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Joachim R. Frick
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To Claim or Not to Claim: Estimating Non-Take-Up of Social Assistance in Germany and the Role of Measurement Error

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To Claim or Not to Claim: Estimating Non-Take-Up of Social Assistance in Germany and the Role of Measurement Error

by Joachim R. Frick and Olaf Groh-Samberg* (SOEP)

Abstract

Using representative micro data from the German Socio-Economic Panel Study (SOEP) for the year 2002, we analyse non-take-up behaviour of Social Assistance (SA) in Germany. According to our simulation as much as 67 percent of the eligible population did not claim SA in that year which is slightly higher than reported in previous work. We particularly emphasize the role of measurement error in estimating non-take-up. First, we consider misspecifications of the simulation model due, e.g., to households claiming to have received SA although not simulated as eligible ("beta-error"). Second, we employ sensitivity analyses revealing the impact of measurement errors in reported household income and wealth as well as in simulated needs. Misreported household incomes appear to have the greatest impact on the estimated non-take-up rates, as shown in Monte-Carlo-type simulations. Regression analysis of the potential determinants of non-take-up behaviour confirm that rational motives – i.e., the expected net utility from claiming – as well as stigma and other barriers play a crucial role in explaining the puzzle of large non-take-up rates of SA.

Keywords: Non-Take-Up, Social Assistance, Measurement Error, Microsimulation, SOEP

JEL-Codes: I38, D61, C15

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1 Introduction

Means-tested social benefits targeted at the very poor are a pillar of modern welfare states. As a "last safety net," they are designed to ensure every member of society the possibility to participate, at least at a minimum level. However, recent literature provides evidence that a substantial number of people do not claim the social benefits they are eligible for. Reviewing the international literature, van Oorschot (1991, 1998) finds that non-take-up is at least 20% in all countries observed and even higher in many cases, depending on the type of benefit. For Germany, recent studies of non-take-up of social assistance estimated non-take-up rates ranging from 43.3% (Wilde/Kubis 2005) to 63.1% (Kayser/Frick 2001; see also Riphahn 2001 and Becker/Hauser 2005). In other words, means-tested social benefits seem to fail the goal of providing the whole population with a minimum of resources needed to participate in social life, which can be interpreted as a lack of welfare state efficiency.

Still, the understanding of the empirical finding of high non-take-up rates is a puzzle. In line with economic theory, it is usually taken for granted in social policy that individuals will maximise their profits from any relationship with the welfare state. Preoccupied by the idea of rational, profit-seeking individuals, social policy has been much more concerned with misuse and over-consumption of social benefits, thus widely neglecting or playing down the problem of under-consumption (van Oorschot 1998: 101f.). Yet, empirical investigations have provided evidence that non-take-up is a serious problem of social policy, related – among other factors – to stigmatisation, information deficits and complex claiming schemes. Especially in the case of benefits targeted at the very poor aimed at maintaining minimum living standards – which are at the focus of this paper – non-take-up points to a severe failure of the social security system.

In recent years, the scope and determinants of non-take-up of social assistance has become an important issue in social policy related research. This is most important for micro-simulation models focussing on the evaluation of social policy reforms that often implicitly assume a complete take-up of social benefits, i.e., a non-take-up rate of zero percent. Also, monitoring trends in poverty and social exclusion by analysing the population of social benefit recipients might be misleading if non-take-up is not accounted for, resulting in a significant underestimation of the population in need and even arriving at wrong conclusions if trends in non-take-

up counteract the observed trends in take-up (see Kayser/Frick 2001: 28 and Riphahn 2001: 379 for more arguments on the relevance of non-take-up).

In this paper we estimate the incidence and the potential determinants of non-take-up of social assistance in Germany for the year 2002. However, empirical estimation of non-take-up rates is a difficult enterprise. The simulation of eligibility depends heavily on the scope and quality of the available data. Even if perfect information were available – at least the same information that social assistance agencies request from their claimants – the decision on eligibility is still at the discretion of the social assistant agency, leaving room for individual judgements by the social administrator. But most important, the information available in the survey data may not cover the complete information required in the claiming process, and the information available is most likely afflicted with measurement error.

Therefore, in this paper the scope and relevance of measurement error will be addressed in detail at the various stages in the simulation process. We provide different measures of non-take-up rates arising from modifications of the simulation model and its inherent decisions, and we address the impact of measurement error in the information on incomes and needs by means of sensitivity analysis. For our analyses, we use micro-data from the German Socio-Economic Panel Study (SOEP) that provides us with a wide range of relevant information. All information on needs, housing costs, incomes and social assistance receipt refer to the same point in time: the month of the interview. Moreover, and in addition to previous literature on non-take-up of social assistance in Germany, we are able to draw on detailed personal information on wealth and assets collected in the survey year 2002. This allows us to consider wealth and assets according to the subsidiarity rule implemented in the underlying means testing schemes.

The paper is organised as follows. In Section 2 we provide a brief overview of the social assistance scheme and the development of social assistance in Germany since the 1980s. In Section 3 we discuss the previous literature on the incidence of non-take-up of SA in Germany by means of various data sources as well as explanatory models on non-take-up behaviour. The reference simulation model of eligibility for social assistance is developed in Section 4, while Section 5 provides an in-depth discussion of quality problems and alternative specifications of the simulation model, and the identification of non-take-up households. In Section 6 we provide regression analyses on non-take-up behaviour, and Section 7 concludes.

2 Social Assistance in Germany

In Germany, like in many other European countries, the social security system relies heavily on social insurance schemes that are upstream of means-tested benefits like housing benefits or social assistance (SA). Within the social security system, SA operates as a last-resort safety net. It is aimed at "enabling to the receipt to live a life consistent with human dignity. The aid should, as far as possible, enable the recipient to live without it, and the recipient must contribute his/her utmost to achieving this." (§1 BSHG, authors' translation). According to the principle of subsidiarity, a person is eligible for SA only if all other means of making ends meet have been exhausted. This includes all incomes and downstream benefits as well as the consumption of personal assets and wealth as well as labour market activity.

