interest rate. The lower the interest rate, the higher the percentage which can be released.

conversion is related to welfare state typologies. On the one hand, poverty declines the most in the Southern welfare states, where about 80% of the population is home owner. Also in Nordic and Continental states we find important poverty reductions, but to a much smaller extent.

Despite opposing housing policies – with policies favoring home ownership in the Southern and Continental states and policies favoring social housing and renting in Nordic states- welfare outcomes are surprisingly in a sense. In either system about 11% of the elderly have no access to either sufficient income or sufficient home equity, although important national differences remain. Especially inequality and poverty depth differs between countries. This suggests that the welfare situation in different welfare state typologies is less outspoken than sometimes claimed, at least when looking at people 65 years or older. Also the results for inequality - which probably gives a better assessment of the welfare distribution than headcount poverty - confirm this finding. We find that inequality after home equity conversion is the lowest in the Nordic states, followed by the Southern welfare states (except Italy) and Germany. Inequality is highest in the Continental states (except Germany) and Italy.

We find some impact of welfare state typology as far as the impact of home equity conversion is concerned. Clearly, poverty drops in the south while the decline in the other countries is much milder. Home ownership corrected levels of poverty and inequality are correlated with the typology, mainly due to different proportions of owner occupied dwellings associated with the typologies. Inequality does not lower significantly in Nordic states, while in southern and Continental states the decline is significant. The extent of the decline is largest in Spain, The Netherlands and France, countries with very different housing markets and old-age income regulation. In none of the investigated countries we found substantial impact of housing conversion on the welfare differences between socio-economic groups. Only the reverse mortgage gives a greater advantage to the oldest age groups, because they can access a larger fraction of their home equity in this formula.

If home ownership run-down can bring financial relief to large group of the elderly, then why is this kind of transaction so rare? The exact reason why the income poor/house rich elderly do not release (parts of) their home equity to support consumption is unclear. We suggest that this is mainly due to preferences. The majority of the elderly has strong bequest motives while at the same time, the elderly have a strong aversion to moving house. There are also signs that many elderly lack the desire for additional consumption. The supposed life-cycle

consumption smoothing theory is subject to discussion (e.g. Banks e.a 1998; Börsch-Supan, 1991).

Many authors have stressed that home ownership should be taken account of in household income when comparing incomes across the population (e.g. Canberra Group, 2001). Our findings confirm the importance of home-ownership on household welfare. Taking home ownership into account can be done by adding imputed rent to the family income, thus considering the family home mainly as a consumption good. Our simulations also add the investment aspect that is attached to owner occupied dwellings. The selected method can cause substantial differences on the income of specific households, on the aggregate level both approaches give comparable results. The net effect of imputed rent vs. our simulations is generally limited, although in some countries the difference is not negligible. A great disadvantage of imputed rent is its fictitious nature. Our simulations are actual life possibilities for the elderly; which we prefer when taking home equity into account for housing income. We believe such simulated income comes closer to the economic reality of the household.

The neutral connotation of *imputed rent* veils how essential the method of calculation is. In this survey, imputed rent is calculated straightforwardly as a fixed percentage of house value. Especially among the elderly, this causes large proportions of total household income to be due to imputed rent. Because the results of imputed rent and the simulations are so similar, we assume that imputed rent value in SHARE is exaggerated. After all, we simulate actual dissaving. The resulting simulated incomes are not much higher than after taking account for imputed rent, where no home equity rundown is required. As the calculation method is so important, we prefer imputed rent to reflect real-life opportunities like our simulations do.

As our analysis (and many other) shows, the high poverty rates among elderly Europeans are mainly due to not taking housing situation into account. On the other hand, the income value of homeownership among the elderly is, to a large degree, a theoretical affair: elderly persons often have a strong savings and bequest motive, as well as a strong aversion to moving house. Policies for elderly welfare should take the close relation of inheritance and poverty into account, as poverty and housing is somewhat a variation on the story of the chicken and the egg. The chicken delivers every day an egg to eat, but in really bad times you can always decide to eat the chicken. Unfortunately, there will be no egg the next day. In the reverse mortgage simulation, the elderly can eat the chicken and still receive their daily egg. Only in this case, their heirs will have no chicken.

