Income mobility – curse or blessing?

Mobility in Social Security Earnings Data since 1947 of West-German men

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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 a main aspect of the wealth of nations. In this context the distribution and its changes over time are of great interest from a theoretical as well as from an empirical point of view and a lot of research has been done to answer questions such as how the distribution is forming out or what the underlying process is which creates the distribution. Younger people are joining the distribution, older people are leaving – therefore the inequality may change but the underlying process about the development of individual income is unclear. If one can answer those questions, one can also give solutions for economic policy measures concerning the income distribution and therefore the wealth of nations.

In this context the relevance of income mobility is manifold[1]. One assumption in economic theory is that people normally are risk averse. Therefore they are interested in a steady income stream. This can be called the *security aspect* of income mobility: The higher the mobility, the lower ceteris paribus the wealth of people[2]. The expectation of future income is relevant for planning of expenditures and savings: The less stable an income stream is, the more people are concerned with the arrangement of spending and saving money[3]. A lot of goods and services have to be paid permanently such as rent, contributions for insurances[4] or redemption of credits. An unsteady income stream bears the risk of not being able to fulfill the expectations and therefore may hinder e.g. long term financial commitments[5].

Another facet of income mobility from an economic point of view is the *incentive aspect*. Upward income mobility provides incentives for economic activities as it is possible to be successful and move up the income ladder as a reward, enjoying a higher social standing. Downward mobility delivers the "sticks" for economic activities as if one is not successful, one will move down in the income distribution – in the worst case getting stigmatized as a failure. Additional, income mobility is seen as an aspect which can offset the inequality of an income distribution[6]. It is seen as a general possibility of moving up the ladder of wealth - often called the American Dream or the Horatio Alger Myth[7]. In other words income mobility is considered to be an equalizer of opportunities. Mobility characterise an open society, where

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1 Gottschalk/Danziger (1997), p. 4 f., gives a comprehensible example of the relevance of analysing income mobility; see also Hills (1999), Yaqub (2000), Benabou/Ok (2001a), Brodaty (2007), Lünnemann/Wintr (2009).

2 See for example Sinn (1980), Kaufmann (1970), Aaberge/Mogstad (2008).

3 This will result in opportunity costs which are positive correlated with the extent of income mobility.

4 Life insurance, health insurance, car insurance, third party insurance to name a view.

5 For an example of an analysis linking income distribution and risk perception see Amiel/Cowell (2001). The aspect of risk with respect to income mobility is also mentioned in Burgess et al. (2000). The relationship between saving and income variability is considered e. g. in Bristol (1958).

6 On the interdependencies between income inequality and income mobility see e. g. Clark (2003), De Fontenay et al. (2002), Millimet et al. (2003), Bosworth et al. (2001), Organisation for Economic Co-Operation and Development OECD (1996) or Gardiner/Hills (1999). Kopczuk et al. (2007), p. 1, point out that "… In order to understand fully the evolution of economic disparity and opportunity […], it is therefore crucial to combine the analysis of earnings inequality with the analysis of long-term mobility. …".

7 Sarachek (1978), Holtz-Eakin et al. (2000).

everyone has a chance to climb the ladder of success, which is to some extent documented in the income position[8].

Last but not least, in a more technical view, income mobility can be regarded as just another form of redistribution – albeit a stochastic one[9].

Regarding the empirical analysis, in most analyses, the time period covered by the data is relatively short. Therefore special aspects of the life cycle theory could not be analysed. As we can use data of workers covering their whole working life, we are able to shed some light on the income mobility over their entire employment 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 invers-U-shape assumption of income profiles and the underlying mobility pattern[10].

Furthermore, we will fill some gap in the knowledge as in Germany, income mobility is mainly neglected in the area of distributional and social policy analysis[11]. Virtually nothing is known for example about earnings mobility and its impact on earnings inequality. Has earnings mobility increased along with earnings dispersion? Is the transition to move up the earnings ladder now easier than before? Has earnings mobility offset the increase in earnings inequality? Which worker groups are likely to see their earnings status to improve, and which to worsen?

The paper is structured as follows. First a short overview is given of some relevant theoretical aspects, which has to be taken into account when analysing income mobility. What follows is a survey of the analysis done for Germany. The results presented will yield as background information for our analysis. It is shown that most of the analysis is descriptive just giving information about the changes of income over time without trying to construct or test an explanatory model. However, due to the restricted socio-economic information in our data base, we are unable to test explanatory models, as can be seen in chapter 4 in which the data and the method are briefly explained. Though, as the time span covered by our data is large, we get information about the relevance of age-, period- and cohort-effects for explaining income mobility.

2 Some theoretical remarks

At first, it is 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 research unit, e.g. individuals, households, or families – considering sometimes also the intergenerational dimension[12]. However, using families or households[13] as research units is problematic as such

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[8] See for example Ayala/Sastre (2008a), Organisation for Economic Co-Operation and Development OECD (1996), Bigard et al. (1998) or Van Kerm (2006) for research on the differences in income mobility with respect to the comparison as one aspect of the welfare of countries.

[9] See for such an approach Benabou/Ok (1998) and Benabou/Ok (2001b), p. 2.

[10] See for example Polachek/Siebert (1993). „Understanding how age affects productivity and how in turn this translates into the dynamic of wages seems crucial from the point of view of labour market policy focusing on the 'greying workforce'. There has so far been little literature focusing on this specific topic and yet any good policy directed at increasing the participation of older workers must be based on a thorough understanding of the age-wage profile."; Myck (2007), p. 19. See also Börsch-Supan et al. (2005), Kliegl/Mayr (1997), Skirbekk (2004) and Zimprich (2004).

[11] Only some rather general information is given in e. g. Bundesregierung (2001), pp. 41, Bundesregierung (2005), pp. 48, Bundesregierung (2009), p. 41.

[12] See e. g. Solon (1992). For an analysis of intergenerational mobility on mother or father – daughter or son pairs see Österberg (2000),

a unit is not stable over time[14] even if one uses equivalence scales to take changes in the household composition into consideration. Nevertheless for comparing the income mobility between countries, it is necessary to take the different household compositions into account[15].

Independent of the income definition and the research unit, six theoretical concepts of mobility are discussed and analysed in the literature[16]:

1. time dependence, the focus of this concept is the degree to which income in one period is determined by the income in the previous period(s);
2. positional movement, using this concept one is interested in changes in economic positions in the income distribution (using classifications like ranks, deciles, or quintiles);
3. share movement, this concept focuses on the change of the recipient's shares of total income in the population;
4. income instability[17], which analyse the size of changes in income levels but not their sign;
5. directional income movement, which measures how many recipients move up or down the income distribution and by how much; and
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 those concepts are used in analyses with different definitions of income[18] and different research units. Therefore, even though a lot of research was done on the methods of measurement of income or earnings mobility[19], the problem still exists that, "the income mobility literature is still distressingly far from being unified on how to measure mobility and make mobility comparisons"[20].

In international literature, most economic mobility studies are based on transition matrices[21]. Typically, the rows and columns of such matrices are quantiles (such as quintiles or deciles) of the base year and the final year income distributions.

A rather unconventional analysis is the case study of Hills et al. (2006) with 93 families as they are analysing income variations within a year (weekly income records) for family income. Income diaries were used to collect the data and to support the primary data collection method which was a fortnightly Computer-Assisted Telephone Interview.

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13 Households could be defined e. g. to be one person living alone, or a group of persons who either share living accommodation or one meal a day, and who have the address as their only or main residence Burgess et al. (2000), p. 17. However, in some analysis the terms household and family are used equally; see for example Chen (2009), pp. 77 f., Dickens/McKnight (2008b) or Pendakur (1998).

14 See inter alia Duncan/Hill (1985). Therefore analysis on the household level indicate more income mobility than on the individual level, see e.g. Burgess et al. (2000). p. 5.

15 See for a detailed discussion e. g. Abatemarco (2003), Jenkins (1998), Jarvis/Jenkins (1998) or Gottschalk/Danziger (1997), p. 8 f., Schluter (1997), p. 9; another view on this matter is given in Burgess et al. (2000), p. 18, Hills et al. (2006), Aaberge et al. (2002), or Cruces (2005).

16 Dragoset/Fields (2007), pp. 12. See for an extensive discussion of those concepts inter alia Fields (2004). For surveys of the theory of income mobility measurement see Fields/Ok (1999), Fields (2004), Fields (2007).

17 Sometimes called flux Dragoset/Fields (2007), pp. 12.

18 Covering the whole spectrum from household income to earnings from a specific kind of work.

19 See for an overview Ayala/Sastre (2008a).

20 Fields/Ok (1999), p. 586.

21 Atkinson et al. (1992); Buchinsky/Hunt (1999), Fields (2001).

Most of the discussion is not about the mobility and its explanatory variables / determinants [22] but on the adequate method of measurement[23]. In the literature new axiomatic contents and analytical properties equal to those existing in the case of the static analysis of the income distribution has been discussed, which are the foundation of new methods and techniques for the measurement of income mobility that has been developed. For example, there are some axiomatic lines of research establishing the basic assumptions that mobility indices should satisfy when analysing the movement of incomes over time[24]. Also the measurement of income mobility from a welfare point of view is intensively examined in the literature. Such approaches generally relate income mobility with the equality of opportunity and the removal of social barriers.

A different approach is the Markovian model of mobility. This model utilizes stochastic processes for modelling 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 can not be explained. But this is unsatisfying as the changes in the income position over time need to be explained.

Therefore the questions remain: how to explain mobility respectively what are the determinants of income mobility? A natural starting point would be the life cycle theory. The main goal of this theory is the explanation of the development of individual income over time. But this includes implicitly also 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 rather seen as a residual factor or the transitory component contrary to the permanent income[25].

Permanent income can be viewed as a function of human and non-human capital of individuals (or households conditioned by its composition) which controls for position in the life cycle[26]. This can be illustrated by a simple formulation such as:

$$Y_t = \alpha_t \cdot D_t + \beta_t \cdot E_t + \gamma_t \cdot A_t + \delta_t \cdot C_t + \varepsilon_t \qquad 1$$

Where permanent income Y in time period t is seen to depend on

household composition D,

the educational and occupational status E,

stock of physical assets A – it is assumed, that A will peak after around 2/3 of working life; using a quadratic term to deal with this assumption leads to an invers-U-shape profile[27] –, and

community or environmental characteristics C such as access to amenities.