The SA system, as of 2002, offers two main types of benefits:

- The first type of benefit provides regular support to cover living expenses (*Hilfe zum laufenden Lebensunterhalt*, HLU) to households that would otherwise be unable to maintain minimum living standards. It provides monthly payments, and for unemployed but employable persons, also offers assistance in finding a new job (*Hilfe zur Arbeit)*.[1] The regular subsidization of living expenses for non-institutionalized recipients, who are the focus of this study, will be described in more detail in the following sections and referred to as "regular SA".

- The second type of benefit provides support covering additional living expenses in special situations (*Hilfe in besonderen Lebenslagen*, HbL). It is targeted at households facing special circumstances whose extra costs require temporary or prolonged financial support. The most important special SA of this type is aid for the rehabilitation and reintegration of disabled persons into the working world. Special SA also covers nursing care, aid to young families, blind persons, etc.

- The third type provides one-time benefits (*Einmalige Hilfen zum Lebensunterhalt*) as financial stand-alone funding for goods and services that are needed but are either not covered by regular SA payments or too costly for low-income budgets. This type of benefit is usually given to households already receiving SA, but could also be given to other house-

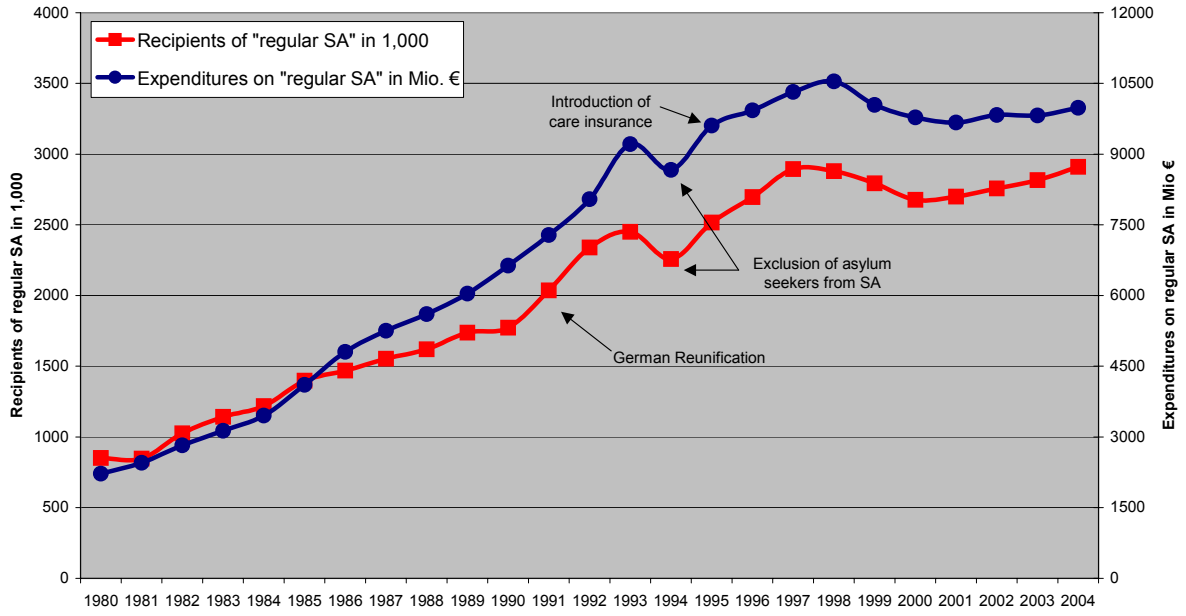
[1] As of the reference year of this study, 2002, the support for labour market reintegration operates separately from the official labour offices at the level of the local authority. The recent labour market reforms ("Hartz" Acts) aimed to overcome this double structure by unifying the former labour market activities of the SA agencies with those of the labour offices. However, these new regulations are ignored in this paper.

holds. Roughly approximated, it accounts for as much as ten percent of regular SA payments (Becker/Hauser 2005: 54). However, given that this kind of benefit is conditional on passing the means test for HLU and is paid on top of the regular payments, it will not be considered in the simulation of eligibility.

The SA system in Germany dates back to the social assistance act of 1962 (*Bundessozialhilfegesetz*, BSHG). At the time of initial implementation, poverty was in sharp decline compared to high post-war poverty in Germany, and was expected to decline further. The political decision makers who drafted the social assistance act (BSHG) explicitly stated that the most important part of the new SA system would be the benefits for special living conditions (HbL). The largest group of long-term recipients of regular SA were older women, mostly widows, who had lost their husbands in World War II and were otherwise receiving no or inadequate old age pensions (Hauser et al. 1981: 75ff.). In light of the economic prosperity and full employment that continued over the 1960s, it was expected that the population in need of longer-lasting support would steadily decline. In this period, the thresholds defining basic needs for living expenses (*Eckregelsätze*) were also constantly rising in line with the rising living standards.

Over the course of the 1970s this development did an about-face. In contrast to the short recession of 1967, mass unemployment did not recover after the 1973 oil shock and could not be reduced to its former level of full employment. In 1981, unemployment rates again increased sharply to more than 9% and could not be reduced thereafter. Along with this gradual increase in mass unemployment, income inequality and poverty as well as the population share of SA recipients continuously increased over the 1980s and 1990s (Becker/Hauser 2003; Frick et al. 2005). Contrary to the initial expectations, the overall raise in SA recipients was driven entirely by the increase in the number of regular SA recipients, whereas the rates of recipients of benefits for special living conditions (HbL) remained almost unchanged. Figure 2.1 shows this increase in the number of recipients as well as total expenditures for regular SA.