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Methodological annex

Home value

With some of the home values being extremely high, we decided to top home value at 400000PPP for two reasons. First, we consider only the impact of home equity on the income distribution. We thus consider the home value above this threshold as a regular asset which we don't include in household income. Second, the reliability of these owner made estimates are doubtful. Because we are certain that these respondents are home owners, we preferred to assign the threshold value rather than removing them from the analysis.

In some households, only imputed rent or only home value is given. We imputed the missing information with a rank approach. We divided home value and imputed rent in 20 groups, and assigned the mean value of the corresponding rank group.

Base income

Base income is calculated as total household income minus imputed rent and minus all kinds of capital income. Household income is standardised using the square root equivalence scale.

Descriptive statistics by country

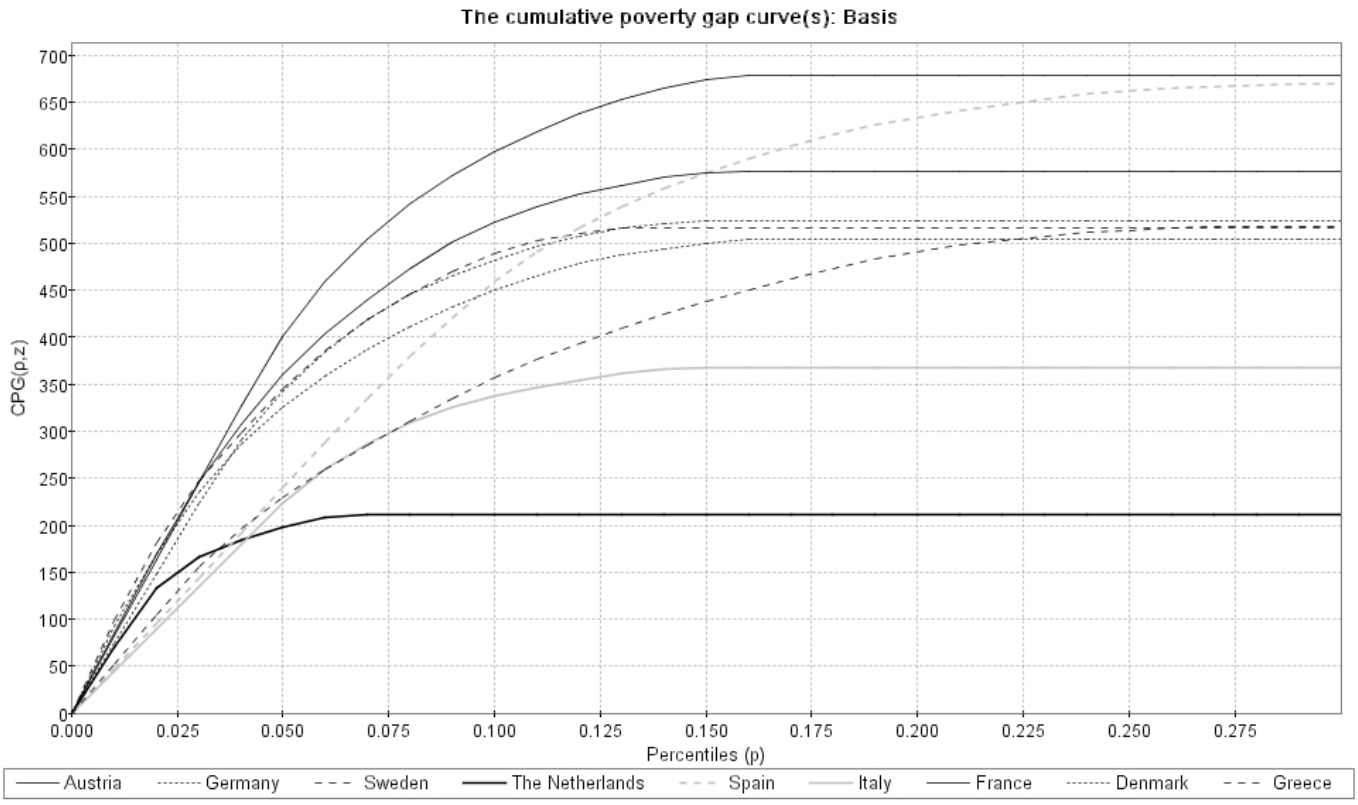
	N	Minimum	Maximum	Mean	Std. Dev.
House value					
Austria	545276	0.00	400000.00	179614.69	110115.28
Denmark	471205	0.00	400000.00	164020.45	108713.30
France	5771885	99.00	400000.00	202360.13	120101.24
Germany	6300443	0.00	400000.00	220369.29	113807.72
Greece	1365991	0.00	400000.00	86588.59	71221.50
Italy	6501114	0.00	400000.00	175668.79	126455.54
Spain	5690044	0.00	400000.00	142111.61	96139.12
Sweden	1020256	0.00	400000.00	120418.43	104886.92
Netherlands	839657	240.00	400000.00	263743.68	102307.60
Imputed rent					
Austria	1171205	0.00	201654.00	4025.11	11000.51
Denmark	769841	-1486.00	148683.00	3707.50	10338.57
France	9630002	0.00	155400.00	8349.35	21528.26
Germany	14736906	-427.00	124320.00	3889.21	7986.05
Greece	1840177	0.00	70580.00	3144.63	5822.74
Italy	10488931	-846.00	127038.00	5138.74	9205.01
Spain	7488333	-22585.00	105399.00	6090.89	11582.19
Sweden	1627151	-39730.00	139541.00	2913.34	8287.23
Netherlands	2160301	-5881.00	196040.00	4231.19	10016.91
Base Household income					
Austria	1171205	-1.00	222827.00	22441.00	27065.96
Denmark	769841	0.00	137633.00	19213.42	17141.72
France	9630002	0.00	212121.00	26065.35	29717.46
Germany	14736906	-0.71	172883.00	19242.59	18425.67
Greece	1840177	-0.71	101635.00	9580.35	9426.07
Italy	10488931	-0.71	140377.00	14674.55	16127.35
Spain	7488333	-0.71	89002.12	9289.93	10115.28
Sweden	1627151	0.00	225002.00	23078.98	21382.74
Netherlands	2160301	0.00	215056.00	30323.19	34773.54

