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Identifying Snakes and Ladders: Welfare Indicators of Income Experience during Old Age

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Identifying *Snakes and Ladders*: Welfare indicators of income experience during old age

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1. Introduction

The economic well-being of older people is often measured by a snapshot that reports on income in a single period (see *inter alia* Förster, Fuchs and Makovec 2003; Disney and Johnson 2001; Hagenaars, De Vos and Zaidi 1994). While widespread, this practice is only revelatory of the actual circumstances of older population in so far as both household circumstances and income receipts remain constant during old age phase of life. This belief or assumption is only justified when the major share of income for the majority of older population comes from static sources of pension incomes (e.g. the basic state pension). However, in a number of industrialised economies, particularly in Great Britain and the Netherlands, people are relying increasingly on private income (e.g. investment income and private pensions) to ensure economic security in old age. This is largely a result of drift towards the 'individualisation' of pension accounts in which individuals rely on private financial institutions to provide pensions for their old age (see e.g. Blake (2000) and Rake *et al*. (2000) for details on reforms in the pension system and their implications).

This greater reliance on potentially volatile sources of income in old age, and the fact that people now spend a significantly longer time in this phase of life, makes it more likely that older people will observe significant changes in their pension income. It is therefore crucial to extend our lists of welfare indicators for older population beyond a 'snapshot' and supplement the picture of *income adequacy* with an understanding of *income certainty* in the financial means of older people during the ageing process. A holistic picture – as provided by income levels and its dynamics, especially when income mobility is linked with lifecourse events such as changes in living arrangements and health and disability status and widowhood in old age – may well modify the conclusions one draws on the basis of cross-sectional evidence on economic well-being in old age and processes that generate changes in it.

The *comparative* aspect of income mobility of older people brings in additional policy relevant information: how do different old age social security systems mitigate the income risks associated with various life-course transitions that older people experience. Thus, the comparative analysis of income mobility will highlight the relative importance of individual attributes (e.g. being a woman) and life-course events (e.g. becoming widow) in determining the income experience of older people living in different systems of old-age social provisions.

The remainder of this paper is organised as follows. **Section 2** is devoted to discussions about the relevance of income mobility measures as welfare indicators for older population. Having provided motivation for the use of income mobility measure as an indicator, **Section 3** is more specific in its recommendations of empirical indicator of income mobility. **Section 4** concludes.

2. Income mobility measures as welfare indicators

The study of mobility merits attention only when it captures a change that has a broader social and economic relevance. A fundamental objective for studies of mobility should be, therefore, to distinguish between 'transitory' or insignificant fluctuations around an individual's otherwise persistent characteristics (as captured in the notion of variance) and fluctuations which represent meaningful change (e.g. a threshold is crossed). Thus, questions of the dimensions in which mobility should be observed (e.g. different concepts of income, or the distinction between relative and absolute mobility), the measure of mobility used and the way that mobility is described or summarised are not 'merely methodological'. They encompass different underlying concepts and, as such, distinct perspectives on what constitutes a meaningful change. Before making a suggestion about any empirical indicators of income mobility, we first review these conceptual issues.

2.1 Why study income mobility in old age?

The availability of longitudinal datasets – allied to recent advances in theoretical and statistical approaches in studying welfare dynamics – have made it possible to augment snapshots of income with a more complete picture of income dynamics. This is apparent from the recent burgeoning literature on income and poverty dynamics in countries where longitudinal data are accessible.[1] Such studies have, in the main, concentrated on mobility during working life, yet the study of income dynamics in old age carries significance for at least three broad reasons:

- *First*, to aid sound policy formation, it is essential to have a good understanding of the dynamics of post-retirement income. This will provide information on the extent to which older people experience falling or rising resources as they age. This type of analysis constitutes a much desired shift of focus from the mere forecasting of income at the time of retirement to a study of how income changes in the years after retirement and, also, identify life-course events and attributes that are associated with these changes. This has become important not least because rising human longevity and trends towards early retirement mean that people now spend increasingly longer periods of time in retirement.