Figure 2-1:
Recipients and Expenditures of Regular SA in Germany, 1980-2004



Note: Expenditures for SA are gross total expenditures for HLU.
Source: StaBuA 2003 (Tab. A5.1 and B4)

Expenditures on SA increased from €2.2 billion in 1980 to almost €10 billion in the late 1990s, and over the same period, the number of regular SA recipients increased from 850 thousand to nearly three million. However, this increase would have been much greater if there had been no attempts to cap it. These attempts included refraining from adjusting the basic rates of SA and the introduction of more restrictive conditions for eligibility, such as workfare programs combined with stronger sanctions of rejections of workfare programs (Semrau 1990: 112; Hauser/Hübinger 1993: 50ff.; Adamy/Steffen 1998: 34-52; Becker/Hauser 2005: 49f.). Another important change in the institutional setting was the exclusion of whole groups of potential beneficiaries. In 1993, asylum seekers were excluded from the eligible population and a new kind of benefit scheme was introduced for them (AsylbLG), which is below the minimum level established by regular SA. In 1994, when the "care insurance" (*Pflegeversicherung*) was introduced as a new component of the social insurance system, many elderly recipients of SA – many of whom were, until then, receiving aid for special living conditions – also began receiving upstream social benefits. The rise in the SA budget over the last two decades was accompanied by a structural change of the population in need. Whereas the receipt of benefits declined steadily among the elderly, the corresponding numbers for children increased. A sharp increase in SA rates was also experienced

by single-parent households and by foreigners and immigrants (Hauser/Hübinger 1993: 55ff.), with the latter being most severely affected by the massive unemployment due to the lack of additional means of compensation (e.g. capital income).

As such, the main pressure on the social security system came from the return of mass unemployment. Of course, there are other social benefits designed to protect households against unemployment. One is unemployment insurance, which is based on contributions by the employed, and another is unemployment assistance, which is a means-tested benefit financed by taxes. However, these benefits, which are upstream to SA, failed to absorb the increasing numbers of unemployed people and were subjected to increasing restrictions in terms of eligibility conditions, benefit amounts, and maximal duration of receipt. Thus, the German SA became a kind of permanent de facto basic income for huge numbers of needy people although initially designed only as a means of temporary aid.[2]

3 Non-Take-Up of SA – Literature Review and Research Questions

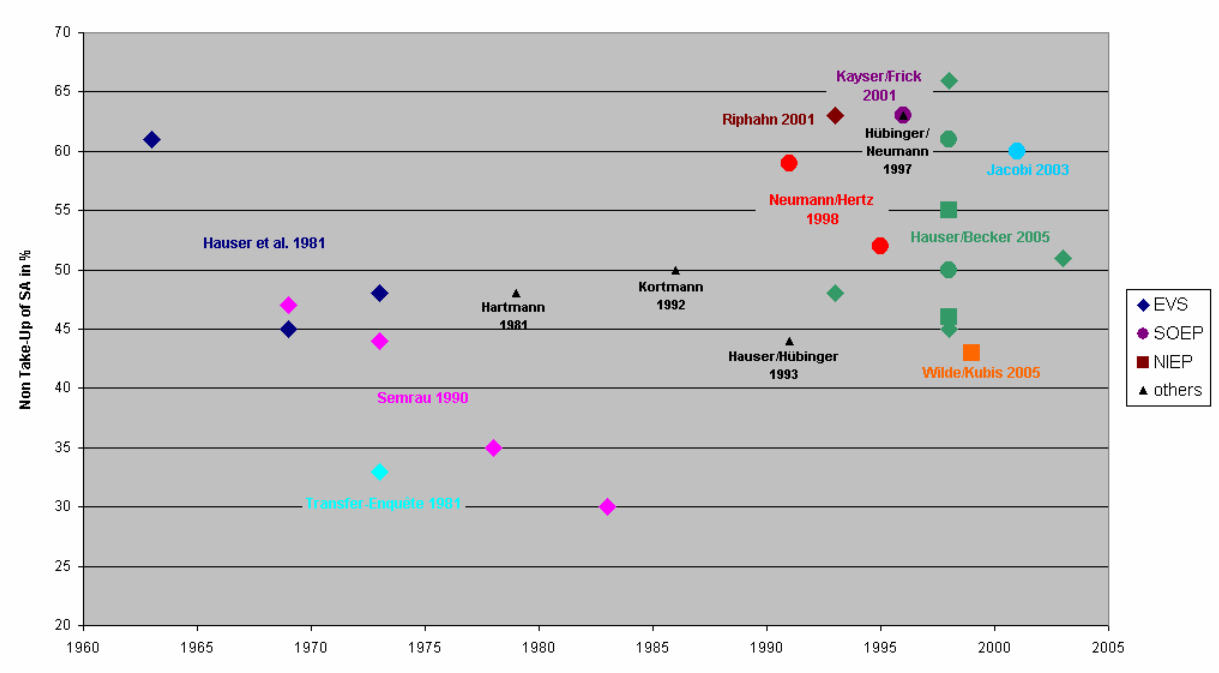
3.1 Incidence of Non-Take-Up in Germany – Trends over Time and Comparability Problems

A few studies have addressed non-take-up of SA in Germany. The overall focus of these studies has been on the incidence of non-take-up rates of SA and descriptive estimates of non-take-up rates for various subgroups of the population such as the elderly or families with young children. Compared to other countries, non-take-up rates seem to be quite high in Germany, in particularly if more recent studies are considered. The continuous but still sparse literature on non-take-up of SA in Germany allows at least some suggestions about its development over time. An overview of the estimated non-take-up rates is given in figure 3-1. However, it has to be noted that comparability among these studies and their results is hampered by the use of different data sources as well as different simulation models. Concerning

[2] Since 2002 there have been reforms of the social security system in Germany, but these are beyond the scope of this paper. For example, in 2003, a basic income for the elderly was introduced, not least to reduce the high stigma costs and other barriers to taking up SA for this group of the population. Finally, in 2005 the so called "Hartz" reforms led to a realignment of the social security system by unifying all labour market related activities (at so-called job centres) as well as all benefits for employable persons to the new unemployment assistance type II (*ALG II*). These changes actually left only persons out of workforce at the focus of the rearranged "social assistance" system. See Becker (2007) for a first analysis of non-take-up of the new designed unemployment benefit (*ALG II*).

the population covered, the data set most often employed, the German Income and Consumption Survey (*Einkommens- und Verbrauchsstichprobe*, EVS) which is a quota sample of households with top-capped incomes, is also not representative for the overall population, in that foreigners and immigrants are highly mis- and underrepresented. A correct representation of this group is very important given that migrants tend to be overrepresented among SA recipients, not because they differ from natives with respect to their take-up behaviour but just because of above-average eligibility (Castranova et al. 2001). While older studies using data up to 1990 focused solely on West Germany, some recent studies include or focus mainly on East Germany and others do not. Although incomes in East Germany are considerably lower than in the western states, non-take-up of SA has been found to be higher in the East during the 1990s when the West German SA system had just been introduced, with some regional adjustments for East Germany, and was still a novelty there. Easterners knew less on average about claiming procedures, had higher information barriers as well as higher stigmatisation due to the history of social security benefits in the GDR.