Household income with imputed rent						
	Austria	1171205	0.00	222827.00	25594.70	29003.80
	Denmark	769841	0.00	139332.00	22158.08	19791.38
	France	9630002	0.00	217949.00	32428.78	33649.59
	Germany	14736906	0.00	172883.00	22236.72	20085.22
	Greece	1840177	0.00	101635.00	11978.00	10806.61
	Italy	10488931	0.00	140377.00	18432.70	17854.61
	Spain	7488333	0.00	94201.47	13613.75	12464.56
	Sweden	1627151	0.00	230816.00	25397.84	22894.06
	Netherlands	2160301	0.00	215056.00	33621.25	35653.67
Household income with reverse mortgage						
	Austria	1171205	0.00	255418.14	26481.02	29806.70
	Denmark	769841	0.00	145830.16	23876.61	19383.26
	France	9630002	0.00	216161.59	31603.93	31134.13
	Germany	14736906	0.00	172883.00	23013.12	20160.64
	Greece	1840177	0.00	101635.00	12624.63	10762.13
	Italy	10488931	-0.69	140377.00	19115.28	18480.02
	Spain	7488333	0.00	133123.35	14456.08	12535.62
	Sweden	1627151	0.00	230651.48	26789.71	23156.53
	Netherlands	2160301	0.00	218510.93	35249.94	36096.11
Household income after moving to a smaller dwelling						
	Austria	1171205	0.00	258242.58	27461.61	30715.20
	Denmark	769841	0.00	149000.13	24905.01	21299.43
	France	9630002	0.00	215930.24	32138.05	31986.14
	Germany	14736906	0.00	172883.00	23438.98	21034.25
	Greece	1840177	0.00	101635.00	13327.10	12181.38
	Italy	10488931	-0.71	143708.58	20983.74	20361.94
	Spain	7488333	-0.71	132274.40	15284.13	13673.15
	Sweden	1627151	0.00	236311.06	28048.25	25000.67
	Netherlands	2160301	0.00	219377.34	34246.57	35975.00