- *Second*, most existing analyses of older people's incomes are based on cross-sectional data and thus run the risk of portraying a misleading picture of income changes within the population of retired people. The use of cross-sectional data for year to year comparisons has a distorting effect, because it is based on a different population of pensioners each year: the data include new retirees in every subsequent year, who are generally better off than older retirees as a result of additional years with better occupational pension coverage. By carrying out longitudinal analysis of the incomes of

[1] See e.g. Jarvis and Jenkins (1998, 1995) and Gardiner and Hills (1999) for Great Britain; Dirven and Fouarge (1996) for Belgium and the Netherlands; Hauser and Fabig (1999) and Leisering and Leibfried (1999) for Germany; Burkhauser and Paupore (1997) for a comparison between the United States and Germany; and Cantó (2000) for an ingenious use of the Spanish Family Budget Survey.

older people, a distinction between *cohort* and *age* effects on pensioners' income can be drawn.[2]

- *Third,* recent pension reforms towards privatisation have resulted in an increased *individualised risk*. While pay-as-you-go social security systems pool risks across generations, systems with private personal pensions expose individuals to a greater variety of financial market risks. For this reason, it is important to examine how such changes in the composition of pension income result in income mobility in old age. This understanding can help us capture the consequences of this shift towards privatisations of pension systems.

2.2 Income mobility in old age: is it a 'good' or 'bad' thing?

Following Atkinson *et al*. (1992), income mobility assumes a broader social and normative dimension. For society as a whole, mobility in old age may be considered positive in that it results in smaller 'permanent inequality' among older people and hence it might moderate our concerns about rising cross-sectional inequality among the older population.[3] However, it is crucial to determine the extent and type of income mobility that would suffice to offset the concerns about rising inequality (see further below).

From the individual's point of view, the experience of mobility as a 'good' or a 'bad' thing is likely to be mediated by a number of factors including:

- The direction of the change (i.e. is it downward or upward mobility);
- Whether the change was anticipated;
- The magnitude of the change;
- The individual's ability to 'weather' the change; and
- Concomitant changes in the income of other household members.

In common with the whole population, the older population is likely to experience variation in the degree of anticipation and planning for events that affect their incomes, such as widowhood, while their ability to deal successfully with changes in income will be crucially affected by the size of that change, the size of their incomes overall and their ability to interact with the capital market. However, the older population has specific characteristics that lend a unique, often negative, dimension to their experience of income mobility. In particular, the opportunities of older people to adjust their behaviour in response to changes in income may be restricted by compulsory retirement age and/or age-based discrimination in the labour market as well as by their own health and disability status.

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[2] If people in the same birth cohort are observed over time, we observe what is referred to as the *age effect*. However, we are faced with an identification problem since the *pure* age effect cannot be identified separately from the *period effect*: we cannot tell whether changes in people's incomes are attributed to changes in their age or as part of an overall trend for that time period. We refer to Atkinson et al. (1992: 18-19) for a formal exposition of this problem.

[3] Rising income inequality amongst British pensioners is revealed by most snapshot studies on pensioner population (see e.g. DSS 2000; DSS 1998a & 1998b).

Lets look at a simple scenario in which we abstract from changes in the incomes of the other family members, and also assume perfect information so that older people are able to anticipate changes that they are likely to observe.[4] Then the income stream that people observe will depend upon their interaction with the capital market, i.e. their ability to borrow and lend. We also assume a fixed borrowing and lending rate, i.e. a perfect capital market in which people can borrow or lend unlimited amounts at the same interest rate. Under these assumptions, it would make sense to simply look at the present value of income during the whole period in question. In that case, greater mobility does indeed mean a good thing: the inequality of permanent income is less relative to the observed one-period inequality. So if we observe that both one-period inequality and mobility have increased, then these may be offsetting.