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22 See for an example of analysis using explanatory variables for income mobility Bandyopadhyay/Cowell (2006) with respect to different risk factors or Fachinger (1991), Contini et al. (2007) for approaches to identify some determinants. Chen (2009) analyses the impact of government income (pp. 89-92) and of demographic factors (pp. 92 f.)

23 Fields/Ok (1996), Fields (2008), Schluter/Van de Gaer (2003), Cruces (2005), Aaberge/Mogstad (2008) Sastri Madduri (1976), Silber/Weber (2008), Ruiz-Castillo (2004), Altonji et al. (2009) ..

24 Fields/Ok (1996), Mitra/Ok (1998), Cowell/Schluter (1998).

25 See for an analysis with panel data on transitory and permanent components e. g. Ramos (2003).

26 Deaton (1992).

27 See for a discussion Fachinger (1994).

Therefore ε is the catch-all variable for all other aspects not included in the explanatory variables D, E, A, and C. Changes in income are due to external shocks like illness, unemployment, retirement, economic shocks influencing the income out of savings (like the ongoing financial crisis), changes in the service of communities etc. For individuals those shocks are not predictable and the individuals are helpless in face of such factors like a small boat on a stormy sea.

Entering the labour force a lot of the above mentioned variables are deterministic, like age, gender, or education. The question is what are the relevant determinants to explain income changes? It should be clear, that the income from at least the previous period must be taken into account as, given equation 1, income mobility can bee seen as the differences in income between to points in time.

$$\Delta Y = Y_{it} - Y_{it-1} + \varepsilon \qquad 2$$

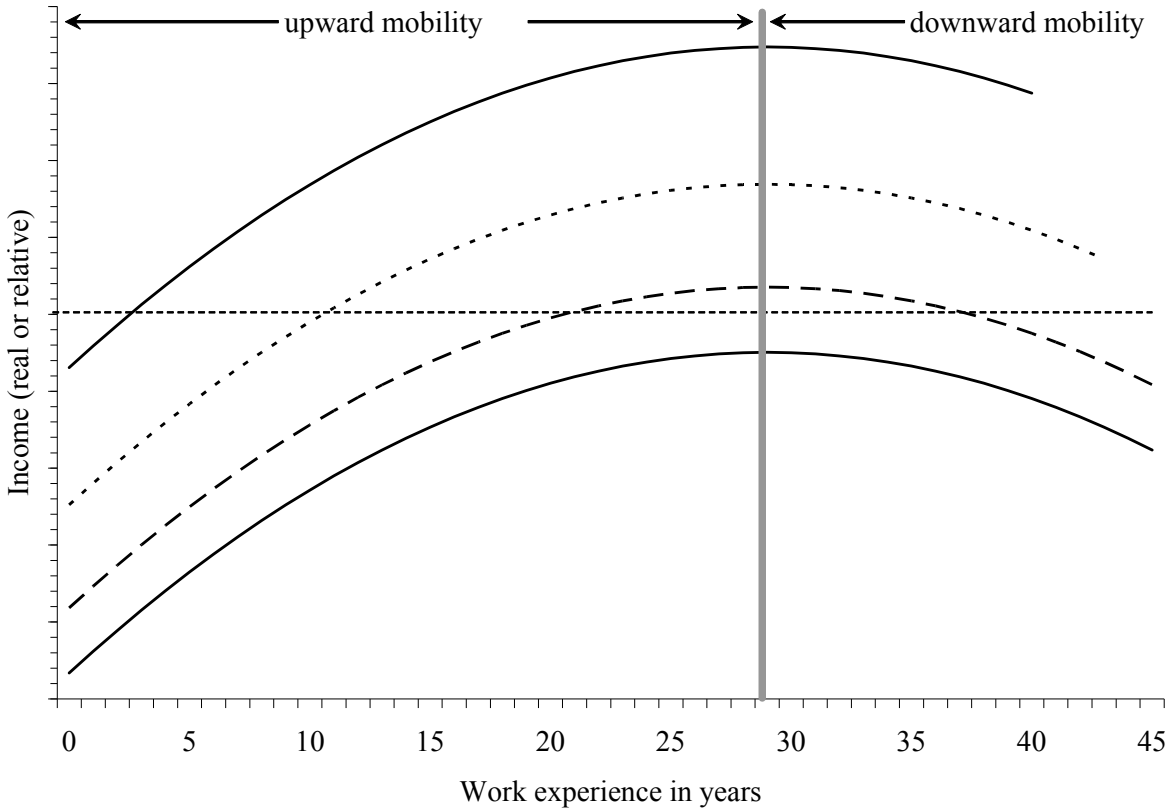
Let X be a vector which includes the "explanatory" variables (e. g. X includes dummies for gender, race, age, and education) and using lagged income variable Y_{it-1} result in

$$\Delta Y = \rho \cdot X + \delta \cdot Y_{it-1} + \varepsilon \qquad 3$$

Taken into account the kind of determinants in the four groups, this is acknowledged e. g. by Dragoset/Fields (2007), who "… do not interpret this as a causal model of earnings changes, but rather a way of answering the question of which individuals experience the most positive earnings changes, holding other things equal. …"[28].

Using such equation for the description of the income development over time, results in an invers-U-shaped profile for the (working) life cycle of individuals as shown in Figure 1.

Figure 1: Income profiles and income mobility



[28] Dragoset/Fields (2007), p. 15. However, e. g. Smith (1994) identifies some factors which "explain" income mobility.

Source: Own diagram.

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[29]. Since the marginal productivity decreases over the whole career and employees are paid due to their productivity, the income profile follows this pattern. Therefore, from its own point of view the individual experience a rise in real income – upward mobility – and after about 2/3 of 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 labour market the individual may start to climb up the income ladder over the time as she or he is physically well equipped and has the newest knowledge about technology etc. The amount of human capital will therefore lead to a higher productivity for younger than for older employees, resulting in a steeper profile and to a higher productivity. The profile has a decreasing marginal rate of return as the human capital / earnings capability will diminish. The wear and tear lead to a drop down in physical skills as well as the intellectual assets will get older.

This means that we notice an upward mobility in the income distribution during the first part of working life and a downward mobility afterwards. In other words, by analysing mobility, someone has to look at the entire picture as short-term analyses can not identify the long-term development – even if in some years downward mobility dominates, it is necessary to take the development over a longer period of time into consideration.

This concept of income mobility is a little bit trickier to explain as it has to take the income distribution 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, her or his relative position within the distribution may decrease.

The first kind of income mobility measuring concept is called non-positional income mobility because the changes of the absolute real or nominal income over time are considered[30]. If the relative position and its changes in the distribution are considered, this kind of mobility is called positional mobility.

With that in mind, the invers-U-shape of an income profile in cross sectional analysis can be interpreted as a description of the development of an individual position in the income distribution over time. However, there exist strong indications that it is not an individual profile[31].

At least one more problem arises in measuring and / or explaining income mobility. One has to take into account the composition of income. As a rule, income of people or individuals comprises different components enclosing earned and unearned income. Each component should be analysed separately because the factors, which could explain the mobility of income are not the same[32]. The determinants of wages are different (productivity, labour unions etc.)

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29 See for example Skirbekk (2008).

30 It is explained in more detail in Fields/Ok (1996); Beenstock (2004) distinguish those two aspects in quantity and rank mobility.

31 But often it is viewed as such, … especially by using cross sectional data from one point in time for the analysis of time-dependent processes such as income development (e. g. Schäfer (1981), Millimet et al. (2003), Klevmarken (2004), Bager-Sjögren/Klevmarken (1998), p. 487)… as is mentioned also in Burgess et al. (2000), p. 11. This is discussed in detail inter alia in Fachinger (1994), Fachinger/Himmelreicher (2007).

32 See for example Burgess et al. (2000), p. 7 f.

than the determinants of income from capital (economic success of investment company etc.). However, the direct and indirect effect of an income source on income mobility depends on its own mobility.

Therefore, we take a closer look at the development of one special kind of wages – earnings which are subjected to social insurance contributions. Such data has also some advantages compared with survey data. On a more technical note, especially in analysing mobility on the basis of survey data you have to deal with measurement errors[33] – are the deviations for real or the result of the data collection process? In an attempt to work with an error-free measure of earnings[34] a much smaller literature uses only administrative-based data to study mobility. Using such data is also advantageous because there are no problems with sample attrition exist[35].

3 State of the Art

Nowadays we know a lot more about the distribution of income and earnings – but we don't know the underlying processes which generate such distributions and until now, only little research has been done to explain them. Research was almost done on describing income mobility – i. e. markov process or transition matrices are measures to describe the process, not to explain it. Analysis was mostly undertaken empirically to identify the underlying process which shape the income distribution. Furthermore, despite the extensive empirical literature about income mobility in general, little is known about the long term mobility as "… studies of mobility have focused primarily on short term mobility measures due to lack of long and large longitudinal data. …"[36]. Therefore we know a lot about the process itself – how income mobility has develop over time for particular countries esp. the U. S.– but we know a lot less about the reasons, why this has happened[37].

Contrary to the overall situation, only little research has been done on income mobility in Germany – and those empirical works differ especially in method and covered time period as can be seen in Table 1. For Germany just two data bases were used to analyse income mobility: The German Socio-economic Panel (GSOEP)[38] and social security earnings records from the Statutory Pension Insurance (FDZ-RV)[39]. Most analyses were done using the GSOEP – albeit with different populations and statistical units, which makes the results

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33 See e. g. Gottschalk/Huynh (2006), Klevmarken (1993); an overview is given by Dragoset/Fields (2007), p. 2 ff.

34 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 (2008a), for the U.S. Kopczuk et al. (2007) and Congressional Budget Office (CBO) (2007).

35 See for problems concerning sample attrition e. g. Ayala et al. (2006).

36 Kopczuk et al. (2007), p. 1.

37 The empirical literature on income and earnings mobility in various countries around the world is voluminous; see Atkinson et al. (1992), Baulch/Hoddinott (2000), and Dragoset/Fields (2007) for surveys. An overview of empirical research in Latin America is given by Fields et al. (2006).

38 For a description of the data see e. g. Wagner et al. (2007).

39 See for a general description of the data Fachinger (1994), chapter 2, and Himmelreicher/Stegmann (2008).

hardly comparable in detail – and so far, only three analyses covering a large time period were done by using data records from the FDZ-RV[40].