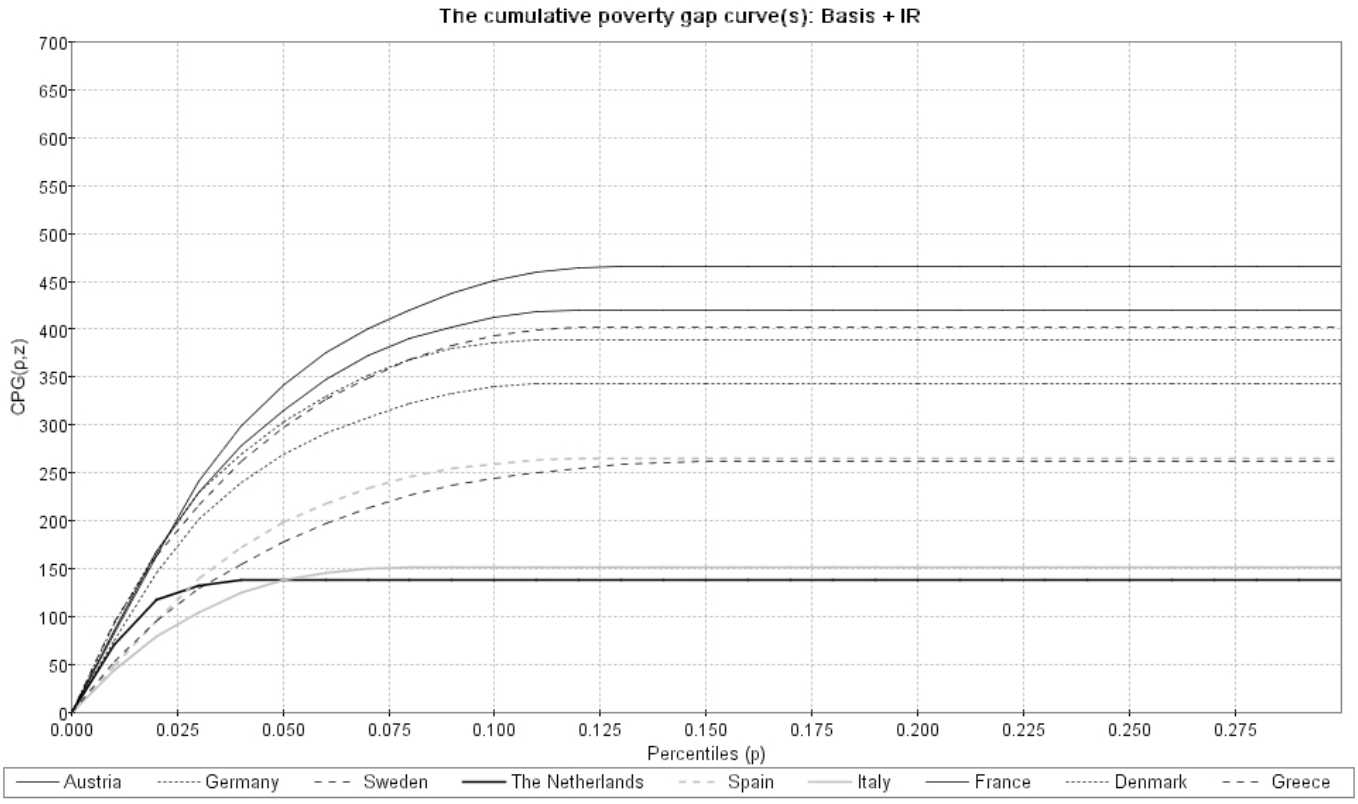
Age						
	Austria	1171205	65.00	100.00	74.22	6.69
	Denmark	769841	65.00	104.00	75.23	7.30
	France	9630002	65.00	99.00	74.93	6.96
	Germany	14736906	65.00	97.00	73.89	6.92
	Greece	1840177	65.00	97.00	73.83	6.90
	Italy	10488931	65.00	100.00	74.22	6.79
	Spain	7488333	65.00	103.00	75.18	7.20
	Sweden	1627151	65.00	102.00	75.69	7.81
	Netherlands	2160301	65.00	99.00	74.72	7.07

