

## **Income Mobility – Curse or Blessing?**

### **Mobility in Social Security Earnings: Data on West-German Men since 1950**

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#### **Abstract**

Descriptions and analyses of citizens' or households' income have a long tradition in economics. A large body of research has recognized that levels of income and how income is distributed are important contributors to the wealth of nations. Within the broader context of income and its distribution, there has also been a considerable amount of research on the process underlying income distribution that is, income mobility. The relevance of income mobility is manifold. First of all, mobility is an indicator for an open society providing economic opportunities for everyone. As people are normally risk averse, they are interested in a steady income stream. This can be called the *security aspect*. Another facet of income mobility is the *incentive aspect*. Upward mobility provides incentives for successful economic activity as it is possible to move up the income ladder. If upward mobility offers the “carrot”, downward mobility epitomizes the “stick” of economic activity. Downward mobility increases insecurity and insecurity is harmful to well-being. We use data covering the whole working lives of workers/employees to shed light on income mobility. This will result in more information about the adequacy of some assumptions of the life-cycle theory concerning the development of income over time – and especially on the inverse U-shape assumption of income profiles.

*JEL Classification: D63, C82, B16, D91*

#### **1. Introduction**

The description and explanation of the income of people, households, and families has a long tradition in economics as income and its distribution are seen as an important aspect of the wealth of nations. In this context, distribution and how it alters over time are of great interest from both a theoretical and an empirical point of view and considerable research has been undertaken to answer questions such as how distribution is formulated or what the underlying distribution-generating process is. If it is possible to answer such questions, one could also offer solutions for economic policy measures concerning income distribution and therefore, in turn, also to those questions addressing the wealth of nations.

In this context the issue of changes in income or income mobility is of particular importance (Gottschalk/Danziger, 1997; Hills; 1999, Yaqub, 2000; Benabou/Ok, 2001a). One assumption in economic theory is that people are normally risk averse. Therefore they are interested in a steady income and consumption stream. This can be called the *security aspect* of income mobility (Kaufmann, 1970; Sinn, 1980; Aaberge/Mogstad, 2008). The expectation of future income is relevant when planning expenditures and savings: Usually, the less stable an income stream is, the more concerned are people with the arrangement of spending and saving money. Many goods and services such as rent, contributions for insurances, or redemption of credits have to be paid for on a continuous basis. An unsteady income stream involves the risk of not being able to fulfill the expectations and may therefore hinder long-term financial commitments (Bristol, 1958; Burgess et al., 2000; Amiel/Cowell, 2001).

Another aspect of income mobility from an economic point of view is the *incentive aspect*. Upward income mobility provides incentives for economic activity, as it is possible to be successful and to be rewarded by moving up the income ladder and by a higher social standing. Downward mobility epitomizes the “stick” for economic activity. Being unsuccessful entails moving down the income distribution scale and in the worst case, stigmatization as a failure. Additionally, income mobility is seen as an aspect which can offset the inequality of income distribution (Organisation for Economic Co-Operation and Development OECD, 1996; Gardiner/Hills, 1999; De Fontenay et al., 2002; Clark, 2003; Millimet et al., 2003; Kopczuk et al., 2007; Gottschalk/Smeeding, 2000, 294). The existence of a general possibility of moving up the wealth ladder – often called the American Dream or the Horatio Alger Myth – is generally assumed (Sarachek, 1978; Holtz-Eakin et al., 2000). In other words income mobility is considered to equalize opportunities. Mobility characterizes an open society, where everyone has a chance to climb the ladder of success, which is to some extent manifested in the income position (Bigard et al., 1998; Van Kerm, 2003; Ayala/Sastre, 2008; Van Kerm, 2006). Last but not least, in a more technical view, income mobility can be regarded as just another form of redistribution – albeit a stochastic one (Benabou/Ok, 1998; Benabou/Ok, 2001b).

Our analysis is based on two sets of longitudinal micro-data drawn from the German Federal Pension Insurance. These data sets contain biographical and pension information on those who retired with an old-age pension. The investigation is limited to West-German men born in 1921 and 1945 who retired at the age of 60 in 1981 or 2005, respectively. Both samples cover process produced earnings information for each month in the entire occupational biography. In contrast to surveys, this data represents an error-free measure of earnings without problems of panel attrition. In this way we can show wage profiles by age and we are thus looking at income mobility within the two selected cohorts in different historical and biographical backgrounds.

In most analyses, the time period covered by the data is relatively short, preventing analysis of the special aspects of the life-cycle theories. As we can use data on employees covering their whole working life, we are able to shed some light on the income mobility over their entire careers. This will result in more information about the adequacy of some assumptions of the life-cycle theory concerning the development of income over time – especially about the inverse U-shape assumption of income profiles (Kruse, 2000; Börsch-Supan et al., 2004; Kliegl, 2004; Skirbekk, 2004; Zimprich, 2004; Bundesministerium für Familie, Senioren, Frauen und Jugend, 2005; Myck, 2007).

Furthermore, we will fill the knowledge gap of Germany's income mobility that is mainly neglected in the area of distributional and social policy analysis (Bundesregierung, 2001, 2005, 2009).

The paper is structured as follows. First we give a short presentation of some relevant theoretical aspects that have to be taken into account when analyzing income mobility. It is shown that most of the studies are descriptive, providing information only about the changes of income over time without trying to construct or test an explanatory model. This is exemplified for Germany by the literature review in section 3. However, due to the restricted socio-economic information in our data base, we are also unable to test explanatory models, as can be seen in section 4 in which the data and the method are briefly explained. Though, as the time span covered by our data is large, we provide information on the relevance of age, period and cohort effects for explaining income mobility. The results are shown and discussed in section 5. Overall, income mobility is quite high and the development of individual profiles and income mobility does not correspond very well to the assumptions of distributional theory. However, due to data restrictions we could not answer the question of what the relevant determinants of income mobility are.

## 2. Some Theoretical Remarks

First, it has to be stated that in all empirical and theoretical analyses, income mobility is defined as the change in income from one period to another for the same subject of the study – individuals, households, or families – also considering the intergenerational dimension (Österberg, 2000; Solon, 1992; Piketty, 2000).