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)	GSOEP		1984 to 1989	transition matrices, deciles
Rohwer (1991)	GSOEP		1984 to 1989	transition matrices
Berntsen (1992)	GSOEP			transition matrices
Rendtel et al. (1993)	GSOEP	equivalised[41] 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)	GSOEP	equivalised[42] household income	1984 to 1989	transition matrices with four groups with respect to the median***
Müller/Frick (1997)	GSOEP	equivalised[43] household income	1990 to 1994	transition matrices
Trede (1997) / Trede (1998)	GSOEP	gross labour incomes earned by males	1984 to 1992	Mobility indices and transitions matrices
Merz/Kirsten (1998)	GSOEP	equivalised[44] household income	1985 to 1994	
Schluter (1998)	GSOEP	equivalised[45] post-tax post-benefit household income	1984 to 1993	Shorrocks and Prais mobility indices
Hauser/Fabig (1999)	GSOEP	gross individual labour income, gross and net equivalent[46] labour income of households	1990 to 1995	Bartholomew-Index and transition matrices with six classes

[40] But this situation may change as such data are now provided by the Research Data Centre (FDZ) of the German Pension Insurance (FDZ-RV) (http://forschung.deutsche-rentenversicherung.de/ForschPortal Web/contentAction.do?key=main_fdz_english) and of the Federal Employment Agency at the Institute for Employment Research (http://fdz.iab.de/en.aspx).

[41] 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.

[42] "New" OECD equivalent scale: Income divided by household size raised to power 0.5.

[43] 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.

[44] Different equivalent scales.

[45] OECD equivalent scale: Income divided by household size raised to power 0.5.

[46] „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.

Fabig (1999a) / Fabig (1999b)	GSOEP	gross and net equivalised[47] household income	1990 to 1995	Bartholomew-Index and transition matrices with seven classes
Habich/Spéder (2000)	GSOEP		1990 to 1994	transition matrices with six classes
Maasoumi/Trede (2001)	GSOEP			generalized entropy mobility measures
Himmelreicher (2001)	GSOEP	household pre-tax-equivalised[48] income	1984 to 1997	transition matrices with seven classes
Jenkins/Van Kerm (2003)	GSOEP	Person's post-tax post-transfer annual income	1985 to 1999	Gini-Index and decomposition of inequality change
Van Kerm (2003)	GSOEP	Person's post-tax post-transfer annual income	1984 to 1997	Mobility indices
Schluter/Trede (2003)	GSOEP			Mobility indices,
Behr et al. (2003)	ECHP**	Household income	1997 to 1998	transition matrices, quintiles
Zaidi et al. (2004) / Büchel et al. (2004)	GSOEP	net equivalised[49] household income	1990 to 2000	Shorrocks index and transition matrices, quintiles
Sopp (2005)	GSOEP		1984 to 2000	
Hauser et al. (2007)	GSOEP	net equivalised[50] household income	2000 to 2006	transition matrices
Ayala/Sastre (2008b)	ECHP	Real disposable equivalised[51] household income	1993 to 1997	Fields and Ok mobility index, Chakravarty–Dutta–Weymark mobility index
Grabka/Frick (2008)	GSOEP	net equivalised[52] household income	1996 to 2006	transition matrices
Brenner (2009)	Social security earnings records	Gross individual earnings	1976 to 2004	correlations between annual earnings are estimated with bivariate tobit models

* : Fachinger (1994), chapter 5, p. 211 ff.

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

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

As can be seen in the list, in principle information about income mobility in Germany is available. Unfortunately the results are not directly comparable as those analyses are using the same data base but not the same methods and not even the same income concept. However, overall one can state that a lot of income mobility was detected. But all those analyses on the basis of the GSOEP cover only a short period of time. Only the analyses done by Fachinger and Brenner (2009) took the whole working biography into account.

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47 „Old" OECD equivalant scale: head of household 1.0, member of household older than 14 years 0.7 and household members 14 and younger 0.5.

48 Equivalence scale is approximated by the square root of the household size.

49 Equivalence scale is approximated by the square root of the household size.

50 Equivalence scale is approximated by the square root of the household size.

51 "Modified" OECD equivalent scale: head of household 1.0, member of household older than 14 years 0.5 and household members 14 and younger 0.3.

52 Equivalence scale is approximated by the square root of the household size.

The GSOEP was also used in the reports of poverty and riches of the Federal Government of Germany[53]. The reports illustrate the view of the Federal Government on the relevance of income mobility in economic and social policy as mobility is mainly discussed in connection with poverty risk and not as an overall phenomenon to describe the aforementioned aspects of welfare in respect to income mobility[54].

Hence from a political point of view it is unknown what has to be done to reduce or to foster income mobility. The political focus lies on attempts to reduce income poverty or social exclusion, in other words to rise upward mobility for the poor[55] and to reduce downward mobility for those who have a high poverty risk. Therefore, "explaining" mobility concentrates on trying to find determinants which could be used to develop measures reducing or avoiding social exclusion.

Concerning income mobility, for Germany only one analysis was done to identify and analyse its determinants using hazard rate models[56]. However, even our knowledge about the process of mobility itself is limited. Will there be less mobility in later working life when the positioning in the income distribution has finally taken place as the following figure indicates? How much persistence exists? We do not know whether the income position remains the same as it is indicated by the profile of average income after a period which ends with the positioning into the distribution.

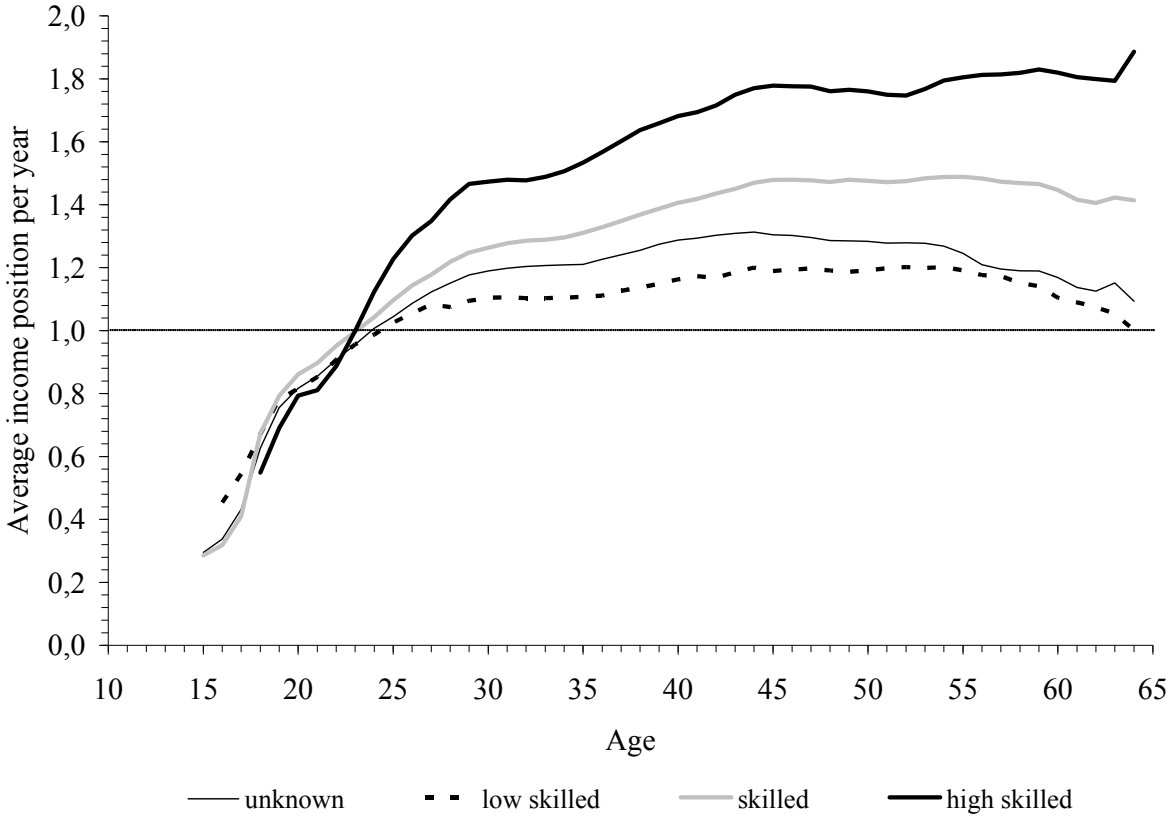
Figure 2: Age-earnings profiles of West-German men of the birth-cohorts 1939-1944 who retired in 2004, according to level of education

53 Bundesregierung (2001), pp. 41, Bundesregierung (2005), pp. 48-49, Bundesregierung (2009), p. 41.

54 See for a more general discussion Gardiner/Hills (1999)

55 In this sense, the comparison of low income earners in Germany and Great Britain leads to a positive result for the labour market in Britain as the upward mobility and therefore the chance to move up the income ladder is higher in Britain; see e.g. Klodt (1998).

56 Fachinger (1991).



Source: FDZ-RV – SUF VVL2004, own calculation; see Himmelreicher/Stegmann (2008).

Arguing along the line of concept 2 or the so called positional mobility and looking at the profiles in Figure 2 it could be assumed, that – after entering the labour market – over a time span of about ten years upward income mobility will determine the income changes. Following this remarkable increase of the income position, contrary to the profiles in Figure 1, only minor mobility within the distribution will take place. Only the profiles for low skilled employees and for those with unknown education level indicate some downward mobility at the end of the working career starting at the age around 55.

4 Method and Data

As previously discussed, at least three aspects has to be taken into account in analysing income mobility,

1. the definition of income,
2. the definition of the research unit, and
3. the setting of the concept of mobility analysis.

The income used for the analysis is set by the used data[57]: gross monthly labour earnings which are due for social security contributions. This also constitutes the research unit: the individuals who are registered in the German federal pension insurance records. In the analysis, we will consider the income of the same individuals at two or more points of time.