Cumulative Poverty Gap Curves

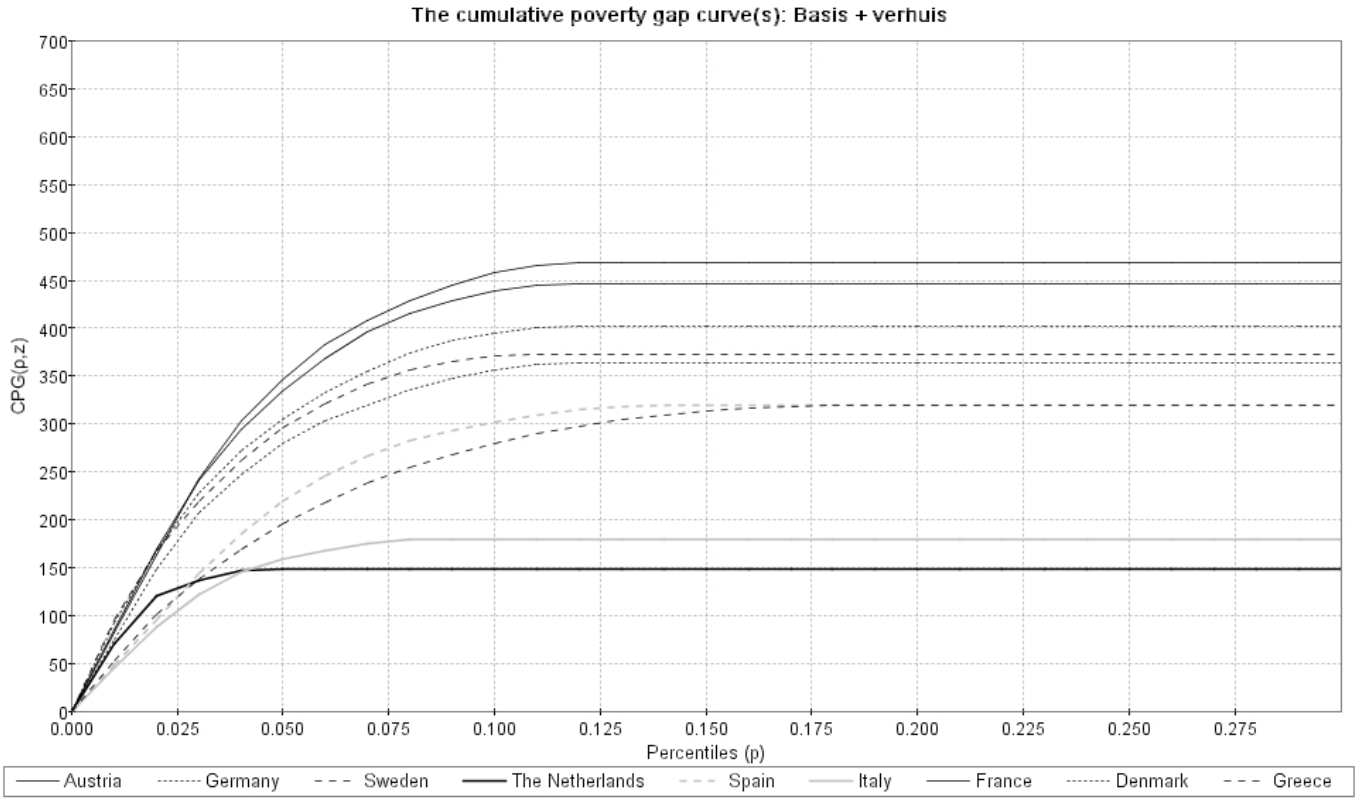
CPG of base income



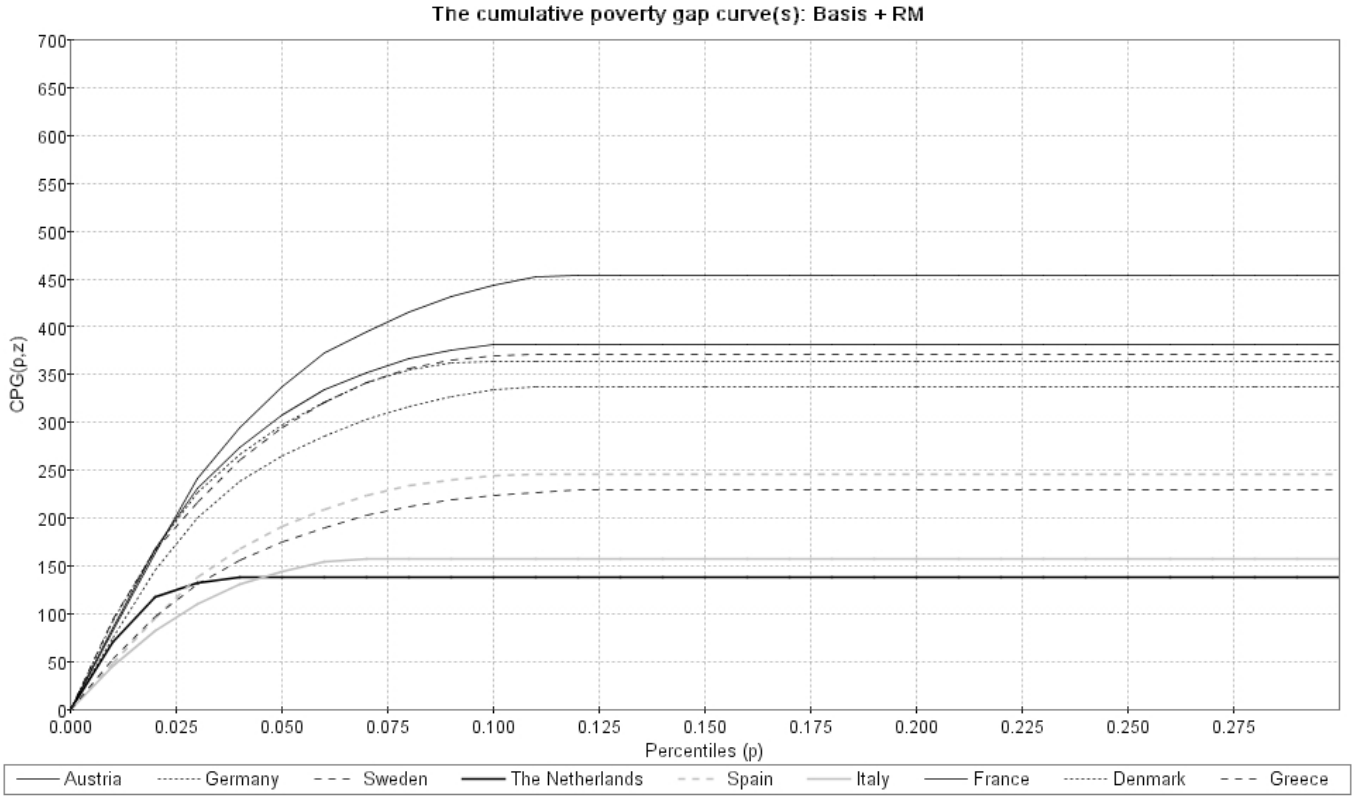
CPG of base income + imputed rent



CPG of income after moving to a smaller dwelling



CPG of base income with reverse mortgage annuity



Inequality (Atkinson 0.5) inference test

Various authors have derived the asymptotic sampling distribution of the estimators of numerous inequality and poverty measures. Using the Law of Large Numbers and the Central Limit Theorem, asymptotic normality of these estimators has been confirmed. Consequently, confidence intervals and test statistics can be constructed. The expressions for the appropriate standard errors can be found in e.g. Davidson and Duclos (2000). The statistic

$$Z = \frac{M_F - M_G}{SE(M_F - M_G)},$$

is ~*N(0,1)* under the null hypothesis $H_0 : M_F = M_G$, where M_F and M_G represent a poverty or inequality index for distributions *F* and *G* respectively. The standard error[1] of $(M_F - M_G)$ is given by $SE(M_F - M_G)$. These are readily provided by *DAD 4.4*, a program designed by Duclos, Araar and