Independent of the income definition and the research unit, six theoretical concepts of mobility are discussed and analyzed in the literature (Fields, 2004; Dragoset/Fields, 2007):

1. time-dependence with different entities: including intergenerational mobility of children and parents and mobility studies with the same underlying entity
2. positional movement: a concept that explores changes in economic positions in the income distribution (using classifications like ranks or quantiles)

3. share movement; this concept focuses on changes to the recipient's share of total income in the population
4. income instability, which analyzes the size of changes in income levels but not their direction
5. directional income movement, which measures how many recipients move up or down the income distribution scale and by how far
6. mobility as an equalizer of longer-term income, which compares the inequality of income at a point in time with the inequality of income over a longer time period

All these concepts are used in analyses with different definitions of income and different subjects (individuals, families or households). However, using families or households as research units is problematic as these units are not stable over time (Duncan/Hill, 1985; Pendakur, 1998; Burgess et al., 2000; Dickens/McKnight, 2008b; Chen, 2009; Shi et al., 2010). Nevertheless, for comparing income mobility between countries, it is necessary to take the different structures of households into account, because their size and composition differs (Gottschalk/Danziger, 1997; Schluter, 1997; Jenkins, 1998; Jarvis/Jenkins, 1998; Aaberge et al., 2002; Abatamarco, 2003; Cruces, 2005; Hills et al., 2006; Chen, 2009).

Therefore, even though much research has been undertaken on the methods of income measurement or earnings mobility (Ayala/Sastre, 2008), 'the income mobility literature is still distressingly far from being unified on how to measure mobility and make mobility comparisons' (Fields/Ok, 1999, 586).

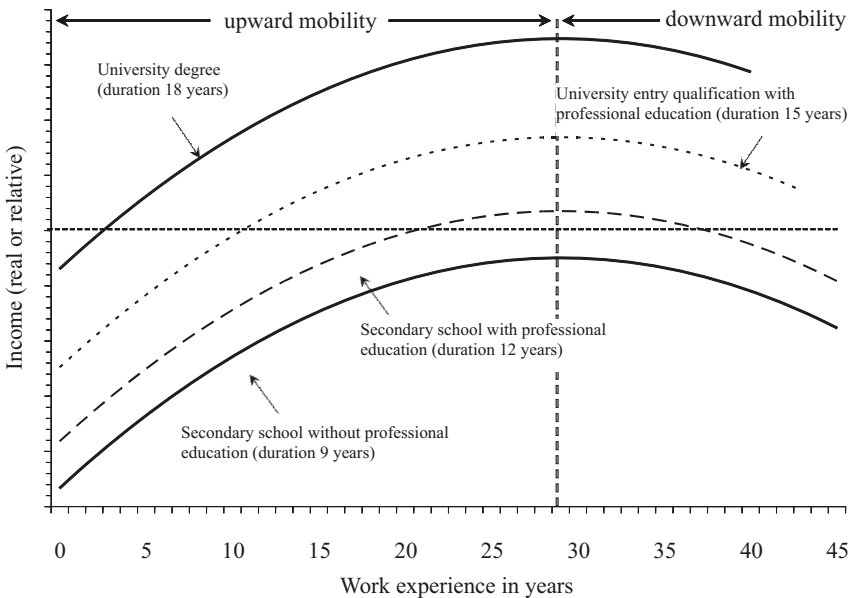
In the international literature, most economic mobility studies work with transition matrices (Atkinson et al., 1992; Buchinsky/Hunt, 1999; Fields, 2001). The rows and columns of such matrices are typically quantiles of the base year and final year income distributions.

Most of the discussion is not about mobility and its explanatory variables or determinants but about the adequacy of methods of measurement (Fachinger, 1991; Madduri, 1976; Fields/Ok, 1996; Schluter/Van de Gaer, 2003; Ruiz-Castillo, 2004; Cruces, 2005; Bandyopadhyay/Cowell, 2006; Contini et al., 2007; Aaberge/Mogstad, 2008; Fields, 2008; Silber/Weber, 2008; Altonji et al., 2009). In the literature new axiomatic content and analytical properties equal to those applied in the static analysis of income distribution have been discussed. They form the foundation of new methods and techniques for the measurement of income mobility that have been developed. There are for example some axiomatic lines of research establishing the basic assumptions that mobility indices should reflect the movement of incomes through time (Fields/Ok, 1996; Cowell/Schluter, 1998; Cowell/Schluter, 1998; Mitra/Ok, 1998). In addition, the measurement of income mobility from a welfare point of view has been examined intensively in the literature. Such approaches generally re-

late income mobility to the equality of opportunity and the removal of social barriers.

A different approach is embodied by the Markovian model of mobility. This model uses stochastic processes for modeling the time path of income. The last approach sees income mobility as the transitory component of income development over time – with no “explanatory power”. This would mean that mobility is residual and cannot be explained. But this is unsatisfactory as the changes in the income position over time have to be explained.

Therefore, the question of how to explain mobility remains, and its answer requires the identification of the determinants of income mobility. A natural starting point could be the life-cycle theory. The main goal of this theory is the explanation of the development of individual income over time. But this also implicitly includes the consideration of some of the six concepts mentioned above, and therefore the explanation of some aspects of income mobility. However, in life-cycle theory, income mobility is not explicitly addressed. It is seen rather as a residual factor or the transitory component contrary to the permanent income (Ramos 2003). In line with the life-cycle theory, the development over time of income and income mobility results in an inverse U-shaped profile for the (working) life-cycle as shown in Figure 1.



Source: Authors' own illustration.

Figure 1: Income profiles and income mobility

The profiles in Figure 1 indicate a special pattern of mobility but the figure is open to at least two interpretations. Firstly, the profile can be seen as the development of real individual income over time, representing the productivity of the worker (Skirbekk, 2008). Since the marginal productivity decreases over the whole career and employees are paid according to their productivity, the income profile follows this pattern.<sup>1</sup> Therefore, from their own points of view, individuals experience a rise in real income – upward mobility – and after about two-thirds of their working life, a decline in real income – downward mobility. Explaining this process would therefore be identical to explaining income mobility.

Secondly, the development of real income may also lead to changes in the income position. Entering the labor market, the individual may start to climb up the income ladder over time as she or he is physically well-equipped and has the most current knowledge, for example of technology. The extent of human capital will therefore lead to greater productivity compared to older employees, resulting in a steeper upward-mobility profile and to higher productivity. The profile has a decreasing marginal rate of return as the human capital or earnings capability diminishes. Physical skills decline over time and intellectual assets get older.

This means that we notice an upward mobility in the income distribution during the first part of the working life and a downward mobility thereafter. In other words, when analyzing mobility, we should look at the entire picture as short-term analyses cannot identify the long-term developments – even if in some years downward mobility dominates, it is important to take the development over a longer period into consideration.

This concept of income mobility is a little bit trickier to explain as it has to take the distribution of income into account. It is not covered by the income function as one can experience upward mobility due to a rise in real income and at the same time, the relative position within the distribution may decrease.