Figure 3-1:
Non-Take-Up Rates for Germany



Hauser et al. (1981) and Semrau (1990) provided consistent time series estimates of non-take-up rates based on EVS data showing a monotonic decrease in non-take-up during the 1960s and 1970s. However, more recent studies based on various data sets show significantly higher rates of non-take-up for the 1990s. Due to the lack of consistent time series analysis for the

time period spanning the 1980s, one can only speculate that non-take-up rates increased again in line with the overall U-shaped pattern of poverty rates in post-war Germany (see above, section 2) although there appear to be some endogeneity problems due to rising poverty rates induced by (increasing) non-take-up of SA.[3]

Given the substantial differences in estimated non-take-up rates and the unclear picture across time, differences in the simulation model – due to the different information available in different data sets – have gained a great deal of attention in the recent literature (Wilde/Kubis 2005; Becker/Hauser 2005). Becker and Hauser (2005) provided a comparative analysis on non-take-up of SA based on the three most important survey data sets for Germany: EVS, SOEP and NIEP (a panel study of low-income households, *Niedrigeinkommenspanel* (Kortmann et al. 2003)). They worked out a "basic simulation model" that could be applied almost identically to the three data sets, in order to derive estimates of non-take-up that mainly reflect differences in the sample selection and data quality of the three surveys. And in fact, non-take-up rates differed markedly, ranging from 55% for NIEP to 66% for EVS, with the SOEP showing an intermediate rate of 61%. In a second step, Hauser and Becker developed different simulation models for each data set in order to fully exploit the available information. Resulting from this, the rates of non-take-up, which declined overall due to an improved simulation of wealth holdings, were much closer, ranging from 45% (EVS) and 46% (NIEP) to 50% (SOEP).

Thus, adapting simulation models to the peculiarities of the data set will result in more reliable measures of non-take-up rates than trying to stipulate a standardised but rather general and rough simulation model on the data. One of the most crucial parameters in a simulation model affecting the measurement of non-take-up is whether and how wealth and assets are taken into account. Table 3-2 shows the impact of considering such wealth controls in the eligibility simulation as reported by Riphahn (2001), Wilde/Kubis (2005) and Becker/Hauser (2005) in their different studies. As can be seen, the estimated rate of non-take-up decreases by almost 20% once wealth is controlled for.

[3] The strong decline of non-take-up rates estimated by Neumann and Hertz (1998) between 1991 and 1995 is questionable for methodological reasons, since for example non-take-up rates are estimated comparing eligibility in the SOEP micro data with SA rates derived from official statistics. However, a declining trend of non-take-up between 1995 and 1998 might also be in line with a decline in poverty rates, following the labour market fluctuations during this period following the German unification boom of the early 19902. Also, time series analyses provided by Becker and Hauser (2005) for the years 1993, 1998 and 2003 show a minor decline of non-take-up rates from 48% to 45%, but a further increase to 51% thereafter.

Table 3-2:
Impact of Wealth Control on Non-Take-Up Rates

Study	dataset (year)	non-take-up prior to wealth control	non-take-up after wealth control	reduction in %
Riphahn 2001	EVS (1993)	76,8	62,6	18,5
Wilde/Kubis 2005	NIEP (1999)	54,5	43,3	20,6
Becker/Hauser 2005	EVS (1998)	65,7	47,5	27,7
	SOEP (1998)	61,4	49,1	20,0
	NIEP (1999)	55,4	49,6	10,5

However, substantial differences in the estimated non-take-up rates remain constant across the studies.[4] Also, non-take-up rates may still remain remarkably high even after controlling for wealth, as shown by Riphahn (2001) based on EVS data for 1993 and by Kayser and Frick (2001) based on SOEP data for 1995, who are both reporting a non-take-up rate of about 63% after considering wealth in the simulation model. Thus, differences in the reported non-take-up rates cannot be attributed to different considerations of wealth, as suggested by Wilde and Kubis (2005).

Summing up the results of these extremely diverse but broadly comparable previous studies suggests that over the last twenty years, non-take-up rates of SA in Germany have generally followed the overall U-shaped development of poverty rates. However, this conclusion still lacks detailed empirical substantiation through consistent time series analysis and should thus be taken with caution. But if it is true, it would contribute to the discussion about determinants and causes of non-take-up, pointing to the importance of macro-level factors that might affect the structure of needs as well as the collective perceptions and attitudes towards SA, which certainly affect the stigmas attached to receiving SA.

This paper contributes to the existing literature, not only by providing estimates of non-take-up for a more recent point in time, but also by focusing on the role of measurement error in simulating eligibility and estimating non-take-up. Although the recent literature has begun to examine the impact of alternative specifications of the simulation model on non-take-up rates (see Riphahn 2001; Kayser/Frick 2001; Wilde/Kubis 2005; Becker/Hauser 2005), the sensitivity analysis and robustness checks on data quality are still incomplete. In particular, the phenomenon of a "beta error" has been widely ignored – that is, the ratio of households re-

[4] Another important parameter in the simulation models that highly affects non-take-up rates which has not received much attention in the previous literature is the way housing costs are dealt with in the simulation model (see Kayser/Frick 2001: 36; Becker/Hauser 2005: 56ff., 61; see also below, section 4.2).

porting SA receipt but being simulated as non-eligible – which also gives indications about the quality of the simulation model. Furthermore, issues of measurement error in survey information on income and needs are also widely neglected in the literature so far. Notable exceptions include Duclos (1995) and more recently Hernandez/Pudney (2007).