Fortin (2001). We then performed a simple two-tailed test (on the 1%-level) by comparing the value of *Z* with a critical value, $Z_{0,005} = 2{,}57$, the $0{,}5^{th}$ percentile of the Standard Normal distribution. Whenever $|Z| < Z_{0,005}$, we fail to reject the null hypothesis and accept the alternative hypothesis. The results are below. Significant differences are in bold.

[1] *DAD 4.4* allows *F* en *G* to be dependent; the standard error, $SE(M_F - M_G)$, is still consistently estimated. This allows us for significance tests between our different simulations.

Difference between Gini-indices by country and by simulation

	$(G_{Basis} - G_{IR})$	Z	$(G_{Basis} - G_{Move})$	Z	$(G_{Basis} - G_{RM})$	Z
	SE		SE		SE	
Austria	**0,017**	3,101	0,006	0,951	**0,016**	2,561
	0,005		0,007		0,006	
Germany	0,007	1,502	-0,010	-1,704	0,007	1,275
	0,005		0,006		0,005	
Sweden	-0,003	-0,655	**-0,023**	-3,980	0,000	0,019
	0,004		0,006		0,004	
The Netherlands	**0,025**	7,318	**0,018**	5,376	**0,026**	7,056
	0,003		0,003		0,004	
Spain	**0,054**	5,947	**0,028**	2,628	**0,063**	6,017
	0,009		0,011		0,010	