The first type of the income mobility measuring concept is called non-positional income mobility because changes to the absolute real or nominal income over time are taken into account (Beenstock, 2004; Fields/Ok, 1996). When the relative position and changes in the distribution are considered, this type of mobility is called positional mobility.

Bearing this in mind, the inverse U-shape of an income profile in cross sectional analysis may be interpreted as a description of the development of an individual position in the income distribution over time. However, there are strong indications that it is not a good representation of an individual profile (Schäfer, 1981; Fachinger, 1994; Bager-Sjögren/Klevmarken, 1998; Burgess

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<sup>1</sup> For an empirical analysis in the context of income mobility see e.g., Bowlus/Robin (2004).

et al., 2000; Millimet et al., 2003; Klevmarken, 2004; Fachinger/Himmelreicher, 2007).

### 3. Literature Review

Little research has been done on income mobility in Germany studying differing methods and time periods, as can be seen from Table 1. Two databases were used to analyze income mobility: the German Socio-economic Panel (SOEP; see Wagner et al., 2007) and social security earnings records from the Statutory Pension Insurance (FDZ-RV<sup>2</sup>; see Himmelreicher/Stegmann, 2008). Most analyses were carried out using the SOEP, but with different population and statistical units, an issue that makes the results difficult to compare in detail.

*Table 1*

**Data sources and methods  
used in income mobility analyses in Germany**

| References               | Source                           | Population and statistical unit           | Period  | method  |
|--------------------------|----------------------------------|---|---|---|
| Schäfer (1981)           | Various surveys                  | special groups of workers                 | 1886 to 1906; Cross section from 1900, 1905, 1910 | non-positional mobility and hypothetical profiles based on cross section data |
| Schmähl/Fachinger (1989) | Social security earnings records | gross individual earnings                 | 1961 to 1970                                      | transition matrices, deciles  |
| Fachinger (1991)         | Social security earnings records | gross individual earnings                 | 1950 to 1979                                      | hazard rate models, deciles   |
| Rendtel/Schwarze (1991)  | SOEP                             | equivalized <sup>3</sup> household income | 1984 to 1989                                      | transition matrices, deciles  |
| Rohwer (1991)            | SOEP                             |   | 1984 to 1989                                      | transition matrices   |
| Berntsen (1992)          | SOEP                             |   |   | transition matrices   |

*Table continued next page*

<sup>2</sup> But this situation may change as such data are now provided by the Research Data Centre of the Federal German Pension Insurance ([www.fdz-rv.de](http://www.fdz-rv.de)) and of the Federal Employment Agency at the Institute for Employment Research (<http://fdz.iab.de/en.aspx>).

<sup>3</sup> The equivalence scale used in this analysis was in accordance with German legislation for social aid: head of household 1.0, member of household older than 18 years 0.8, household members aged between 15 and 18 years 0.9, for household members 0.65 which are aged between 8 and 14 and for those younger than 7 years 0.55.

*Table continued*

| References                  | Source                           | Population and statistical unit   | Period       | method  |
|-----------------------------|----------------------------------|---|--------------|---|
| Rendtel et al. (1993)       | SOEP                             | equivalized <sup>4</sup> household income   | 1984 to 1986 | transition matrices, two states above and below the poverty threshold |
| Fachinger (1994)*           | Social security earnings records | gross individual earnings   | 1950 to 1979 | transition matrices, deciles  |
| Schluter (1997)             | SOEP                             | equivalized <sup>5</sup> household income   | 1984 to 1989 | transition matrices with four groups with respect to the median***    |
| Müller/Frick (1997)         | SOEP                             | equivalized <sup>6</sup> household income   | 1990 to 1994 | transition matrices   |
| Trede (1997)/Trede (1998)   | SOEP                             | gross labor incomes earned by males   | 1984 to 1992 | mobility indices and transitions matrices                             |
| Merz/Kirsten (1998)         | SOEP                             | equivalized <sup>7</sup> household income   | 1985 to 1994 |   |
| Schluter (1998)             | SOEP                             | equivalized <sup>8</sup> post-tax post-benefit household income                                 | 1984 to 1993 | Shorrocks and Prais mobility indices                                  |
| Hauser/Fabig (1999)         | SOEP                             | gross individual labor income, gross and net equivalent <sup>9</sup> labor income of households | 1990 to 1995 | Bartholomew-Index and transition matrices with six classes            |
| Fabig (1999a)/Fabig (1999b) | SOEP                             | gross and net equivalized <sup>10</sup>   | 1990 to 1995 | Bartholomew-Index and transition matrices with seven classes          |

<sup>4</sup> The equivalence scale used in this analysis was in accordance with German legislation for social aid: head of household 1.0, member of household older than 18 years 0.8, household members aged between 15 and 18 years 0.9, for household members 0.65 which are aged between 8 and 14 and for those younger than 7 years 0.55.

<sup>5</sup> New OECD equivalent scale: Income divided by household size raised to power 0.5.

<sup>6</sup> The equivalence scale used in this analysis was in accordance with German legislation for social aid: head of household 1.0, member of household older than 18 years 0.8, household members aged between 15 and 18 years 0.9, for household members 0.65 which are aged between 8 and 14 and for those younger than 7 years 0.55.

<sup>7</sup> Different equivalent scales.

<sup>8</sup> New OECD equivalent scale: Income divided by household size raised to power 0.5.

<sup>9</sup> Old OECD equivalent scale: head of household 1.0, member of household older than 14 years 0.7 and household members 14 and younger 0.5.

<sup>10</sup> Old OECD equivalent scale: head of household 1.0, member of household older than 14 years 0.7 and household members 14 and younger 0.5.