4.1 Method

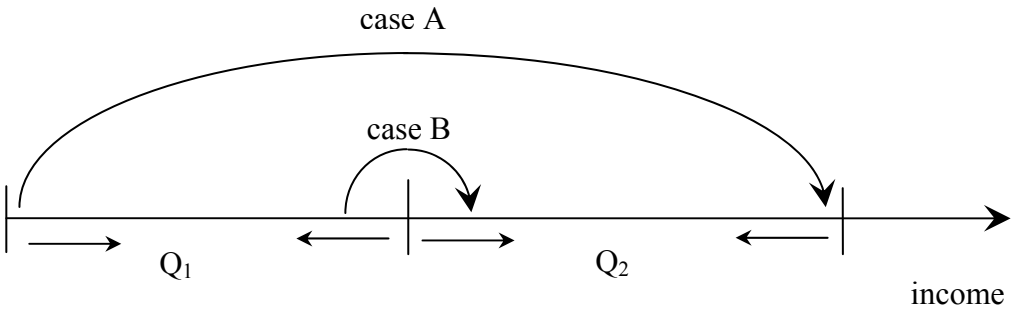
As discussed earlier there are several alternatives to define mobility and the approaches used in previous analyses for Germany are quite different, as is shown in Table 1. We will use the

[57] See for a detailled description Himmelreicher/Stegmann (2008).

concept of positional mobility and apply transition matrices – the change from one relative income class to another – with twenty classes.

This approach bears some problems which have to be taken into account for interpreting the results. For example a change in income from the lower class limit to the upper class limit of the next one (case A) is exactly judged 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 3.

Figure 3: Diagram of „jumping distance“



Source: Own diagram.

Another problem comes from the instability of the class limits. If class limits change over time and the income remain the same, a change of classes could happen – and therefore it would be interpreted as positional mobility even that 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[58].

4.2 Data

Longitudinal micro-data of the German Federal Pension Insurance are used which contain biographical and pension information on people who retired in the same year[59]. Therefore such data are inflow samples which include only retirees. The sample covered a time span from the first year of contribution payment to the German Federal Pension Insurance until the retirement year. Hence the maximum time span covers 52 years, starting in the year the person turned 17 up to the year the person turned 65.

Two different samples are used for our analysis. The first inflow-sample is from the year 1981 (ASK-VVL1981) and the second from year 2005. In all, the data cover the time span from 1947 up to 2005 (FDZ-RV-SUFVVL2005). Therefore, period effects such as the oil crisis have to be taken into account while interpreting the results[60].

For the analysis of income mobility the information about the individual earning points is used. Earnings points are calculated as follows: the individual gross monthly labour earnings which are due for social security contributions are divided by gross earnings per average

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58 Positional and non-positional income mobility is analysed e. g. by Contini et al. (2007), p.17 ff.

59 Unfortunately the data set contains only few explanatory variables – it does not include any information about the household context of the individuals and not even about other income. See for a more detailed description Himmelreicher/Stegmann (2008) and Fachinger/Himmelreicher (im Erscheinen).

60 Unfortunately period effects from the individual life cycle such as partnership formation or having children could not be considered with our data; see for the relevance of such effects e.g. Rigg/Sefton (2004).

employee[61]. Therefore earnings points are dimension free as the division annuls the influence of all factors with the same effect on denominator and nominator[62] – like the real economic activity – and deflation is unnecessary.

Table 2: Number of cases of the birth-cohorts 1916/1921 and 1940/1945

Data set	Number of cases	Data set	Number of cases
F-1916	2.886	F-1940	6.906
F-1921	7.396	F-1945	1.761
M-1916	3.930	M-1940	3.750
M-1921	6.456	M-1945	1.029

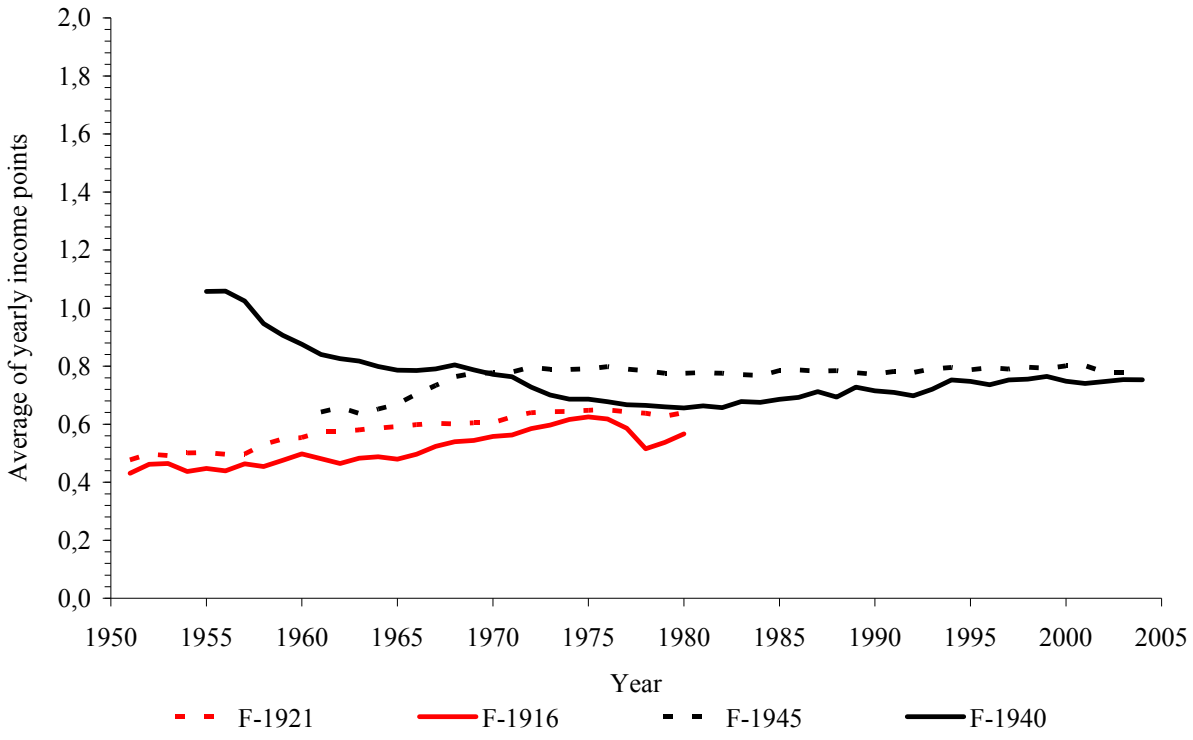
Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

5 Empirical Analysis

5.1 Income profiles

The income profiles shown in the following figures are quite different to the hypothetic ones in Figure 1. An invers-U-shape cannot be identified. The profile for women is rather flat over the working life with some minor variations around the overall trend. There are no period- (Figure 4) or age-effects (Figure 5)[63]. However, the profiles indicate a cohort effect as the profiles of the younger cohorts are higher for the most part of the working life.

Figure 4: Income profiles of women



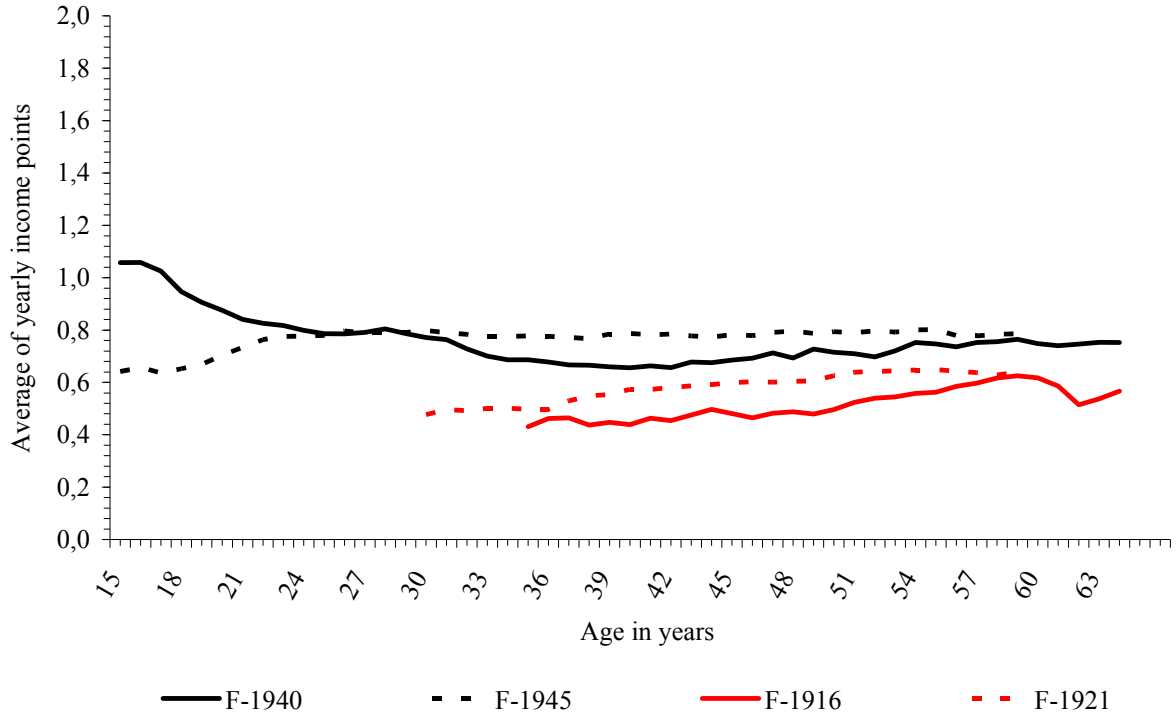
[61] § 70 Book VI of the German Social Welfare Code (SGB VI) and Annex 1 Book V of the German Social Welfare Code (SGB V).

[62] See e. g. Fachinger (1994), pp. 85, with numerous references.

[63] The high values at the beginning of the working careers are due to special legal regulations and do not reflect the income. On the contrary it is just the result of the entitlements expressed in earning points.

Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

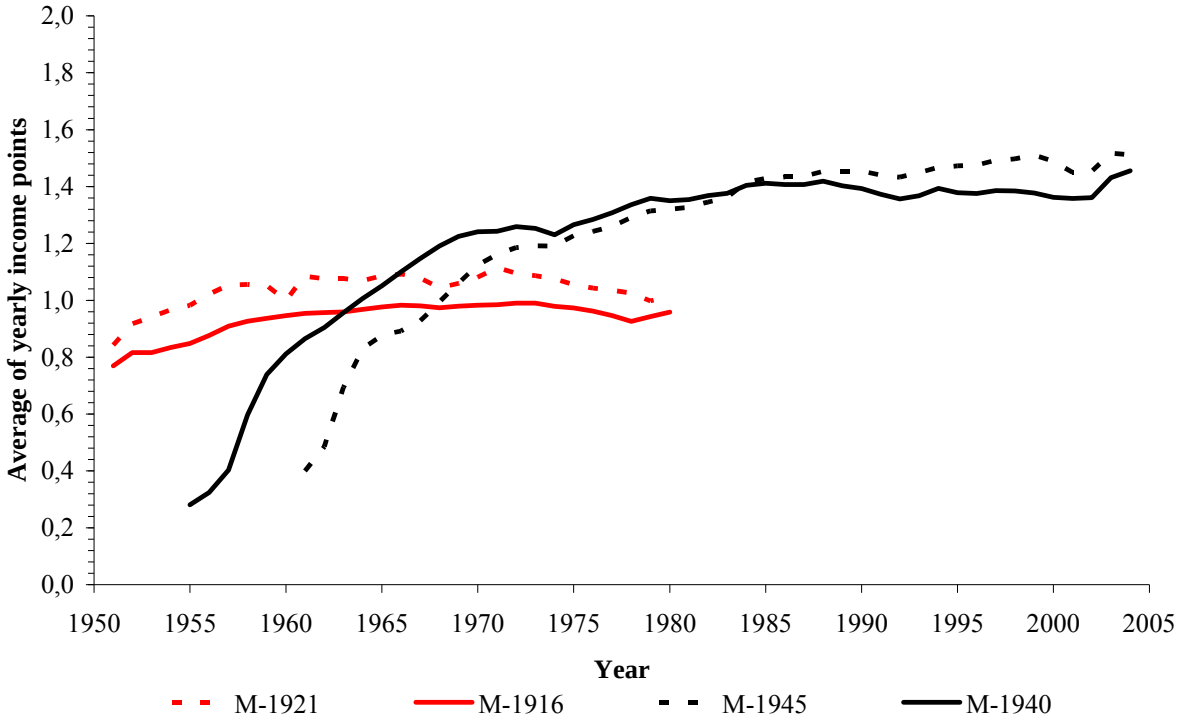
Figure 5: Income profiles of women over age



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

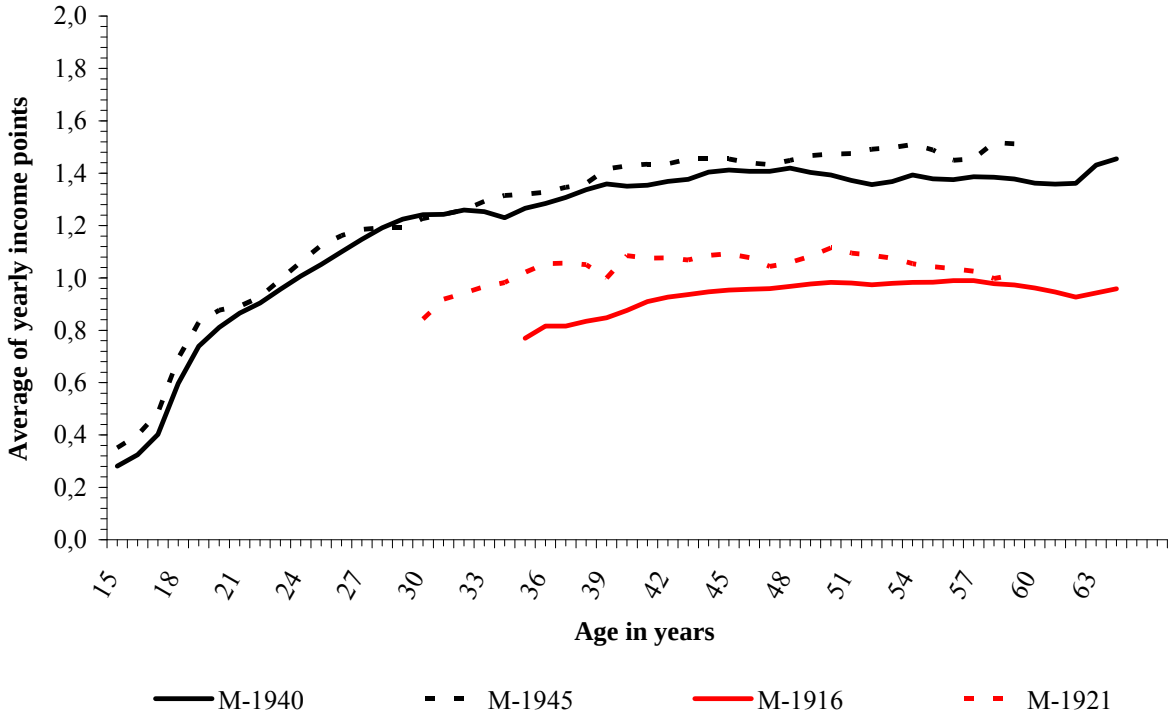
The profiles of men are quite different to the profiles of women. West-German men born in 1916 and 1921 have flat and lower age-income profiles compared to the younger cohorts. At the end of their working careers the average income positions are approximately as high as the average relative income positions of the total population, this are all insured women and men. The younger cohorts have increasing average age-income profiles and all in all a 30% higher income position.

Figure 6: Income profiles of men



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 7: Income profiles of men over age



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Arguing along the line of concept 2, the so called positional mobility, and looking at the profiles in the following figures the subsequent hypotheses could be assumed. After entering the labour market

- for women, income mobility stays the same over the whole working life as no major upward or downward development can be identified in the income profiles (see Figure 4 and Figure 5)..
- for men over a time span of about ten years upward income mobility will determine the income changes, but contrary to the profiles in Figure 1, in the phase after positioning in the distribution between ages 35 to 40, only minor mobility within the distribution will take place on average (see Figure 6 and Figure 7).

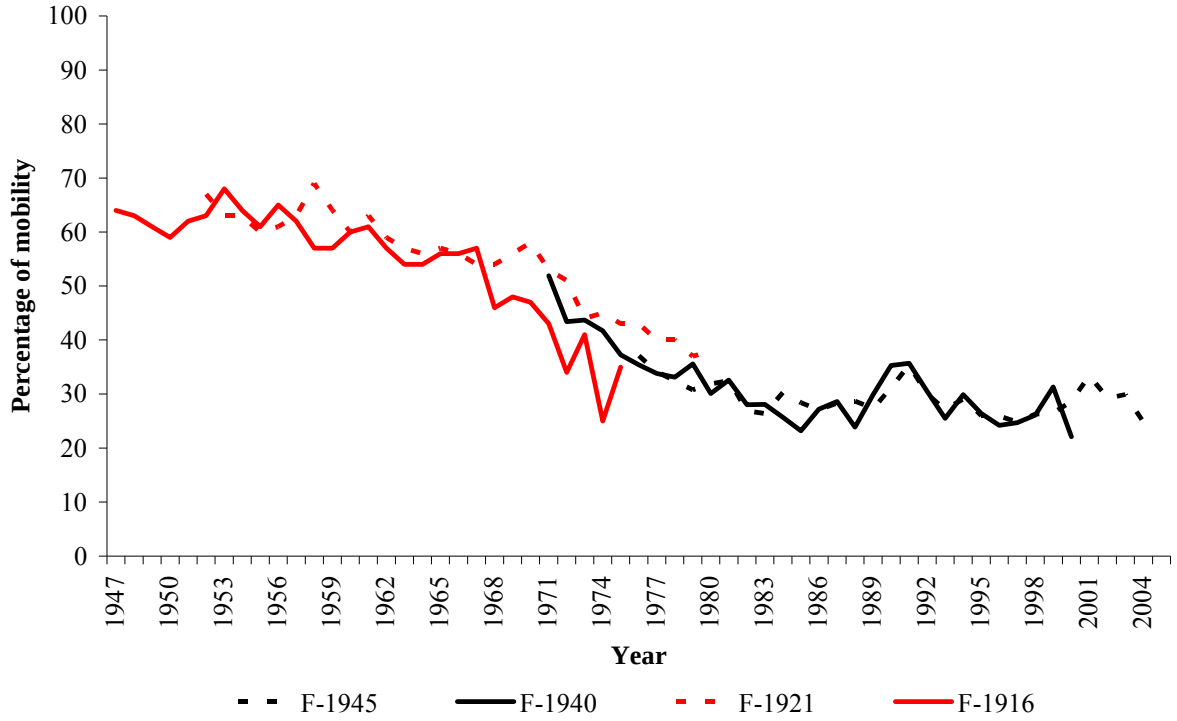
5.2 Mobility

5.2.1 Overall mobility

Analysing the overall mobility give some hints about the security of an income position and the chance of moving up or the risk of moving down within the income distribution. As the average individual income profiles are quite stable over the most part of working life, is this an indication for low income mobility?

Income mobility can be interpreted in the sense of "openness" of the distribution or flexibility of income position. In Figure 8 the development of the percentage of mobility – i.e. percentage of people, which are not in the same income class in the next year – is shown.

Figure 8: Income mobility of women over time



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

More than sixty percent of women have changes in their income position during the time from 1947 to the early 1970s, whereas more than thirty percent over the last twenty years changes their income situation within the distribution, i.e. one third of the female cohort members had instable positions.