Italy	**0,034**	4,435	0,006	0,512	**0,032**	3,038
	0,008		0,012		0,010	
France	0,010	1,552	**0,021**	3,844	**0,035**	7,313
	0,007		0,005		0,005	
Denmark	-0,008	-0,936	**-0,027**	-3,999	0,002	0,315
	0,008		0,007		0,005	
Greece	**0,020**	3,082	-0,014	-1,716	**0,027**	4,285
	0,006		0,008		0,006	

Difference between Atkinson(0,5) indices by country and by simulation

	$(AT_{Basis} - AT_{IR})$	Z	$(AT_{Basis} - AT_{Move})$	Z	$(AT_{Basis} - AT_{RM})$	Z
	SE		SE		SE	
Austria	**0,020**	4,225	0,015	2,526	**0,020**	3,712
	0,005		0,006		0,005	
Germany	**0,015**	3,921	0,006	1,422	**0,016**	4,013
	0,004		0,004		0,004	
Sweden	0,002	0,597	-0,007	-1,833	0,004	1,510
	0,003		0,004		0,003	
The Netherlands	**0,020**	7,607	**0,017**	6,479	**0,023**	8,167
	0,003		0,003		0,003	
Spain	**0,059**	7,973	**0,043**	5,057	**0,066**	7,837
	0,007		0,008		0,008	
Italy	**0,043**	5,251	0,022	2,160	**0,041**	4,311
	0,008		0,010		0,009	
France	0,013	2,543	**0,019**	4,743	**0,030**	7,620
	0,005		0,004		0,004	
Denmark	-0,004	-0,854	-0,010	-2,559	0,005	1,354
	0,005		0,004		0,003	
Greece	**0,021**	4,283	0,002	0,307	**0,026**	5,472
	0,005		0,006		0,005	