| References                         | Source  | Population and statistical unit                                  | Period                       | method   |
|------------------------------------|---|--|------------------------------|--|
| Habich/<br>Spéder (2000)           | SOEP  | household income   | 1990 to 1994                 | transition matrices with six classes               |
| Maasoumi/<br>Trede (2001)          | SOEP  |  |                              | generalized entropy mobility measures              |
| Himmelreicher (2001)               | SOEP  | household pre-tax-equivalized <sup>11</sup> income               | 1984 to 1997                 | transition matrices with seven classes             |
| Jenkins/<br>Van Kerm (2003)        | SOEP  | person's post-tax post-transfer annual income                    | 1985 to 1999                 |  |
| Van Kerm (2003)                    | SOEP  | person's post-tax post-transfer annual income                    | 1984 to 1997                 | mobility indices                                   |
| Schluter/<br>Trede (2003)          | SOEP  |  |                              | mobility indices                                   |
| Behr et al. (2003)                 | ECHP**  | household income   | 1997 to 1998                 | transition matrices, quintiles                     |
| Zaidi et al. (2004)                | SOEP  | net equivalized <sup>12</sup> household income                   | 1990 to 2000                 | Shorrocks index and transition matrices, quintiles |
| Sopp (2005)                        | SOEP  |  | 1984 to 2000                 |  |
| Grabka/Frick (2008)                | SOEP  | net equivalized household income                                 | 1996 to 2000<br>2002 to 2006 | transition matrices with three classes             |
| Fachinger/<br>Himmelreicher (2008) | Social security earnings records 2004/2005          | earnings   | 1953 to 2005                 | transition matrices, percentiles                   |
| Bachmann et al. (2009)             | Social security earnings records IABS 1975-2004**** | gross individual earnings  | 1975 to 2004                 | transition matrices, quintiles                     |
| Chen (2009)                        | SOEP  | equivalized <sup>13</sup> post-tax post-benefit household income | 1991 to 2002                 | Shorrocks index and transition matrices            |
| Fachinger/<br>Himmelreicher (2010) | Social security earnings records 1981/2005          | gross individual earnings  | 1950 to 2005                 | transition matrices, percentiles                   |

\*: Fachinger (1994, 211 ff.).

\*\* : ECHP European Community Household Panel – the data for Germany are from the SOEP.

\*\*\*: lower 0.5, between 0.5 and 1.0, between 1.0 and 1.5 and the fourth with more than 1.5.

\*\*\*\*: Institute for Employment Research, Employment Sample (IABS).

<sup>11</sup> Equivalence scale is approximated by the square root of the household size.

<sup>12</sup> Equivalence scale is approximated by the square root of the household size.

<sup>13</sup> New OECD equivalent scale: Income divided by household size raised to power 0.5.

As the list shows, information about income mobility in Germany is available. Nevertheless, the results are not directly comparable since although the analyses are using the same database, they employ different methods and apply different income concepts. However, one can state that income mobility was detected in the sample overall. There remains a problem with all the analyses on the basis of the SOEP as they cover only a short period of time. Only the earlier analyses by Fachinger (1991, 1994) took nearly the whole working biography into account.

The SOEP was also used in the reports on poverty and wealth of the Federal Government of Germany (Bundesregierung, 2001, 2005, 2009). The reports illustrate the view of the Federal Government on the relevance of income mobility in economic and social policy. Income mobility is mainly discussed in connection with poverty risk and not as a general phenomenon to describe the aforementioned aspects of welfare (Gardiner/Hills, 1999; Jantti/Danziger, 2000).

Hence from a political point of view, what has to be done to reduce or to foster income mobility is not known. The political focus lies on attempts to reduce income poverty or social exclusion, in other words to raise upward mobility for the poor<sup>14</sup> and to reduce downward mobility for those who have a high poverty risk. Therefore, “explaining” mobility focuses on trying to find determinants which could be used to develop measures to reduce or avoid social exclusion. Concerning income mobility for Germany, only one analysis was done to identify and analyze its determinants using hazard rate models (Fachinger, 1991).

#### 4. Method and Data

As previously discussed, at least three aspects are relevant while analyzing income mobility:

1. the definition of income,
2. the definition of the subject of the analysis (individuals, households, or families), and
3. the setting of the concept of mobility analysis.

The income used for the analysis is set by the data material used: gross monthly labor earning points for social security contributions. This also constrains the subject available for the study: individuals who are registered in the German Federal Pension Insurance records (Himmelreicher/Stegmann, 2008).

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<sup>14</sup> In this sense, the comparison of low income earners in Germany and Great Britain leads to a positive result for the labor market in Britain as the upward mobility and therefore the chance to move up the income ladder is higher in Britain (Klodt, 1998).

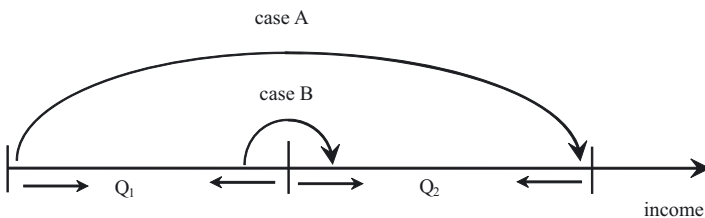
In this analysis, we will consider the income of the same individuals (West-German men) at two or more points in time.

#### 4.1 Method

As discussed earlier, there are several alternative ways to define mobility and the approaches used in previous analyses for Germany are quite different. We will use the concept of positional mobility and apply transition matrices – the change from one relative income class to another, with 20 income classes and 19 percentile class limits: (bottom) P5, P10, P15, P20, P25, P30, P35, P40, P45, P50 (median), P55, P60, P65, P70, P75, P80, P85, P90, (top) P95.

We examine labor income mobility of West-German men in two different birth cohorts between the age of 30 and 60 with a balanced sample, so that each person is observed every year. By this our mobility analysis covers approximately the whole earning biography. However, not every individual in the sample had a recorded income for every year. Problems occur especially due to the low number of observations at the beginning and at the end of careers, so we chose this restricted observation window. The yearly mobility calculation results in 30 transition matrices. To give an overview of income mobility, we aggregate mobility in three simple categories: non-movers (immobility), upward movers and downward movers.

There are some issues for this approach that have to be taken into account when interpreting the results. For example, a change in income from the lower class limit to the upper class limit of the next class (case A) is valued exactly the same as a change from the upper limit of the class  $Q_1$  to the lower limit of next higher class  $Q_2$  as shown in Figure 2.



Source: Authors' own illustration.

Figure 2: Diagram of “jumping distance”

Another problem arises from the instability of the class limits. If class limits change over time and the income remains the same, a change of classes could happen – and therefore it would be interpreted as positional mobility although an individual does not experience a change in income at all. Because transition

matrices are based on ranks in the income distribution, they can only present a picture of changes of position within the income distribution and cannot give evidence about the effects of changes in dollars or other currency units, either within or across classes. This clarifies the differences between positional and non-positional income mobility (Contini et al., 2007, 17 ff.). Further problems result from the left and right censoring of the income data. There is a lower limit, called *Geringfügigkeitsgrenze*, and an upper limit, named *Beitragsbemessungsgrenze*.