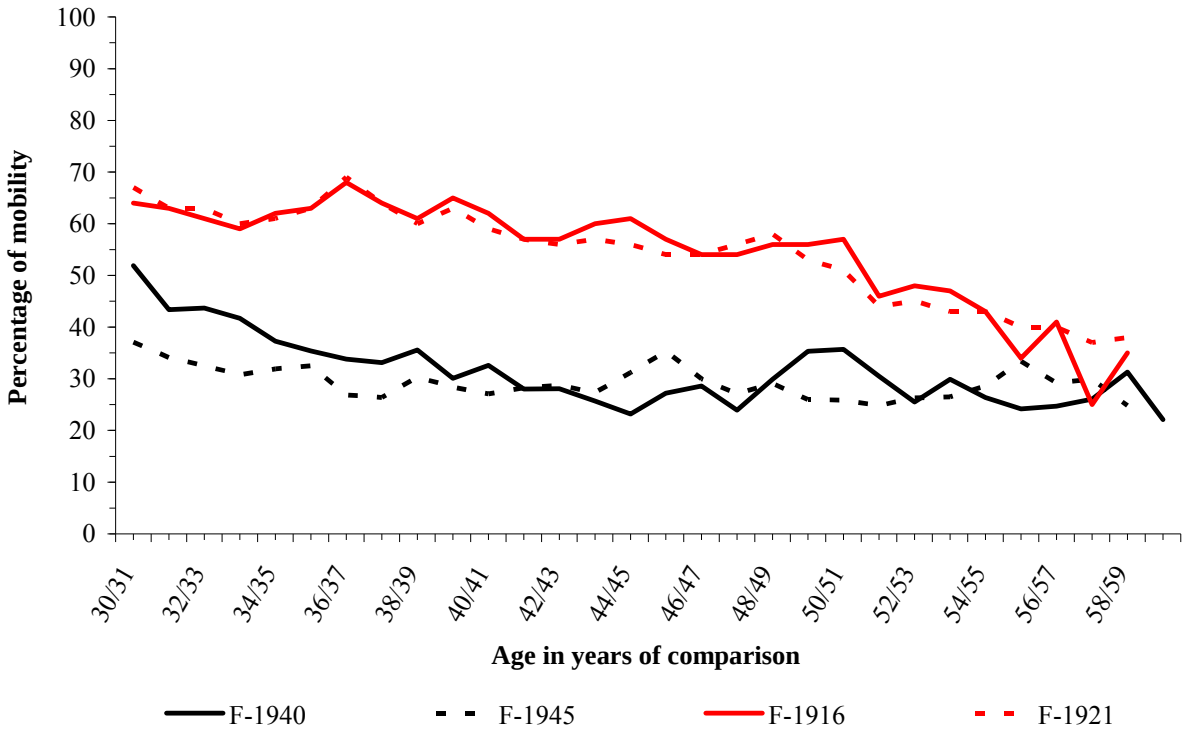
Overall, the development of income mobility of the analysed cohorts seems to be quite steady. The profiles show a decline of overall mobility until the early 1980s which corresponds to the economic development as after World War II the economy was prospering – especially in the 1960s. This came to an end culminating in the first oil price shock. During the 1970s the

economy was full established – integrated into the world economy and therefore more depending on the international economic development. Since the early 1980s Germany had a full grown economy without any special circumstances. The decline of income mobility could also be interpreted as a sign of sclerotisation in the sense of Olson[64].

It seems as if period effects are influencing the income mobility as some up and downs in the profiles occur in the same year. For example, the effect of the breakdown of the GDR and the joining of the five newly-formed German states (1989 to 1992)

However, if one analyses the income development and mobility over time, period-, age-, and cohort-effects have to be taken into account. To get an idea, whether age effects are relevant, in Figure 9 the data are printed against the calendrical age. In Figure 9 a more or less steady decline of income mobility for the older cohorts can be identified whereas for the two younger cohorts the mobility level remains more or less the same. A distinct age-effect for women can not be identified in the mobility profiles.

Figure 9: Income mobility of women over age

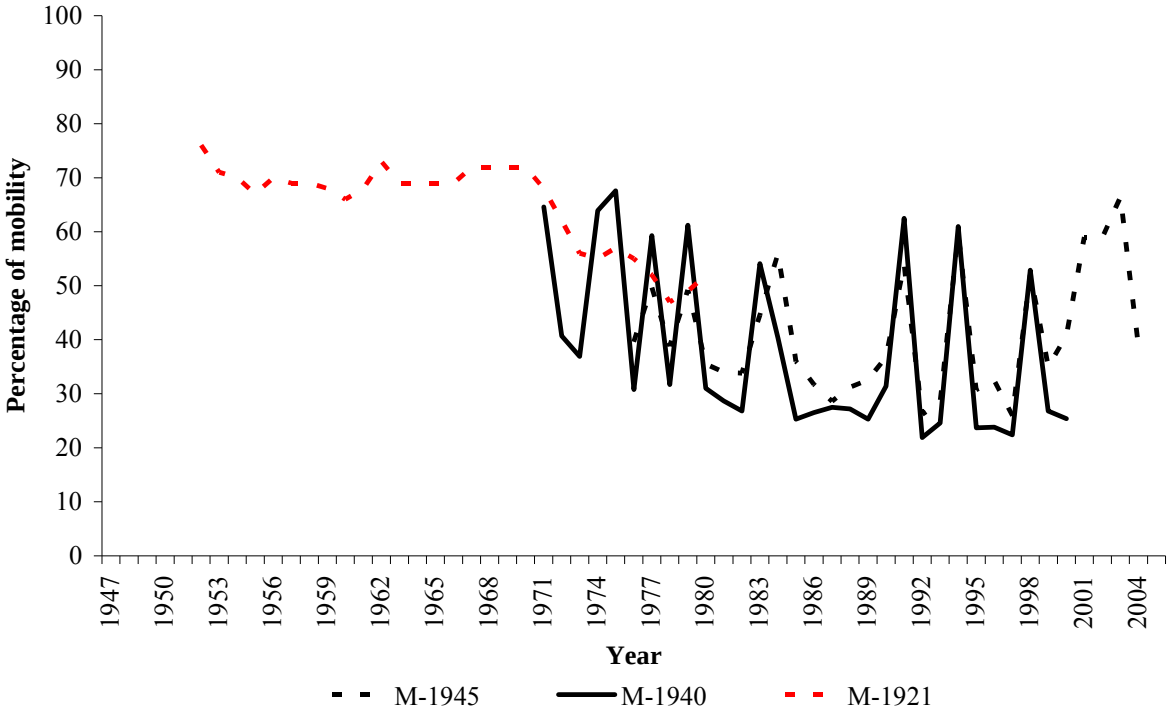


Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Unlike the profiles for women, the income mobility profiles of men show extremely large and unstructured variations over time for the two younger cohorts.

Figure 10: Income mobility of men

64 Olson (1982).



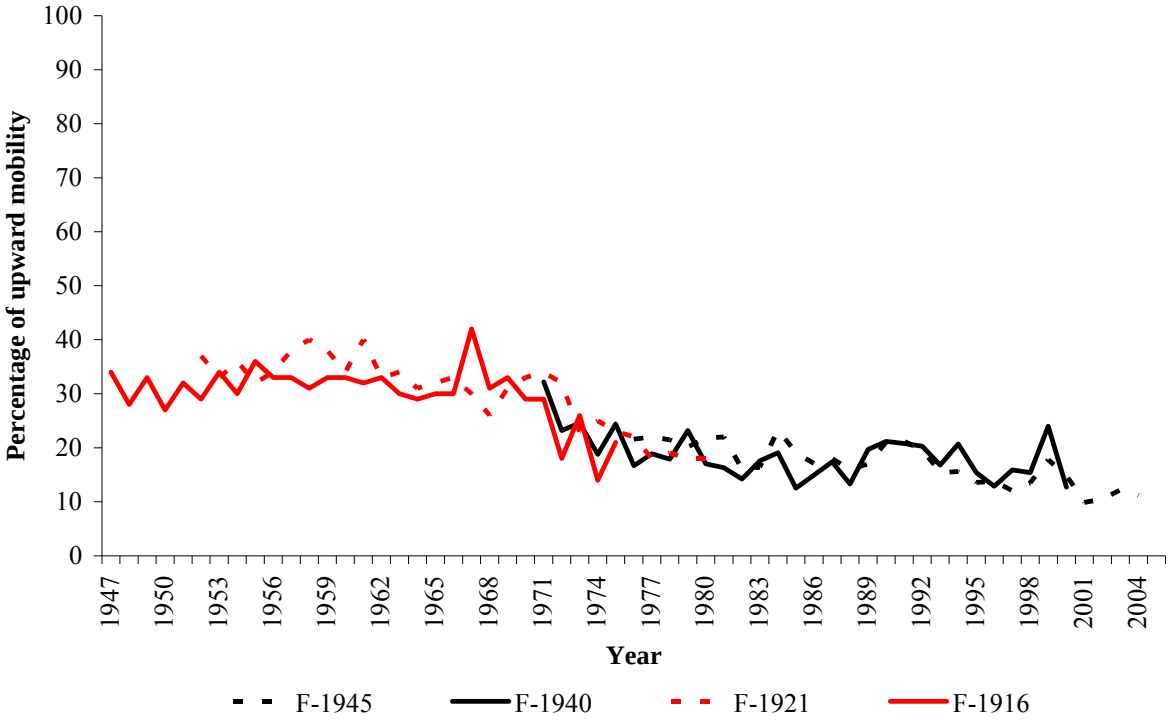
Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

How much of mobility is upward mobility and how much is downward mobility? If some takes the theoretical income profile of Figure 1 serious, at the beginning of one's career, the mobility should be overall upward.

5.2.2 Upward mobility

To get an impression about the possibility of improving its own income situation and whether the distribution is open for successful people, in Figure 11 the profile of upward mobility is shown.