Differences of Atkinson(0,5) indices between countries: Basic income

$(AT_{Column} - AT_{Row})$

SE

Z

	Germany	Sweden	Netherlands	Spain	Italy	France	Denmark	Greece
Austria	**0,055**	**0,089**	0,014	0,002	0,006	0,008	**0,088**	**0,058**
SE	0,015	0,015	0,015	0,016	0,018	0,016	0,016	0,016
Z	3,650	5,777	0,985	0,147	0,333	0,522	5,616	3,683
Germany	0,000	0,034	**-0,041**	**-0,053**	**-0,049**	**-0,047**	0,033	0,003
SE	-	0,013	0,013	0,014	0,017	0,014	0,014	0,014
Z		2,520	-3,213	-3,826	-2,952	-3,443	2,400	0,230
Sweden		0,000	**-0,075**	**-0,087**	**-0,083**	**-0,081**	-0,001	-0,031
SE		-	0,013	0,014	0,017	0,014	0,014	0,014
Z			-5,728	-6,132	-4,909	-5,783	-0,058	-2,151
The Netherlands			0,000	-0,012	-0,008	-0,006	**0,074**	**0,044**
SE			-	0,013	0,016	0,013	0,013	0,014
Z				-0,910	-0,517	-0,481	5,517	3,243
Spain				0,000	0,004	0,006	**0,086**	**0,056**
SE				-	0,017	0,014	0,014	0,015
Z					0,219	0,406	5,939	3,835
Italy					0,000	0,002	**0,082**	**0,052**
SE					-	0,017	0,017	0,017
Z						0,121	4,784	3,022
France						0,000	**0,080**	**0,050**
SE						-	0,014	0,014
Z							5,594	3,472
Denmark							0,000	-0,030
SE							-	0,015
Z								-2,048

Differences of Atkinson(0,5) indices between countries: Imputed Rent

$(AT_{Column} - AT_{Row})$

SE

Z

	Germany	Sweden	Netherlands	Spain	Italy	France	Denmark	Greece
Austria	**0,071**	**0,094**	**0,037**	**0,068**	**0,047**	**0,038**	**0,093**	**0,084**
SE	0,014	0,015	0,014	0,014	0,016	0,015	0,015	0,014
Z	5,014	6,420	2,634	4,727	2,968	2,601	6,355	5,911
Germany	0,000	**0,038**	-0,018	0,013	-0,009	-0,017	**0,038**	0,029
SE	-	0,012	0,012	0,012	0,014	0,013	0,013	0,012
Z		3,076	-1,527	1,064	-0,620	-1,344	3,006	2,410
Sweden		0,000	**-0,052**	-0,021	**-0,043**	**-0,051**	0,004	-0,005
SE		-	0,012	0,013	0,014	0,013	0,013	0,013
Z			-4,244	-1,637	-3,008	-3,919	0,286	-0,372
The Netherlands			0,000	**0,054**	0,032	0,024	**0,078**	**0,070**
SE			-	0,012	0,013	0,012	0,012	0,012
Z				4,539	2,404	1,953	6,503	6,001
Spain				0,000	**0,044**	**0,036**	**0,091**	**0,082**
SE				-	0,014	0,013	0,013	0,013
Z					3,063	2,689	6,827	6,364
Italy					0,000	0,032	**0,087**	**0,078**
SE					-	0,016	0,016	0,016
Z						1,978	5,364	4,934
France						0,000	**0,085**	**0,076**
SE						-	0,013	0,013
Z							6,468	5,991
Denmark							0,000	-0,004
SE							-	0,013
Z								-0,298