## 4.2 Data

We will take a closer look at the development of a special form of income from one resource, namely earnings that are from process produced information, because they are subject to social insurance contributions. Such data has some advantages compared with survey data. On a more technical note, especially in analyzing mobility on the basis of survey data measurement, errors are possible as we cannot be certain if the deviations are real or the result of the data collection process. (Klevmarken, 1993; Gottschalk/Huynh, 2006; Dragoset/Fields, 2007, 2 ff.) In an attempt to work with an error-free measure of earnings, a much smaller body of literature uses administrative-based data to study mobility.<sup>15</sup> Using such data is also advantageous as there is no problem with sample attrition (Ayala et al., 2006).

We use longitudinal micro-data of the German Federal Pension Insurance that contains biographical and pension information on West-German men who retired in the same year with an old-age pension (Fachinger/Himmelreicher, 2010). Therefore it is an inflow sample that includes only pensioners. The samples cover a time span from the first year of contribution payments to the German Federal Pension Insurance until the year of retirement. Hence the time span covers the entire employment biographies, potentially starting in the year the person turned 14 to the year the person turned 60 and retired. To analyze cohort effects we examine and compare inflow statistics from 1981 – with the data set ASK-VVL1981, and 2005 – with the data set FDZ-RV-VVL2005. So we are able to compare the development of mobility of West-German men over 25 years and more.<sup>16</sup> Therefore, period effects such as the

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<sup>15</sup> The DADS (Declarations Annuelles de Données Sociales) data from the French National Statistical Office INSEE, was used for example by Buchinsky et al. (2003) to study income mobility in France, for Germany see Fachinger (1991) and Fachinger (1994), for Austria Hofer/Weber (2001), for Switzerland Meier (1983), for UK Dickens/McKnight (2008), for the U.S. Kopczuk et al. (2007) and Congressional Budget Office (CBO) (2007).

<sup>16</sup> A side note: The original data from ASK-VVL1981 is not available from the Federal German Pension Insurance because the data was collected long before the institution FDZ-RV was established and an agreement was reached regarding the building up of the

oil crisis could also be taken into account when interpreting the results (Rigg/Sefton, 2004).

For the analysis of income mobility, the information about monthly individual earning points is used. Earning points are calculated by dividing the individual gross monthly labor earnings that are subject to social security contributions by gross earnings per average employee.<sup>17</sup> We summarize monthly to yearly earning points for men working every month in a year, otherwise they are eliminated from the sample. In summary, earning points are dimension free as the division eliminates the influence of all factors with the same effect on denominator and nominator – like the real economic activity – and deflation is unnecessary (Fachinger, 1994).

Table 1 shows the numbers of cases of West-German men who retired in 1981 and in 2005 in the data sets. Both sub-populations consist of approximately 6,500 cases, so the number of observations is large enough for our analysis.

*Table 2*  
**Number of cases of West-German men  
in the birth cohorts 1921 and 1945 who retired in 1981 or 2005**

|            | ASK-VVL1981<br>Number of cases |            | VVL2005<br>Number of cases |
|------------|--------------------------------|------------|----------------------------|
| men 1921   | 6,456                          | men 1945   | 6,557                      |
| men, total | 10,386                         | men, total | 44,311                     |

*Source:* ASK-VVL1981, FDZ-RV – VVL2005, authors' own calculation.

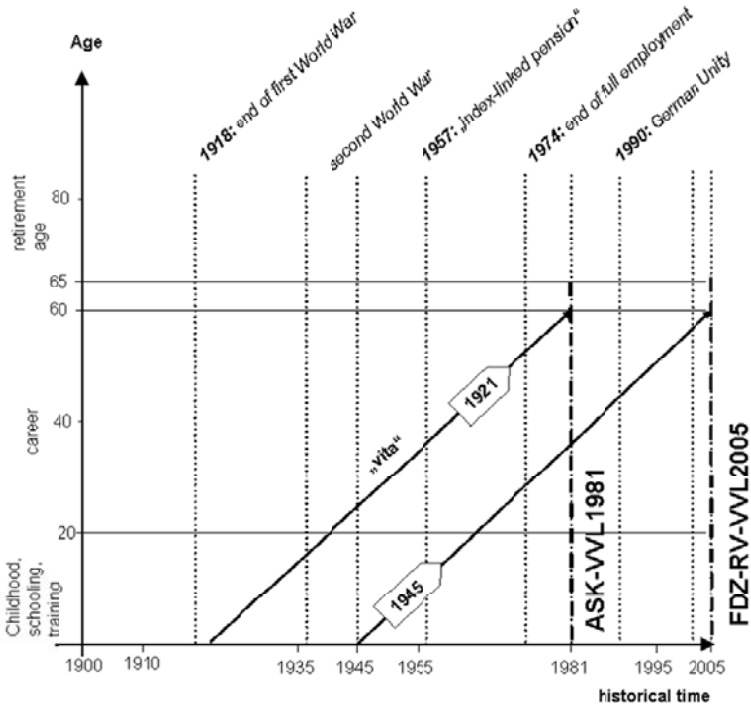
Figure 3 gives an overview of the historical, economical, political, and biographical embedding of the vitas of the two different birth cohorts.

Members of the older cohort were born in 1921 after the end of the First World War. Their (vocational) training was limited as many of them were soldiers in the Second World War and they retired at the age of 60. The members of the younger cohort were born in 1945. At the beginning of their working career they entered a flourishing economy as the so called economic miracle (Wirtschaftswunder) in West-Germany took place. But they have also experienced the decline of the West-German economy since the beginning of the

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Research Data Centre (Rehfeld, 2004). Therefore we use the data from Fachinger (1991 and 1994) for the analysis of income mobility of two cohorts in different historical, social, and economic context.

<sup>17</sup> § 70 Book VI of the German Social Welfare Code (SGB VI) and Annex 1 Book V of the German Social Welfare Code (SGB V).



Source: Authors' own illustration.