Figure 11: Upward income mobility of women

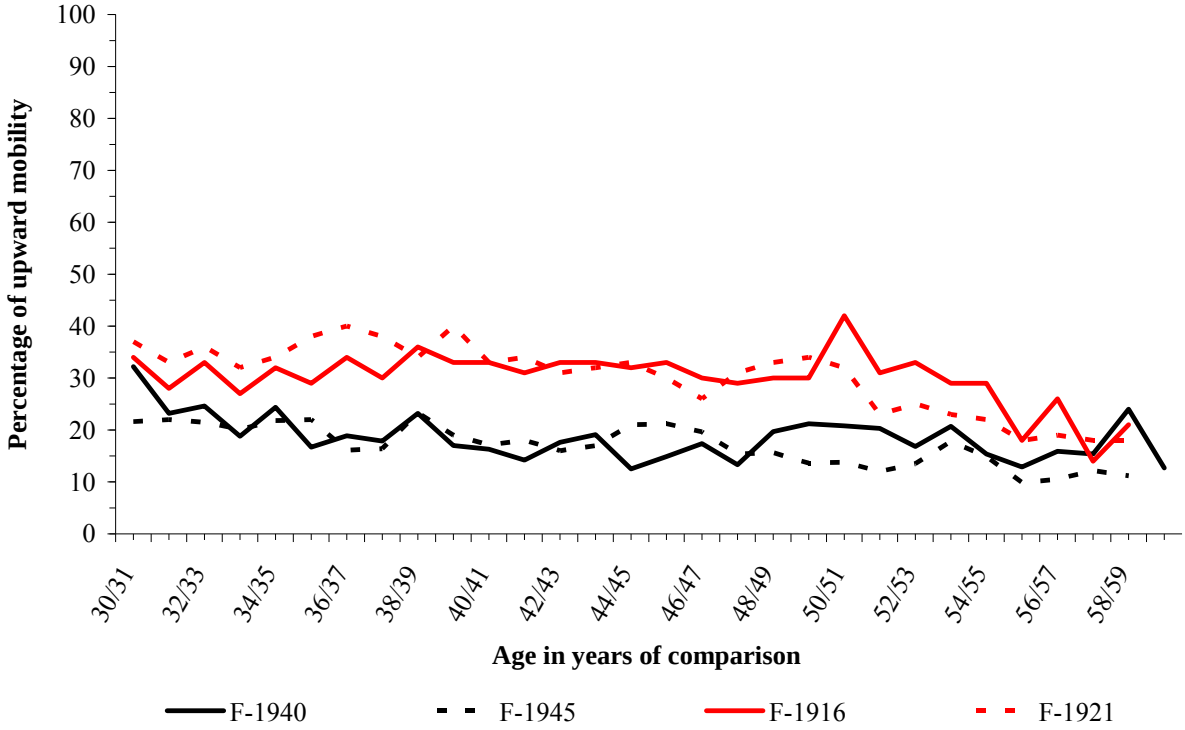


Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

The overall structure of the upward mobility in Figure 11 looks like the structure of the mobility in Figure 8 – just on a lower level and without the drastic reduction over the 1970s. The upward mobility is around thirty percent until the mid 1970s and roughly twenty percent afterwards. Noteworthy is the time period between 1989 and 1995: The mobility during those years seems to consist mostly of income position improvement. This is an indication that period effects may influence the amount and direction of income mobility.

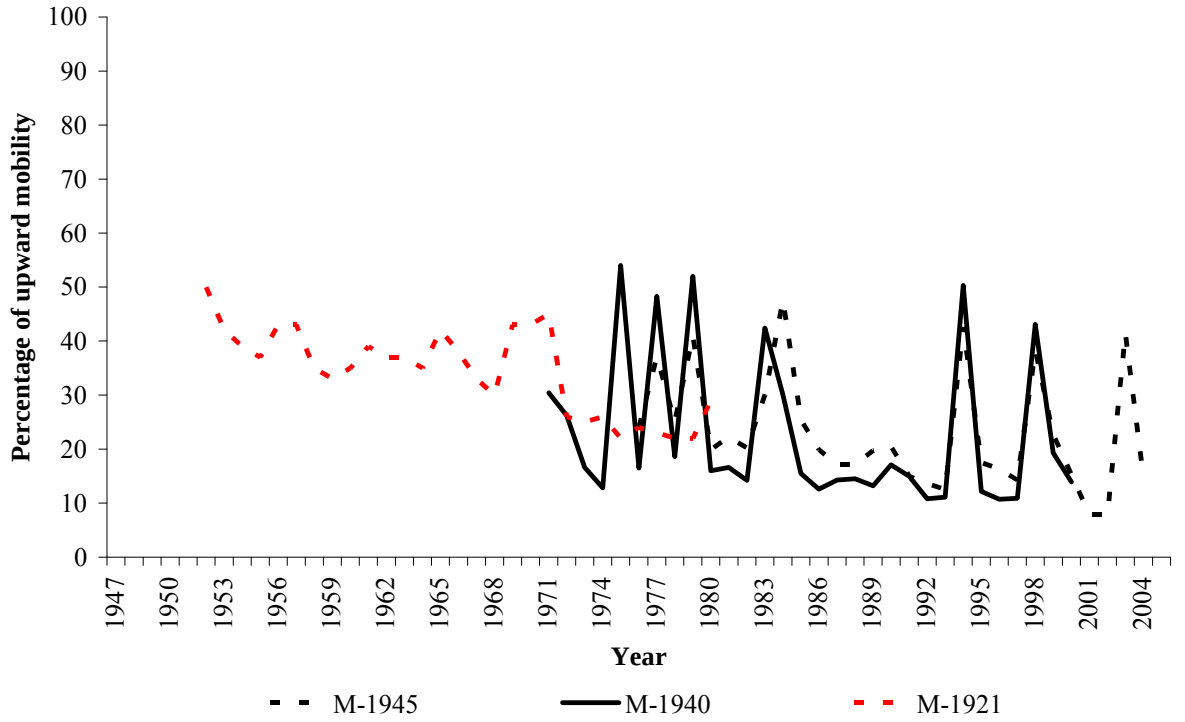
Regarding age-effects one would suggest that there would be a special "time path" as shown in Figure 1. At the beginning of ones career the upward mobility should be quite high but declining with work experience. However, the development of income mobility for women does not correspond very well with the profile in Figure 1. In Figure 12 the age profiles are represented. As can be seen, no indications of age effects are observable.

Figure 12: Upward income mobility of women over age



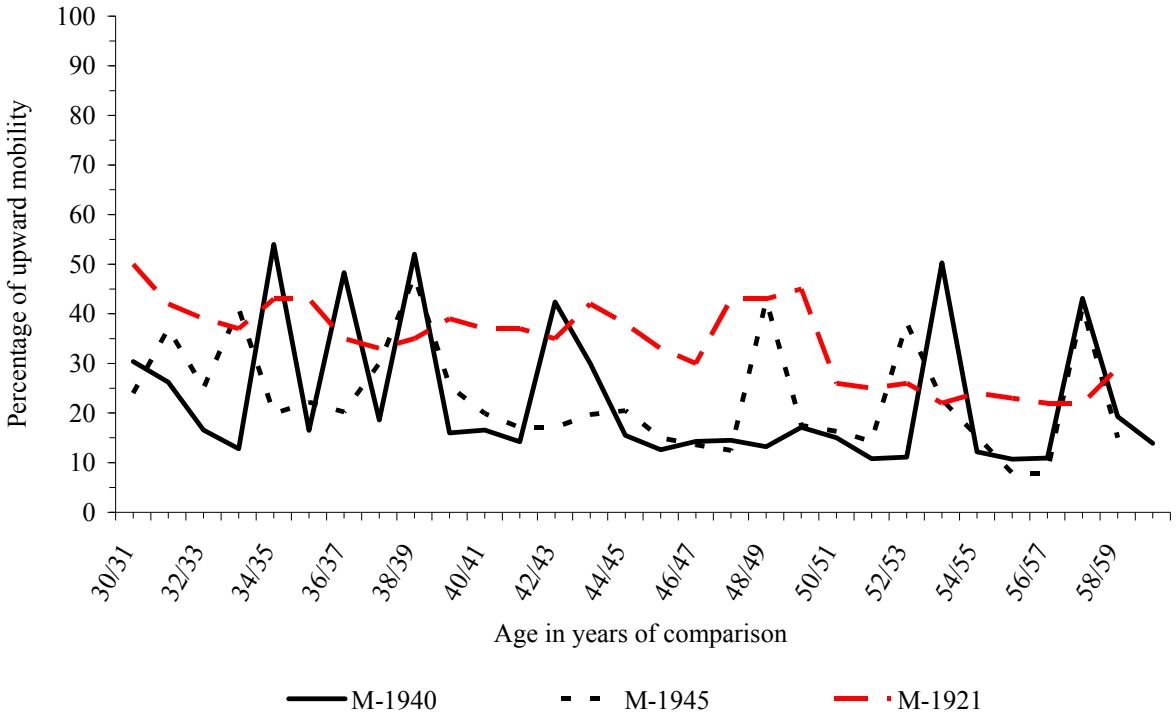
Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 13: Upward income mobility of men



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 14: Upward income mobility of men over age