3.2 Determinants of Non-Take-Up Behaviour

Explanations for the high non-take-up rates of SA found in Germany have been proposed in detailed studies based on standardised or even narrative interviews with smaller samples (Hartmann 1991; Hübinger/Neumann 1997). Only a few studies have tried to analyse the determinants of non-take-up by means of regression analysis based on survey data (Riphahn 2001; Kayser/Frick 2001; Wilde/Kubis 2005). As with the international literature, these analyses are mainly rooted in a rational choice framework, attempting to model non-take-up behaviour as the result of balancing expected benefits against the costs of claiming SA.

The evidence provided by early studies of non-take-up – in Germany as well as elsewhere – can be summed up in the words of the Supplementary Benefit Commission as cited in van Oorschot (1998: 114): *"... [R]eluctance to claim appears to come from some mixture of pride, ignorance, a sense of stigma, reluctance to make the efforts which a claim calls for, a desire for self-sufficiency on the part of an individual or family, an unwillingness to become involved with a government agency and a feeling that the whole business is not worthwhile*." (SBC 1978: 7)

A first breakthrough to a more systematic understanding of the causes of non-take-up behaviour was brought about by "threshold" model first proposed by Kerr (1983). In his model, the decision to claim or not to claim a given social benefit depends on six stages or "thresholds" of the decision-making process that have to be made prior to a claim. The failure to pass at any one of the thresholds would result in not claiming the benefit at all. Kerr's six thresholds were the following: (1) perceiving a need, (2) becoming aware of the existence of a benefit, (3) having a self-perception of eligibility, (4) considering the benefit useful in meeting one's needs, (5) judging the benefit as positive and overall in line with one's attitudes, and (6) being in a stable position of need. Kerr's model has been criticised as modelling the decision process too restrictively with respect to the strict sequential ordering, as well as for being incomplete, for example, with regard to the importance of time and triggers that may induce take-up behaviour, or the importance of strong negative attitudes towards social benefits that might

block the decision process in very early stages (see van Oorschot 1998: 115f. for a more detailed review).

Building on this critique and on modifications of Kerr's model, van Oorschot (1998) provides a more comprehensive explanation of non-take-up that also enlarges the model by taking into account the administrative and benefit levels rather than attributing the causes for non-take-up solely to the clients' behaviour. Van Oorschot's model consists of only three stages that have to be passed sequentially, each of which entails more complex processes. The first stage is the "threshold" stage, at which the benefit has to become salient, which involves becoming aware of the existence of a benefit that might help in making ends meet. However, there are some factors that might prevent people from further investigation during the decision-making process, such as strong attitudinal barriers against social benefits, or a very unstable situation entailing periodic eligibility/ineligibility. At the second stage, the so-called "trade-off" stage, people that have passed the threshold stage will trade off factors promoting a claim (like the perception of longer-lasting needs, of utility and eligibility) and factors inhibiting a claim (like perceptions high time or stigma costs of claiming benefits). If the perceived utility from claiming exceeds the perceived costs of claiming, people will claim the benefits. Finally, van Oorschot adds a third stage to the process: the "application" stage. At this stage, claimants may still withdraw from the claiming process if, for example, they feel humiliated by the social agency or if they had overestimated the utility and/or underestimated the costs of claiming. On the other hand, the claim might also be rejected on behalf of the social agency, what even might happen erroneously.

The importance of this third "application" stage in explaining non-take-up may be increased further by recent social policy reforms introducing or strengthening workfare elements or case management regulations regarding social benefits. On the one hand, these policies usually intend to enhance non-monetary support for getting a job or for coping with the difficulties of everyday life, but on the other hand, they often involve stronger social controls and sanctions by the social agency. As a consequence, they may lead to higher rates of withdrawal from the claiming process. One of the most striking findings from the longitudinal analysis of SA was carried out in the city-state of Bremen in the 1990s. It showed a high rate of claimants withdrawing from the claiming process for unknown reasons (according to the SA agency documents from legal processes). One explanation described this behaviour as a reaction to being offered workfare programs (Buhr 1995: 128).

The model offered by van Oorschot also draws attention to the timing of the claiming process, with the possibility of delays, triggers, interruptions, and starting over again, and explicitly allows for different paths or routes through the claiming process.

However, given the restrictions of survey data that are not designed to measure and explain non-take-up in the first place, this theoretical model can only serve as a general guideline to derive hypotheses that can be tested within a multivariate regression framework. Using non-take-up vs. take-up of social benefits as a binary outcome variable, conditional on a simulation of eligibility, it is assumed that households will claim social benefits if the expected utility from claiming exceeds the costs of claiming. In terms of the more comprehensive threshold model of van Oorschot, only the second "application" stage is considered by such a regression framework. Alternatively, it may also be interpreted as a simplification and unification of the threshold model, assuming that the processes in the first and third stage of the claiming process can at least be approximated by including it in only one unique equation, where for example the inhibiting factors operating at the first stage of the von Oorschot model as well as the factors causing withdrawals from claiming at the third stage are jointly modelled with stigma and other claiming costs operating at the second stage. Such a regression model can be estimated as:

$$P(SA)^* = a + b_c * X_c + b_u * X_u + e \quad \text{with } P(SA)=1 \text{ if } P(SA)^* \geq p \text{ and } P(SA)=0 \text{ if } P(SA)^* < p \qquad (1),$$

where $P(SA)^*$ denotes the unobserved probability of claiming (measured by the binary outcome of receiving vs. not receiving SA, linked to $P(SA)^*$ via a threshold p), X_c denotes a vector of variables approximating the costs of claiming and X_u a vector of proxies for the expected utility from claiming, b_c and b_u the corresponding coefficients, a the constant and e a random error term.

Indeed, all the various aspects that are relevant in determining non-take-up according to the theoretical model can only be measured by proxy information. This is at least how most of the literature on non-take-up proceeds. Since proxy information within surveys is limited, it often appears that a given variable serves as a proxy for different and maybe even divergent processes. Education, for example, might serve as a proxy for the individual's capacity to deal with information costs, assuming that more highly educated household heads will have an easier time filling out the application forms and interacting with the social administrator (see Kayser/Frick 2001). At the same time, education might also serve as a proxy for the expected utility from claiming, assuming that more highly educated household heads will manage more

easily in finding a new job and thus in reducing the duration of needs (see Riphahn 2001). In other words, higher education serves as a proxy for both lower claiming costs and lower utility from claiming (Bargain et al. 2007).