Figure 3: Diagram of historical and biographical embedding of the cohorts born in 1921 and 1945 who retired in 1981 or 2005

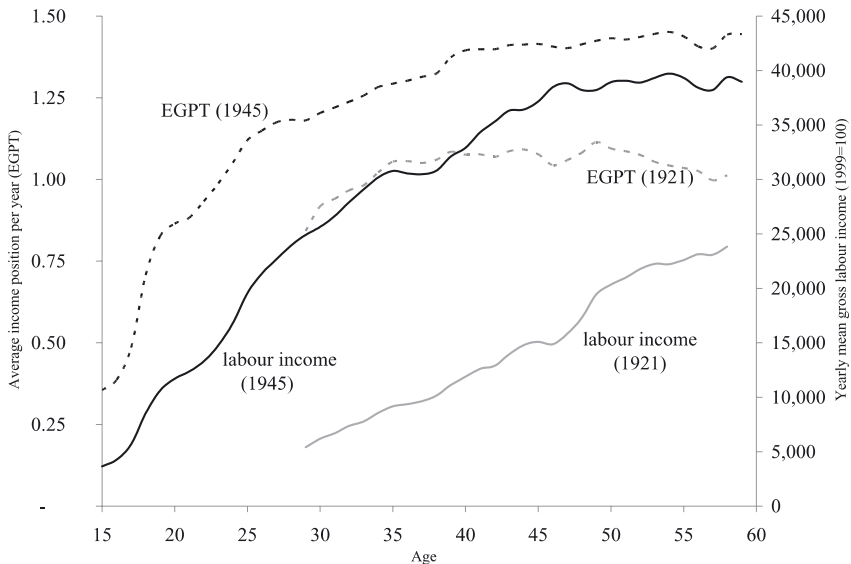
1980s, starting some years after the beginning of their careers. In the middle of their careers, the German Reunification took place. Like the older cohort, they retired at the age of 60. In summary, West-German men of both cohorts have a different historical and biographical background and one can assume that their careers spanned different labor market epochs with different influences on their income development and dynamics.

### 5. Empirical Analysis

At first we will show the development of average income by age measured in earning points for the two cohorts. We will present results of our analysis of income mobility via transition matrices for 20 relative income classes. It should be noted that the two cohorts that are the subjects of the empirical findings reflect a specific population, and so the findings are not representative for all employed West-German men.

### 5.1 Age-income-profiles of West-German men in the birth cohorts 1921 and 1945

To give an initial overview, we show average age-income profiles measured by average yearly earning points and by deflated yearly mean gross labor income for the two cohorts.<sup>18</sup> The reason why the age-income profile of the older cohort begins at the age of 29 is that the accounting period of ASKVVL1981 starts some years after the Second World War in 1950<sup>19</sup>, when the men born in 1921 were 29 years old.



Source: FDZ-RV – VVL2005 and SKAVVL1981, own calculation;  $n_{(\min)} = 50$ . Real values deflated with 1999 as base year. Deflation of the nominal wages by the CPI provided by the German Federal Bureau of Statistics. Usage of the index for West-Germany up until 1990, usage of the index for entire Germany from 1991.

Figure 4: Age-income profiles of West-German men  
of the birth cohorts 1921 and 1945 who retired in 1981 or 2005

In general, West-German men born in 1921 have flatter and lower age-income profiles than the younger cohort. In particular, the difference in the average of yearly real gross labor income is quite striking. As shown in Figure 1A

<sup>18</sup> For a detailed discussion of age-income profiles and the adequacy of methods of measurement, see Fachinger (1994).

<sup>19</sup> In the time before the Second World War the reporting processes of income data were totally different – e.g., people had to buy and collect stamps (Göbel, 1983) and the income information was categorized in income classes.

in the Appendix, this is mainly due to economic growth and reflects the increase in overall wealth in Germany. The average age-income profiles of the income positions (EGPT) for both cohorts increase until the age of 40. Whereas the income position of the younger cohort remains more or less the same from age 40 until age 60 (EGPT1945), the income position of the older cohort decreases at the end of their working life (EGPT1921). Furthermore, the income position of the younger cohort is 30 percent higher overall. However, it is unclear why such a development has taken place and why such differences between the cohorts occur. Nevertheless, reasons for such profiles cannot be found only in individual characteristics but also in macro-economic effects as Figure 1A indicates (for the latter see also Fachinger, 1991).

## 5.2 Income mobility of West-German men of the cohorts 1921 and 1945

Arguing along the line of the positional mobility and looking at the profiles in the previous Figure the subsequent hypothesis could be tested: After entering the labor market for men, upward income mobility will determine income changes over a time span of about ten years, but contrary to the profiles in Figure 1, only minor mobility within the distribution will take place in the phase after positioning in the distribution between ages 35 to 40 on average.

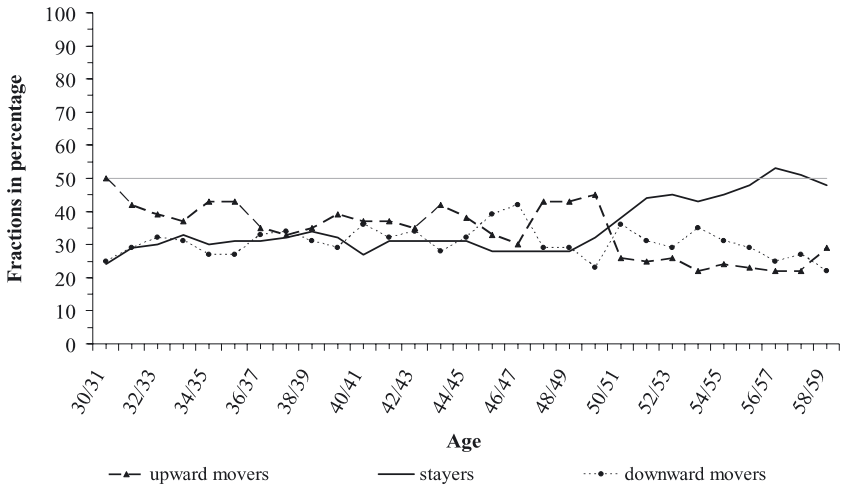
Below we show the results of our analysis of income mobility for three categories: stayers/non-movers (immobility), upward movers and downward movers. Furthermore, to compare income mobility developments over time we distinguish between intra-cohort mobility and inter-cohort mobility, starting with intra-cohort mobility.

### 5.2.1 Comparing mobility levels within the cohorts

Income mobility can be interpreted in the sense of openness of the distribution or flexibility of income position. In the following Figures the development of the percentage of stayers/non-movers and the percentage of upward or downward mobility – the percentage of people in a different income class in the next year – is shown.