Obviously, the assumptions made for such a simplistic scenario are far from actual reality. A departure to imperfection of the capital market, or to uncertainty about the future path of income, changes our understanding of mobility as a 'good' thing that moderates our concerns for cross-sectional inequality. For instance, if people can lend but cannot borrow – a situation that is likely to be true for older populations – then an upward mobility path is worth less. This also means that the prospect of increased mobility is valued less by those currently low in the income distribution, very often true for older population (certainly in the British context). Similarly, less than perfect knowledge about the future stream of income also generates the disutility of uncertainty.

Here, a quote from Alfred Marshall, in his work *Principles of Economics* (1920), will help us emphasise the point about negativity associated with income mobility:

> 'there are people of a sober steady-going temper, who like to know what is before them, and who would far rather have an appointment which offered a certain income of say £400 a year than one which was not unlikely to yield £600, but had an equal chance of affording only £200' Marshall (1920: 554) quoted by Atkinson et al. (1992: 28).

2.3 Mobility in what?

The most important requirement in the measurement of well-being is to determine the welfare indicator used to measure personal resources.

Different perspectives suggest different variables to measure the resources of individuals (see e.g. papers by Pierre Pestieau and Heinz-Herbert Noll). Here, we restrict ourselves to the choice of *economic* welfare and hold the view that the economic well-being enjoyed by older people is best measured by their income. A caveat about this choice of tools is necessary: the association between income and well-being is rather blunt. This is principally because:

- Important a factor as income is, it does not encompass all what is meant by 'well-being' and 'quality of life' of older people. In fact, it is now widely accepted that one's personal welfare should not be assessed on the basis of monetary measures alone; rather, it should be seen in terms of fulfilment of aspirations in various different dimensions of life.

[4] This assumption is equivalent to evaluating income mobility *ex-post*.

- Income is in fact a measure of the *entitlement rights* of older people, and thus has merits in its own right without confusing it with a measure of well-being (see, e.g. Atkinson et al 2002). Following Ringen (1996), income can only be used as a measure of well-being when expressed in *equivalised* form.

Thus, in using income as an economic welfare metric, an assumption needs to be made about how older people benefit from income earned by other members of their household. The main approaches adopted can be categorised as using:

1. The income that each older individual receives without regard to income from other members of his/her household ('*individual income*');
2. The income of the benefit unit. This involves looking at the individual income of single elderly persons and the joint income of couples, even if these units live in a household with other people ('*benefit-unit income*');
3. The income of all members of the household in which an older person resides ('*household income*').

Each approach has advantages and limitations. For instance, the study of mobility of *individual income* is important because it highlights dynamics in individual entitlements during the ageing process. Most welfare states provide a basic income to members of the older population, and it is important to investigate the basis on which this entitlement is provided (e.g. does the entitlement pertain to the individual or to the benefit unit? How are social insurance contributions are shared by partners?) and how it varies during later life. Moreover, on ethical grounds, it could be argued that elderly people should be financially self-supporting: they should have individual income of their own, quite irrespective of how they go about sharing it with other members of their household.

However, since the focus of our indicators is on older people's *well-being*, and individuals share resources with other members of their families and households, economic *well-being* will not be adequately described by individual income alone. Likewise, the study of mobility of income of a benefit unit will be limited in its scope to situations where older people share resources in their household with people who are not included in their benefit unit.

Furthermore, each of these income unit embodies unrealistic assumptions about the distribution of resources across members of the same household (see, e.g. Atkinson 1998: 34-37). The use of individual income assumes that transfers within family are zero. The use of benefit-unit income implies equal sharing of resources across members of the benefit unit only, but no sharing with other members of the household who are not members of the benefit unit. Neither view fits comfortably with an ordinary experience of living in multi-person households.

The use of household equivalised income, on the other hand, assumes equal sharing of resources across all members of the *household*, since each individual in the household is assigned the same level of household equivalent income. This assumption, while equally unrealistic, has been forced upon researchers by lack of data on distribution of resources

within households.[5] The choice to use household equivalent income will also allow for economies of scale, the extent of which will depend upon the choice of equivalence scale.[6]

Ultimately, however, the choice between these income measures is determined by the objective of the welfare indicator in question. Since we emphasise the measurement of older people's welfare, *household* income should be chosen. Equivalence scales will be used to compare the economic welfares of older people who live in households of varied composition and size. Note here that the choice of modified equivalence scale is as good as most other scales for this purpose. By examining an income mobility measure that report changes in *equivalised* income, we will provide a control for the dynamics of living arrangements of the older population.