So far, little attention has been focused on selection issues and the simultaneity of labour supply and take-up decisions. In a recent study of the German case, Wilde and Kubis (2005) criticise the previous literature for this lack and provide empirical evidence on simultaneous decision processes using a simultaneous two-equation model, one for labour supply and one for take-up of SA. Since the argument that (generous) social benefits will create disincentives for the poor to work is widespread and commonly used in social policy debates, it seems important to address this argument explicitly in studies of non-take-up of social benefits. Therefore, in this paper, the potential selection into eligibility will be controlled for by means of a Heckman selection model.

4 Simulating Eligibility – Data & Methods

In this section we describe the simulation model for SA in Germany, based on the representative micro-data of the Socio-Economic Panel (SOEP) collected in the survey year 2002. The SOEP is a wide-ranging representative longitudinal study of private households that provides yearly information on all household members, consisting not only of Germans living in the old and new German federal states, but also foreigners and recent immigrants to Germany (Haisken-DeNew/Frick 2005; SOEP-Group 2001; Wagner et al 2007). The panel was started in 1984, and in 2002, there were over 12,000 households with more than 30,000 persons sampled. For the purpose of studying non-take-up of SA, the SOEP provides monthly information on income, needs and housing costs, as well as a wide range of personal and behavioural characteristics that are of interest in assessing the determinants of non-take-up behaviour. Moreover, the 2002 SOEP questionnaire includes detailed personal information on wealth that has not been used in previous non-take-up studies based on SOEP data.

The simulation model consists of the following steps: After (1) defining the analysis population, we (2) define the needs, including housing costs, (3) define the allowable income, according to the rules of SA, (4) for households with needs exceeding allowable income, we carry out further checks of properties and assets that have to be exhausted before claiming benefits according to the subsidiarity principle. Then (5) we make some brief remarks on

editing and imputation in case of missing information and (6) describe the final classification of households according to "take-up", "non-take-up" and "beta error" households.

Before describing the setup of the simulation model in more detail, we first present information on the number of SA recipients and the amounts received according to the SOEP data as compared to official statistics (see Table 4.1). The number of households reporting receipt of SA is only somewhat above 50% of the number of needs units receiving regular SA by the end of the year 2002 according to official statistics. Nearly the same rate of coverage is obtained comparing the aggregated benefit amount. This underestimation may stem from the fact that low-income households tend to be underrepresented in household surveys in general, which cannot be fully compensated for by weighting techniques. However, comparability of these two data sources is restricted by the fact that the figures from official statistics are based on the households' claiming status as of 31 December 2002, when labour market conditions as well as the Christmas season may have led to above-average SA receipt. On the other hand, the SOEP micro data focuses on the month of the interview, which for about 70% of all surveyed households is between January and March.

Table 4-1:
Receipt of Social Assistance in SOEP vs. Official Statistics

	Recipients of Regular SA	**Amount of Regular SA**
Official Statistics	1,443 thousand needs units (per 31 Dec. 2002)	571 Mill. € (mean per month in 2002)*
SOEP	779 thousand households (in month of interview 2002)	296 Mill. € (in month of interview 2002)
"coverage" (SOEP in % of Official Statistics)	54.0%	51.8%

Source: StaBuA 2003 (Tab. A2.6.1); SOEP 2002

4.1 Restricting the Population

In Germany, all individuals are eligible for SA except of *asylum seekers*, for whom a separate benefit scheme was introduced in 1993 (in reaction to a major increase in the number of asylum seekers during the early 1990s), as well as *students and apprentices* who are eligible for educational subsidies. For this reason, students enrolled at universities as well as any persons in training receiving educational benefits are excluded from the needs calculation in our simulation model.

We also restrict the population to individuals in *private households* only. Although the institutionalised population – in addition to a large number of asylum seekers in special residences and students in student accommodations, this also comprises elderly people in nursing and retirement homes – is at least partly covered by the SOEP due to the follow-up concept, we have excluded them from our analysis. Whereas the first two aforementioned groups are not eligible for SA, the latter groups of elderly people mainly receive support for special living conditions (HbL), e.g., for nursing care. Thus, the likelihood of measurement error on the type and amount of SA, as well as on needs (incl. housing costs) and income is especially high for this population.

Likewise in previous studies, one major restriction of the simulation model applied here is that the unit of the eligibility simulation is the household and not the *needs unit* as defined by the SA law. However, as reported by Becker and Hauser (2005: 243ff.), almost 90% of the recipients of SA live in households that comprise only one needs unit. In the other cases, needs units according to the SA law are subgroups of the household they reside in. For example, parents may not be responsible for supporting children in the same household if over the age of 18 or if they have already started a family of their own but are still residing in the same household with the (grand-) parents. Although it would be possible to identify such needs units within survey households, information on SA receipt is only surveyed at the household level and thus cannot be attributed correctly to one of the needs units within the household.[5]

As a consequence, only in the case of households comprising at least one needs unit eligible for SA and at least one needs unit not eligible for SA, we will either over- or underestimate the number of eligible individuals when judging the household as one entire needs unit. Obviously, this phenomenon is closely linked to what will be dealt with as "beta-error" in the following analyses. Given that the rate of non-take-up is calculated by dividing the number of eligible persons that do not report receipt of SA by the number of all persons eligible according to our simulation procedure, we will subsequently over- or underestimate the rate of non-take-up as well. In case of multiple needs units per household with all needs units being either eligible or non-eligible, however, simulation based on the entire household will result in correct classifications, although the estimated amount of SA might be wrong.

[5] Trying to identify needs units within households with SOEP data is somewhat tricky because the interrelationship of the various household members is only given with respect to the relation to the household reference person, i.e., there exists no ego-centered relationship matrix.