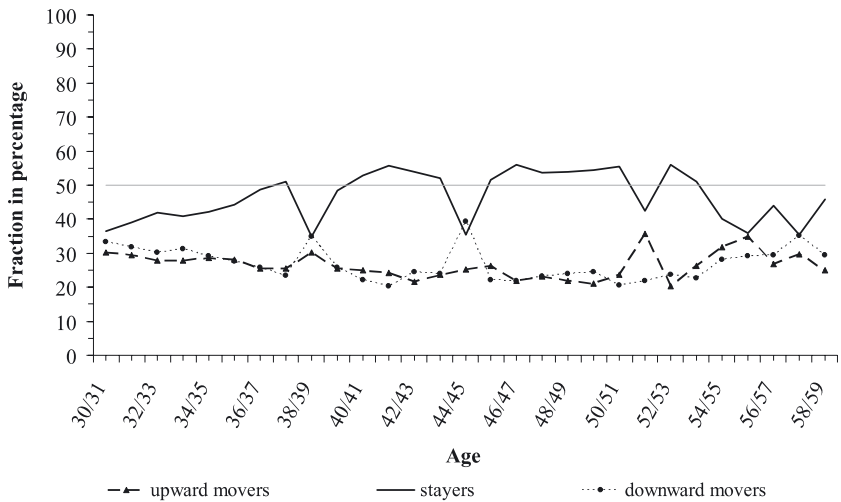
For West-German men in the 1921 birth cohort, we see an increasing share of stayers/non-movers by age, a near constant share of downward movers and a falling share of upward movers. The profiles of West-German men in the 1945 birth cohort show longer periods with immobility of over 50 percent, while downward and upward movement stay at similar levels and show no visible trend over the examined time span. There are three visible spikes, where the share of stayers/non-movers decreases for one period, while either the downward or the upward movement increases for this period. In the next period, the share of immobile income rises back over the 50 percent line. These





Source: SKAVVL1981, own calculation;  $n_{(\min)} = 50$ .

Figure 5: Intra-cohort income mobility of West-German men of the 1921 birth cohort who retired in 1981



Source: FDZ-RV – VVL2005, own calculation;  $n_{(\min)} = 50$ .

Figure 6: Intra-cohort income mobility of West-German men of the 1945 birth cohort who retired in 2005

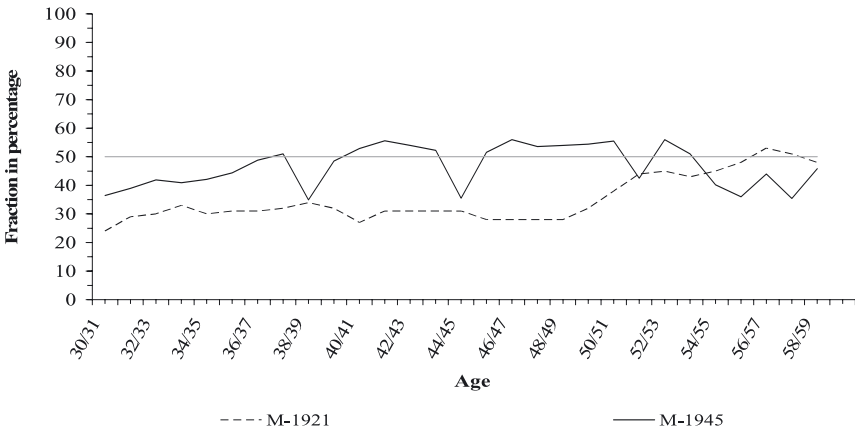
large spikes happen in 1983/84 and 1989/90, with a parallel increase in downward movement, and in 1996/97, with a parallel increase in upward movement. In general, the 1945 cohort exhibits less income mobility than the 1921

cohort. In the last years before retirement, immobility decreases below the 50 percent value, parallel to more downward than upward movements.

Those developments can be seen as an indication of period effects. For example when searching reasons for the spin at age 44/45, it has to be considered that in 1989 the former GDR was integrated into FDR. This might be one reason why the development of real labor income stagnated, the percentage of stayers/non-movers decreased and the percentage of downward movers increased (see Figure in the Appendix). The spin in 1983 can also be seen as connected to the development of real labor income. Regarding the development over the last five years of employment it is well known that a lot of employment instability has occurred (see e.g., Fachinger/Himmelreicher, 2007, 2008). The lower number of stayers/non-movers towards the end of an employment career may be a reflection of the working situation combined with legal regulation of the SGB VI. However, there is also some evidence for macro-economic effects as income mobility seems to be higher during times of economic instability.

### 5.2.2 Comparing mobility levels across the cohorts

In the following sub-section, the mobility levels of both cohorts are compared. It can be seen that the older cohort has a smaller number of stayers/non-movers in all but the last periods. In the final years before retirement, the younger cohort exhibits more income movement than over most of the span of the examined period, while the percentage of income immobility of the subjects born in 1921 increases until retirement.



Source: FDZ-RV – VVL2005 and SKAVVL1981, own calculation;  $n_{(min)} = 50$ .

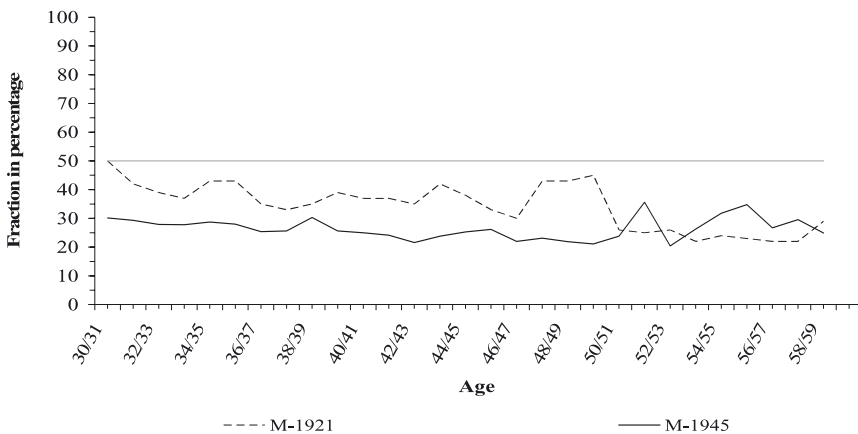
Figure 7: Inter-cohort income mobility of West-German men of the birth cohorts 1921 and 1945 who retired in 1981 or 2005: *stayers/non-movers*

In the first phase of one's working career a great deal of the evident mobility can be assumed to be connected to finding a position within the income distribution context. After people have found their respective working positions – in the middle of the working career – there may be little mobility. During the last third of one's career lower productivity due to health effects or reduced human capital, may lead to an increase in mobility as productivity does not decline for all cohort members at the same time.

The following figures are offered to test whether this holds true in reality and also to investigate the possibility of improving an income situation. We also consider whether the distribution is open for successful individuals, showing the profiles of upward and downward mobility.