2.4 Income or consumption mobility?

We have proposed to measure *income* mobility, rather than *consumption* mobility, to measure changes in the economic welfare of older people. On theoretical grounds, one may argue that consumption mobility provides better information about changes in economic welfare. This is due to the fact that individuals smooth their consumption stream even though their income stream may not be smooth.

However, by taking consumption as the welfare indicator on the basis of this consumption-smoothing argument, we are allowing individuals to make their own judgements about future income prospects and about their borrowing capacity in the capital market. The implication is that older individuals may consume on an 'unsustainable basis' or voluntarily choose to have lower levels of consumption. Another limitation is that liquidity constraints may hamper the intertemporal smoothing of consumption, a phenomenon most likely to be true for older people. These theoretical limitations reinforce our preference for income as the measure of older people's economic well-being. On a practical level, the unavailability of data on consumption expenditures in most longitudinal datasets precludes any attempt to undertake an investigation of mobility using consumption expenditures.[7]

2.5 Absolute or relative mobility?

One broad distinction made in different studies on income mobility is that between relative and absolute mobility (see Shorrocks, 1993; Jarvis and Jenkins, 1995; Fields and Ok, 1999). Relative mobility tracks changes in the relative position of individuals, households or subgroups of the population within a population, irrespective of absolute changes observed in their own income. Relative mobility is, therefore, measured by changes in income ranking observed during the period in question. In contrast, absolute mobility refers to absolute changes in individuals' own income. People can experience absolute mobility even in circumstances where they do not observe any change in their relative ranking in the reference population. For instance, older people may experience upward mobility in an

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5 This is a common practice in studies of welfare measurement (see, e.g. Zaidi and De Vos (2001)). Both Haddad and Kanbur (1990), and Jenkins (1991), investigate the empirical importance of intra-household inequality in the measurement of (distribution of) personal welfare of individuals.

6 See e.g. Buhmann et al. (1988); Burkhauser et al. (1994) and De Vos and Zaidi (1997) for discussions regarding the choice of equivalence scales.

7 In fact, certain components of consumption expenditures may be recorded in these datasets (e.g. BHPS includes expenses on food items, on leisure, etc.) but the data on total consumption expenditures is missing, and in most instances, the expenses on individual components are recorded as a banded variable.

absolute sense (i.e. significantly rising income) even when they experience downward mobility relative to the overall population (i.e. the income of the younger population rises faster than the income of the older population).[8]

One crucial choice that has to be made in the measurement of relative mobility is the choice of the reference society. For instance, the relative mobility of the older population can be measured using either changes in their position relative to the whole population or changes in their relative position within the older population. Depending upon the dynamics in the shape of income distribution, the choice of the reference society may result in significantly different outcomes. The choice of the reference society is important not only in the comparison of mobility across subgroups within a country but also in the measurement of relative mobility across countries.

Whether one prefers a relative or an absolute indicator of income mobility depends upon the weight one assigns to changes in one's relative position within the reference society in comparison to changes in one's own income. Older people are likely to be interested in both, since they watch out for changes in their own income as well as how changes in their own income place them in comparison to the rest of the society. This proposal therefore takes the view that for mobility analysis involving shorter periods (e.g. annual change) individuals are more likely to assign greater weight to absolute changes in income, mainly because it is difficult for them to realise how their relative position in the society has changed within a short period. However, over the longer period, it is likely that more weight is assigned to changes in relative position than to absolute changes in income. For these reasons, we suggest relative measures of mobility when the reference period is reasonably large. Thus, the choice of indicator will depend largely upon the length of panel data available. If data is available only for shorter durations (as is the case with respect to ECHP), we recommend that income mobility indicators should be drawn on the basis of annual variations in income, and focus should be placed on absolute measures of income mobility.