Another source of misclassification of non-take-up comes from eligible individuals who claim SA but are denied it because they have rejected job offers from the SA agency. According to the principle of subsidiarity, individuals are obliged to fully exploit their work possibilities in order to remain eligible for SA. On these grounds, the SA agency is also entitled to test the willingness to work by offering its clients workfare programs. Rejection of such offers may lead to substantial cuts in SA payments and, in case of repeated rejections, even to reductions of SA to the absolute minimum required for survival (§§18-19, BSHG). However, these are probably rare exceptions. What appears more significant is that offers of workfare programs often lead to abstention from (further) SA claims by claimants themselves. As such, this is an important determinant of non-take-up behaviour.

4.2 Defining Needs and Housing Costs

Total needs under the SA scheme are composed, first, of *regular needs* defined on the basis of region-specific thresholds for single adults (*Eckregelsatz*) and adjusted to family composition by means of the BSHG equivalence scale. The household head is assigned the weight of 1, and the weights of all additional members of the needs unit are defined by age (0.5 for children aged 0 to 7, 0.65 for children aged 8 to 14, 0.9 for children aged 15 to 18 and 0.8 for each additional adult). In principle, regional thresholds for a single adult vary across federal states and are adjusted every 1st of July. During the first half of 2002 they range from €274 - 287 and from €279-294 for the second half of 2002. The thresholds are applied to the micro-data according to the month of interview.

Second, in addition to the regular needs, *additional needs* are considered for pregnant women (starting from week 12 of pregnancy), elderly people with walking impairments, disabled people receiving reintegration benefits or unable to work, and people in need of special diet. Except for the latter additional need of a special diet, where information is missing in SOEP, all other sources of additional needs can be identified or at least proxied by survey information. For pregnancy, we used information on childbirth from the subsequent panel wave 2003 – which, however, is missing for survey dropouts. Walking disabilities are approximated using information on the question whether the respondents are "severely" or "slightly" affected by their health status when climbing the stairs. Persons are identified as unable to work if they report an official disability status of at least 30% reduction in their earnings capacity and if they are receiving some kind of pension (although younger than 65). Finally, disabled

persons with reintegration benefits are identified by a reported disability status of at least 30% and by being in training. Each additional need amounts to either 20% or 40% of the regular needs, but the aggregation of these may not exceed 100% of the regular needs of a given individual.

Needs are also defined by *housing costs*. In principle, the actual housing costs (including costs for heating) of SA recipients will be paid directly by the SA agency, but only up to an *appropriate* amount. This is dealt with differently for tenants and homeowners. In case of tenants with rents far higher than the typical local rent, the SA agency may request the claimants to move to another home in order to maintain eligibility. In the case of homeowners, housing costs (including interests, but excluding repayments) are also covered up to an appropriate amount and in cases of housing costs exceeding this amount, the SA agency might request that claimants sell the house. However, for these eventualities no clear-cut thresholds or well defined rules exist. In other words, the definition of the appropriate amount of housing costs is largely at the discretion of the SA agency. Therefore, a rough approximating rule has to be applied in the simulation process. Within the literature, it is usually assumed that the appropriate amount of housing costs can be derived from the corresponding thresholds for households receiving housing allowances (Becker/Hauser 2005; see also Kayser/Frick 2001). Housing benefits are calculated on the basis of well defined tables that distinguish by household size, age of the building, sanitary facilities and, most important, an official regional rent index that distinguishes among six rent levels. However, since SA is the last safety net and housing benefits are upstream benefits to SA, the eligibility threshold underlying housing benefits might be seen as too restrictive for approximating the respective thresholds of housing cost maximums within the framework of SA. In fact, housing benefits for recipients of SA are more generous than for households that receive housing allowances only.

In simulating these housing costs, we applied maximum thresholds that were derived from regression analysis of actual rents (paid by non-subsidized renters in the dataset) on a set of covariates that include (the logarithm of) household size, the regional rent level and the year of construction. We assumed that the mean housing costs of actual rents for comparable types of houses are more suitable approximations of the thresholds that SA agencies might use in their decision-making. In fact, the resulting thresholds derived from the regression analysis are quite similar to those given by the official figures on housing allowances.

Given the actual housing costs and the derived threshold of maximum acceptable housing costs, we applied three different rules in the simulation model. In our "reference simulation model", we assume that the actual housing costs are covered by the SA agency only up to the maximum threshold. Thus, housing costs above the maximum thresholds are simply not considered in defining a given household's needs. In a second, more restrictive simulation model, we assume that in case of housing costs exceeding the maximum threshold, the household will fail the eligibility criterion, since the SA agency will force the household to move to another house (or to sell the owner-occupied home) in order to become eligible for SA. In a third, more generous simulation, we assume that all housing costs, whatever they might amount to, are covered by the SA agency. These two alternative models, the restricted and the generous one, might serve as extreme scenarios, with the "true" eligibility decision somewhere in between. Whereas the reference simulation model of considering housing costs up to the maximum threshold provides a solid approximation of the true decision-making processes, at least at an aggregated level, it should be noted that in individual cases the SA agency has to decide between the alternatives of accepting and paying the entire amount of housing costs or rejecting the whole claim.

Summing up, total needs N for a given household *j* with household members *i* are given by

$$N_j = \sum_{i=1}^{I} RN_i * (1 + AN_i) * T_k) + HC_j \qquad (2)$$

where RN defines regular needs (depending on age), AN defines additional needs (with a maximum of AN_{max}=1), T gives the regional thresholds for the federal state *k* the households resides, and HC defines housing costs (with a maximum of HC_{max} derived from regression analysis).

4.3 Defining Allowable Income

The total needs of a given needs unit are compared to the allowable income in order to decide whether the needs unit is eligible for SA. Allowable income includes all kinds of incomes except benefits for war victims and child-rearing benefits. Starting from this gross income several income allowances are deducted in order to obtain the allowable income. Deductions include taxes and social security contributions, income allowances for employed persons graded by disability status, and allowances for households with children. Furthermore, ex-

penses for old-age provision, contributions to private health insurance, as well as non-obligatory private transfers can also be deducted if they seem appropriate to the SA agency.