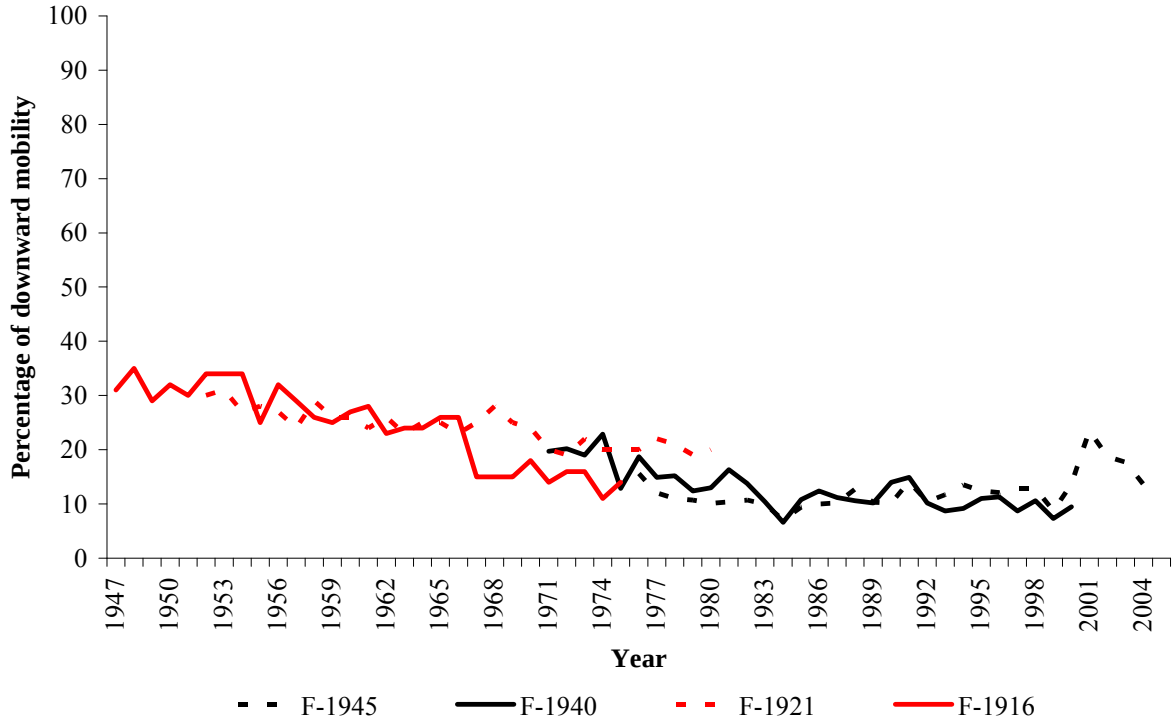


Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

5.2.3 Downward mobility

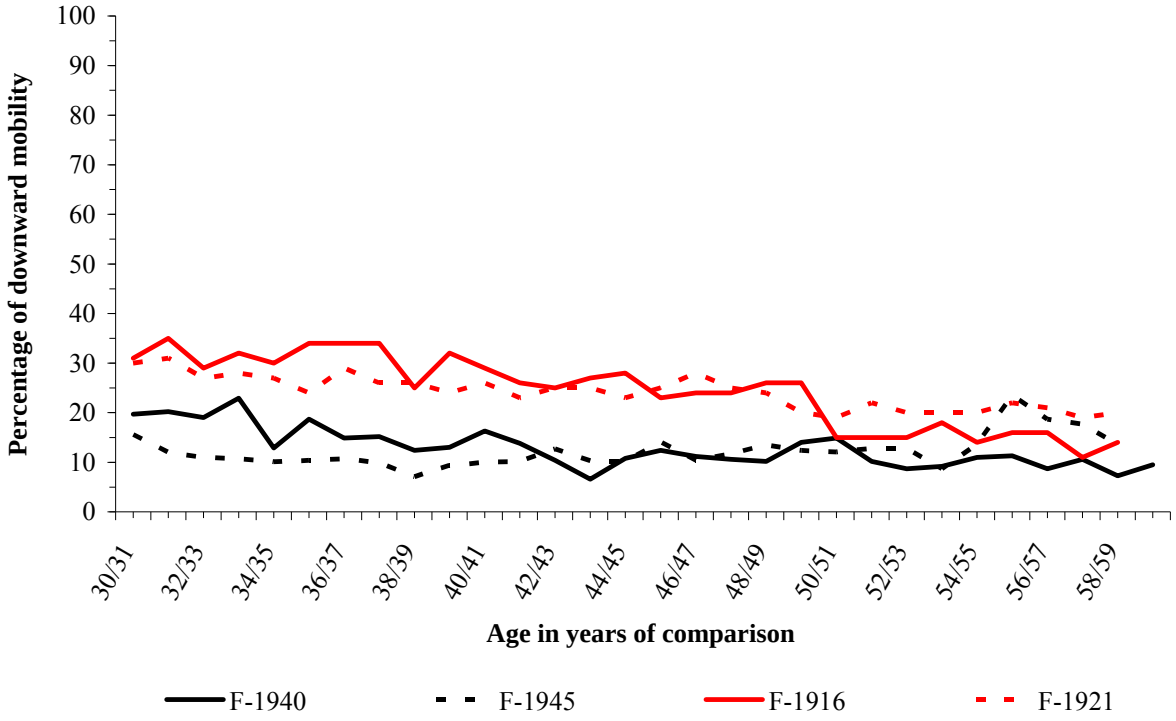
From a theoretical point of view, the development of downward mobility should be contrary to the upward mobility. That means that at the beginning of one's working life, downward mobility should be rather low and at the end it should be expected as rather high. However, just as for upward mobility, there is not such a development over time as can be seen in the following figures.

Figure 15: Downward mobility of women



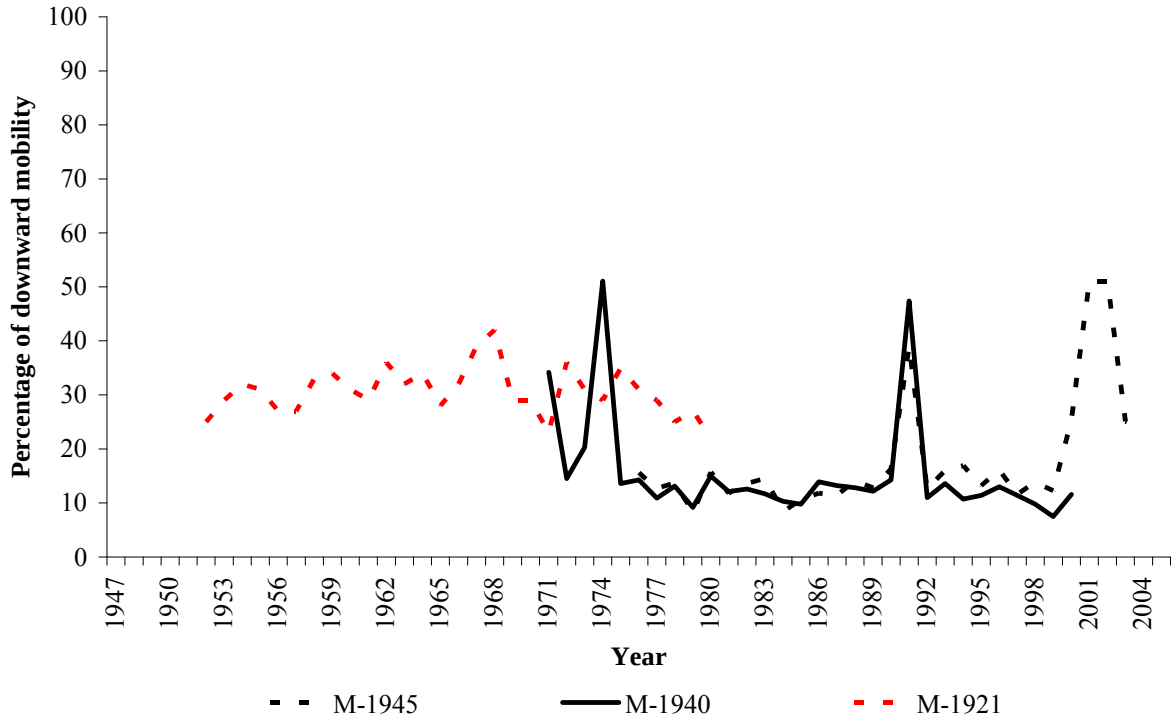
Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 16: Downward income mobility of women over age



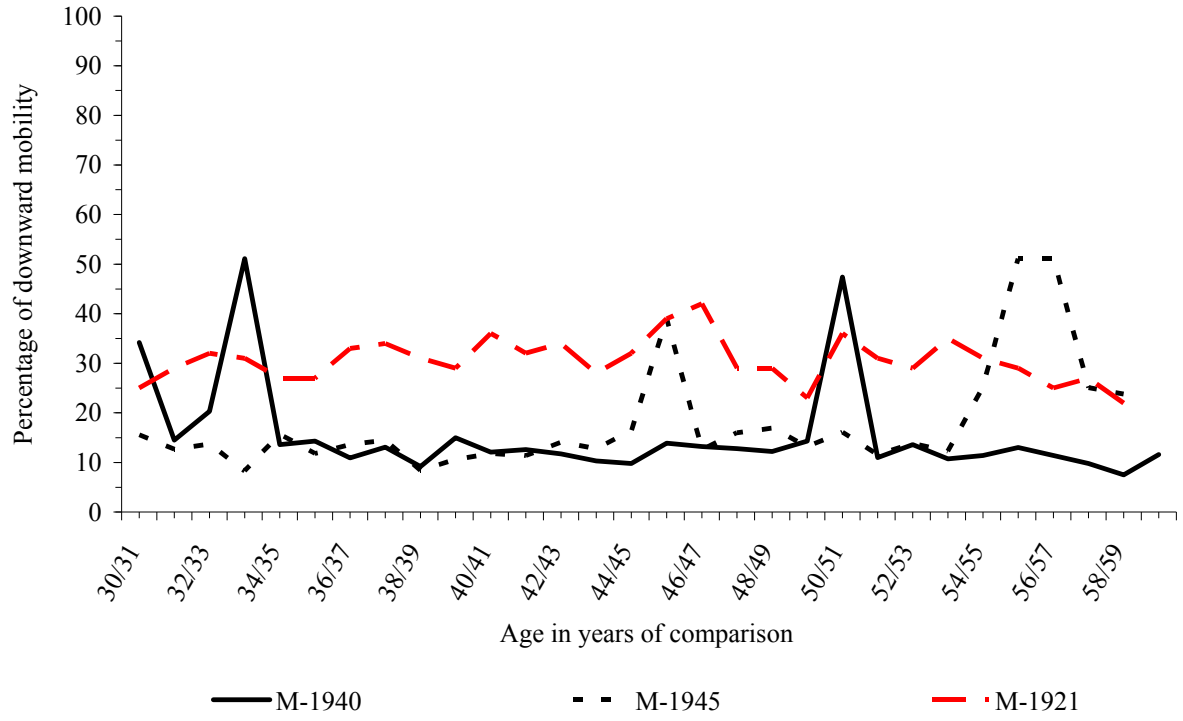
Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 17: Downward mobility of men



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

Figure 18: Downward mobility of men over age



Source: FDZ-RV – SUF VVL2004, ASK-VVL1981, own calculation.

The amount of downward mobility and its development over time is comparable to the upward mobility. A specific structure, i. e. reflecting age-, cohort- or period-effects, can not be identified. It seems as if there is just a percentage of people – between twenty and thirty percent per year – "moving down" the income distribution.

6 Summary

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

The amount of mobility is surprisingly high: over fifty percent of the people are not staying in the same income class. For income from regular dependent employment without phases of unemployment, reduction of working time, and during a time of full employment (with mainly frictional unemployment) one would have thought that the component of permanent income would be higher – especially considering risk averse behaviour.

However, there is not such a general objective "optimal" degree regarding the "correct" amount of mobility – when is it too high and when will it be too low?

Our analysis shows that the development of individual profiles and income mobility does not correspond very well to assumptions of the human capital theory / life cycle theory with dominating upward mobility in the first ten or twenty years of the working life and dominating downward mobility afterwards.

"Transitory" income elements seem to be quite high[65]. This is relatively remarkable as just one income source is analysed: the individual gross monthly labour earnings which are due for social security contributions. Income components such as interest earnings or self-employment income which are mainly seen as unsteady over time are not considered.

[65] A high degree of income mobility is also a result of the analysis of Cantó (2000) for Spain and Joseph Rowntree Foundation (1997) for Britain.

This is not a "good" result as the higher the transitory component, the lower the explanation power of theoretical models as transitory components are beyond economic explanation. Therefore the dominance of the transitory component restricts the analysis merely to a description of the income distribution and its development over time.

What determines the income mobility is still an open question, which could not be answered with our data. However, there are some indications for macro-economic effects. Individual income mobility seems to be higher during times of economic instability.

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