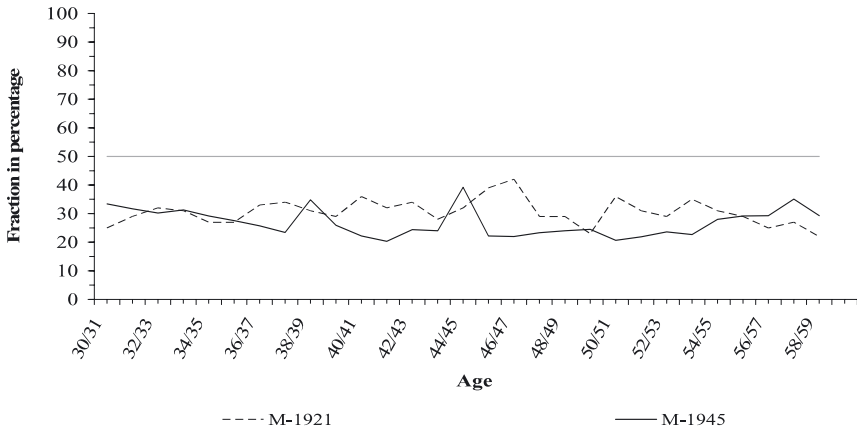
While the general trend of the upward mobility of the 1921 cohort seems to match the theory (it decreases from 50 to 29 percent over the examined period), the 1945 cohort does not exhibit this trend to the same extent. Nevertheless, a much smaller decrease from 30.2 to 24.9 percent over the full period is found, with most values somewhat below 30 percent. For most of the time, the 1921 cohort shows higher upward-mobility movement, which only decreases below the values of the younger cohort in the last 10 years.

A specific structure of downward mobility, one reflecting age, cohort or period effects, cannot be identified. It seems as if there only a percentage of people – between 20 and 40 percent each year – moving down the income distribution ladder.



Source: FDZ-RV –VVL2005 and SKAVVL1981, own calculation;  $n_{(\min)} = 50$ .

Figure 8: Inter-cohort *upward mobility* of West-German men of the birth cohorts 1921 and 1945 who retired in 1981 or 2005



Source: FDZ-RV – VVL2005 and SKAVVL1981, own calculation;  $n_{(min)} = 50$ .

Figure 9: Inter-cohort downward mobility of West-German men of the birth cohorts 1921 and 1945 who retired in 1981 or 2005

Overall the differences in the development of the cohort profiles might be a result of the economic situation during working life, as the members of the older cohort were working within a prospering economy during the 1960s and 1970s for the most part. One could assume from these different trends, that income during the last years of the working life has become less stability-reliable in recent years than before. That would be one reason for the increase in the percentage of stayers/non-movers in the younger cohort; but it could also be derived from an increasing number of people working up until retirement, and those workers finding themselves having to accept precarious employment.

### 6. Conclusion

With our data it was possible to cover a large time period – much larger than any other analysis has covered to date – with different overall economic development phases, and to distinguish between age, period and cohort effects.

The amount of mobility is high<sup>20</sup>: on average, over 50 percent of the 1945 cohort members and over 60 percent of the 1921 cohort members are not staying in the same income class on a year to year basis. For income from regular dependent employment without phases of unemployment, reduction of working time, and during a time of full employment with mainly frictional unemploy-

<sup>20</sup> A high degree of income mobility is also a result of the analysis of Cantó (2000) for Spain and Joseph Rowntree Foundation (1997) for Great Britain.

ment, one would have expected that the percentage of stayers/non-movers would be higher – especially considering risk averse behavior.

Of course, there is no such thing as an optimal level of mobility. Transitory income elements seem to be quite high. This is remarkable as just one income source is analyzed: the individual gross monthly labor earnings that attract social security contributions. Income components such as interest earnings or self-employment income that are mainly seen as unsteady over time are not considered.

Our analysis shows that the development of individual profiles and income mobility does not correspond very well to assumptions of the human capital and life-cycle theories. Those theories would suggest dominant mobility in the first ten or 20 years of working life, dominant immobility afterwards, and an increase in mobility in the waning of one's career.

However, this is not a satisfying result as the higher the transitory component, the lower the explanatory power of theoretical models with regard to economic rationalization. Therefore the dominance of the transitory component restricts the analysis merely to a description of the income distribution and its development over time.

At least one more problem arises in measuring and explaining income mobility. One has to take into account the composition of income. As a rule, income of individuals comprises different components enclosing earned and unearned income. Each component should be analyzed separately because the factors that could explain the mobility of income are not the same (Burgess et al. 2000, 7 f.). The determinants of wages are different (productivity, labor unions etc.) from the determinants of income from capital (economic success of investments etc.). However, the direct and indirect effect of an income source on income mobility depends on its own mobility.

What determines income mobility is still an open question that could not be answered by our data. However, there is some evidence for macro-economic effects: Individual income mobility seems to be higher during times of economic instability.

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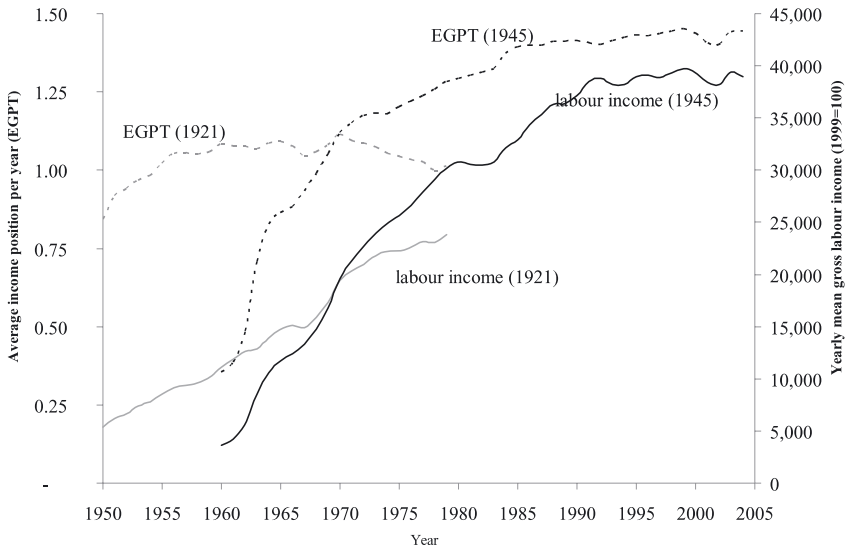
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## Appendix



Source: FDZ-RV – VVL2005 and SKAVVL1981, own calculation;  $n_{(\min)} = 50$ . Real values deflated with 1999 as base year. Deflation of the nominal wages by the CPI provided by the German Federal Bureau of Statistics. Usage of the West-German-only index up until 1990, usage of the index for the united Germany as whole up from 1991.

Figure 1A: Period-income profiles of West-German men of the birth-cohorts 1921 and 1945 who retired in 1981 or 2005