3. Choice of numerical indicators of mobility

The traditional approach of measuring variability in a cross-section is to use measures of dispersion such as coefficient of variation, standard deviation etc. Analogous measures can be applied to capture longitudinal variability of individual income. More difficult is the quantification of mobility.

The traditional approach of measuring variability in a cross-section is to use measures of dispersion such as coefficient of variation, standard deviation etc. Analogous measures can be applied to capture *longitudinal variability* of individual income. More onerous is the task of quantifying *mobility*. Two sets of measures of income mobility stand out from our review of associated literature.

[8] The choice of the reference society in the measurement of relative income mobility is analogous to the choice of the reference society in the measurement of relative poverty (see Atkinson (1995) and De Vos and Zaidi (1998) for a discussion on the choice of the reference society in the measurement of relative poverty).

3.1 Income origin to income destination measures

The *first* set of measures links income 'origins' to income 'destinations'. Thus, in analyses that span the period between 1991 to 1994, the income situation in 1991 (the origin year) would be compared with the income situation in 1994 (the destination year). Such measures, however, ignore information on income during intervening years and therefore may be most suitable for analysis involving annual changes only.

Three different types of numerical measures can be found in the *first* set:[9]

1.1 Income mobility can be measured by the longitudinal correlation of income in the origin year to income in the destination year. For instance, the annual income mobility can be assessed by the correlation of income in period *t* to that of period *t+1*. The correlation coefficient is commonly referred to as the income *immobility* measure and the closer it is to zero, the higher the mobility is. The intuition behind this simple measure is that the correlation coefficient is 'equal to the proportion, θ, of total variance accounted for by the permanent component' of income (Atkinson *et al*. (1992: 5)). Therefore, income mobility is higher if the longitudinal variation in income is less likely to be determined by differences in permanent attributes (for instance, higher mobility implies that low income people are less likely to be handicapped by their origins).

1.2 Another measure of income mobility is the estimate of how strongly people's incomes regress towards the mean over time. This is measured by the slope coefficient β from a regression of (log of) relative income in the destination year on (log of) relative income in the origin year. If β equals one, people tend to hold their relative income positions except for purely random shifts. A positive β less than one provides regression towards the mean and a positive β greater than one regression away from mean. If β equals zero, everyone converges to mean overtime and there is only random mobility around the mean. Thus, closer the slope coefficient is to zero the greater is the regression towards mean, the greater the mobility is.[10]

1.3 The most intuitive way to report on income mobility is to use transition matrices. These matrices report on the probability of moving (or, the proportion of individuals that moved) from one income class to the other during the period in question. The income transition matrix is obtained from cross-tabulations of income group membership in the origin year against income group membership in the destination year. Since the matrix provides information about movements across the whole income distribution, it is a richer source of information than the other two measures.

Our recommendation is that these transition matrices will provide a basic set of indicators of income dynamics for older people. In line with our discussion above, we propose that an absolute measure of income mobility is adopted, thus the income

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[9] This list is not exhaustive, yet it serves the purpose of the selection of an appropriate set of welfare indicators for income mobility in old age.

[10] This holds true when $\beta \in (0,1)$, as is normally assumed. For detailed description of different interpretations of different values of β in the Galtonian model, see Klevmarken (1993: 46-47) and Casson and Creedy (1992: xvi-xvii).

be defined on the basis of income observed in the 'origin' year. Two alternatives can be used for this purpose:

- *Firstly*, income mobility in old age should be operationalised by defining a transition matrix that makes use of income quintiles defined for the origin year. Here, two alternative matrices can be defined: (1) using income quintiles for older population only, and (2) using income quintiles for the overall population;
- *Secondly*, income mobility indicators should also be derived by defining a transition matrix that makes use of income classes defined as a proportion of median in the origin year. For instance, this transition matrix suggested can use the following five income classes: (1) Income below 60% of median; (2) Income between 60 and 80% of median; (3) Income between 80% and 100% of median; (4) Income between 100 and 120% of median; and (5) Income above 120% of median. This transition matrix should be produced for the overall population of older people, as well as for subgroups of older people (such as age groups, females and males, those who experience widowhood, changes in living arrangements and health status).

Next, we describe second sets of income mobility measures which uses income information for the whole period in question.

3.2 Measures summarising income information over the whole period

The *second* set of measures uses the income information available for the *whole* period. The challenge presented by the second set of measures is to come up with a numerical measure that summarises the magnitude of changes in individuals' incomes across the whole period. Much of the existing literature on income mobility uses approaches found in this second set of measures, as they exploit information on each set of annual changes in income more fully. Some salient measures can be described as:

2.1 Shorrocks (1978) derived an aggregate index of income mobility by using the relationship between mobility and inequality. He suggested that 'the extent to which inequality declines will be directly related to the frequency and magnitude of relative income variations' (Shorrocks, 1978: 377). The index exploits the fact that inequality using income information for *m*-periods can never exceed a weighted sum of the single period inequality values. The weights used, w_k, are defined as mean income of each k period as a proportion of mean income for *m*-periods ($w_k = \mu^k / \mu$). Formally the index is written as:

$$R(m) = \frac{I(Y)}{\sum_k w_k I(Y_{k)}}$$

where $I(Y)$ refers to inequality of total income for *m*-period, and $I(Y_k)$ the inequality for period *k*. $R(m)$ is zero in the case in which extending the accounting period of income to more than one wave removes all longer period inequality and therefore presents the case of perfect mobility. On the other hand, the index takes the value 1 when the longer-term inequality equals the weighted sum of the inequality in

individual years, and this represents the case of complete immobility in (relative) incomes.[11]

2.2 Gardiner and Hills (1999), with their work on income trajectories, also offer us a template that can be used to summarise income mobility using the income information for the whole period. Following their approach, the income trajectories that people follow can be summarised into five categories according to significant annual changes in income (e.g. changes in percentile rankings within the income distribution of the older population). A significant change can be defined according to a range of different criterion. For instance, if one is interested in relative mobility, a movement in an individuals' ranking of 10 or more percentiles points from one year to the next can be regarded as a significant change. Similarly, if one is interested in absolute mobility, a movement of 10% in income in absolute terms (after controlling for inflation) can be regarded as a significant move.[12]

4. Conclusions

This paper provides a strong motivation for adoption of welfare indicators that summarise income experience of older people in the post-retirement phase of life. The basic argument is that most indicators of economic well-being use information on incomes in a single year, and these indicators of *income adequacy* should be supplemented with welfare indicators of *income certainty* in old age. These additional indicators would strengthen the information base about the processes that affect income experience of older people.

We recommend income mobility indicators derived from transition matrices which are simple yet intuitive and informative about income dynamics in old age:

- The first set of transition matrices should be derived on the basis of 'quintile income groups' for the origin year. Here, two alternative matrices can be defined: (1) using income quintiles for older population only, and (2) using income quintiles for the overall population. The latter would point towards changes in the relative status of older population within the overall population;
- The second set of transition matrices should be derived on the basis of income classes defined as a proportion of median in the origin year. This transition matrix can use the following five income classes: (1) Income below 60% of median; (2) Income between 60 and 80% of median; (3) Income between 80% and 100% of median; (4) Income between 100 and 120% of median; and (5) Income above 120% of median. This choice of the income classes also facilitates information on poverty dynamics between the origin and destination year. This transition matrix should be produced not just for the overall population of older people, but also for subgroups of older people (such as age groups, females and males, those who experience widowhood, changes in living arrangements and health status). The group-specific analyses would facilitate an identification of lifecourse events and attributes that trigger income mobility in old age.

[11] See Jarvis and Jenkins (1998: 434-436) for a more detailed exposition of this index; also see Atkinson *et al.* (1992: 26-28) for an evaluation of conceptual basis of this index.

[12] The choice of 10% change to represent a significant change is essentially arbitrary.

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