In simulating allowable income, we start from monthly net household income at the time of the interview as reported by the household head. However, if this self-reported monthly income falls short of the computed sum of all individual incomes reported in the personal interviews with household members plus the household-level income components, the aggregated income measure is used instead of the income screener. In the net income measure, taxes and social security contributions are by definition not included, whereas SA payments are included and thus of course have to be deducted. Whereas income allowances for employed persons[6] and for children[7] are quite well defined, we could only approximate further deductions for private insurance and transfers, again a decision that is at least partly at the discretion of the administrative agency. Thus, for robustness purposes, we derive a more restricted measure of allowable income, including only a standard set of well defined employment and child allowances, and a more comprehensive measure of allowable income that also includes approximations of further deductions.

4.4 Applying the Subsidiarity Rule – Wealth Check

In principle, any needs unit with an allowable income of less than its total needs is eligible for SA. However, according to the subsidiarity rule, further checks are necessary, controlling for whether the already demonstrated needs can be met by through other available resources. These checks consist of a screening of any kind of assets and properties, and of a check for whether there exist third persons that are responsible for (and able to) support the needs unit at hand. Again, these checks are highly at the discretion of the SA agency and therefore hard to simulate. For example, a car is, by law, considered property that has to be sold before being eligible for SA payments, unless there are clear reasons why the possession of a car is necessary, e.g. to keep a job or because of a disability. However, in practice, this rule often seems to be interpreted to the advantage of the claimant (Becker/Hauser 2005: 60). For this reason, the possession of a car should not be considered a sufficient indicator of non-eligibility, even in cases where no employed or disabled persons live in the household.

[6] Employment allowances amount to 25% to 50% of earnings, depending on total labour income. In case of disability these rates vary from 30% to 80%. A minimum allowance of 30€ is given to any employed person.

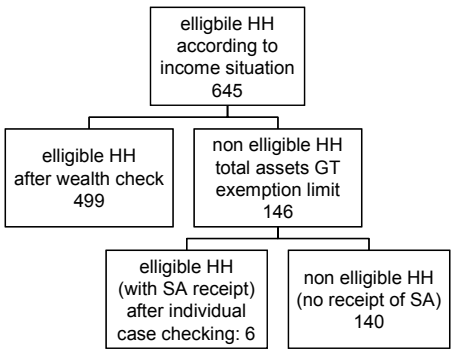
However, as previous studies have shown, a final wealth check seems crucial for the simulation model (see also above, section 3.1). For the survey year 2002, the SOEP contains personal information on different kinds of assets and real property that can be used to simulate a wealth check.[8] We first calculated the sum of all financial, tangible and business assets and the net worth of other properties owned (gross worth of other properties minus possible debt on other properties). If these assets exceed the allowed exempt amounts (e.g. €1279 for the household head), the household is considered ineligible for SA according to the wealth check. Furthermore, we separately calculated total assets in kind for owner-occupied housing and life insurance, for which more generous but not clearly defined thresholds exist. We apply a rather high threshold obtained by multiplying the household's exemption for financial and other assets by a factor of 20. In addition to direct personal wealth information, we also checked for income from capital, assuming that a household possesses financial assets above the exemption limit if it receives annual interest payments exceeding €250.

The reduction of the number of households simulated as eligible due to the wealth check is given in figure 4.2. We simulated 645 households as being eligible for SA considering only the income and needs situation. Of these households, 146 were found to possess financial and other assets above the exemption limits. However, among them are six households that actually report receiving SA. After carefully checking all relevant available information on these households in a case-wise procedure, we found that receipt of SA was in fact plausible from the personal characteristics and the kind of assets possessed (e.g. single-parent households, elderly women). In other words, after simulating an individual case management process by the SA agency, we reclassified those six households as being eligible for SA.

[7] Child allowances are granted only for single children up to 18 years of age and amount to 10.25€ for the first child and 20.50€ for each additional child (in 2002).

[8] Furthermore, the SOEP household questionnaire regularly contains information on incomes from capital, which can also be used as a proxy for financial assets (see e.g. Kayser/Frick 2001).

Figure 4-2:
Wealth Check



Source: SOEP 2002 (unweighted households)

4.5 Dealing with Missing Information – Editing and Imputation

In order to avoid losing observations and running into selectivity problems we imputed missing information whenever possible. For instance when calculating actual housing costs, we substituted missing information on heating costs for homeowners or missing information on actual rents for tenants by means of regression analysis (hot deck imputation). In cases of missing information on monthly net *household income*, we replaced this information by 1/12 of the household's annual post-government income variable (see Grabka 2007; Frick/Grabka 2005).

Most important, the available survey data may also lack information on the *receipt of SA*. In 16 cases (with as many as 56 individuals living in the households), we imputed information on the amount of SA received by households reporting that they do receive SA payments, again within a regression framework. The filter question of whether or not the households received SA at the time of interview does not, as such, contain item non-response, since it is asked within a series of questions focusing on the receipt of various public transfers. At the end of this block of the questionnaire, however, there is a control question whether the household did not receive any of the benefits asked for. If this control question was not answered, we may also lack information on the general receipt of SA. We did not impute this (possibly) lacking information, but we checked for the possibility in cases of households that were simulated as eligible on a case-by-case basis.

4.6 Identifying Non-Take-Up & "Beta Error"

With valid information on total needs, including housing costs, allowable income and wealth, the eligibility condition can be summed up as the intersection of those households with incomes below needs and wealth below the exemption limit:

$$\text{Elig=1, if } \left(\sum_{i=1}^{I} RN_i * (1 + AN_i) * T_k \right) + HC_j > AY_j \quad \cap \quad W_j < W_{\max} \qquad (3)$$

where, in addition to formula (2), AY denotes the allowable income of household *j*, W denotes total net worth of household *j* and W_{max} the according exemption limit.

Given the (simulated) eligibility, we can than cross-tabulate eligibility with (reported) SA receipt:

Table 4-3:
Cross-Tabulation of Eligibility and SA Receipt

	SA receipt	no SA receipt
eligible	*(1) take-up*	*(2) non-take-up*
ineligible	*(3) «beta error»*	*(4) ineligible*

From a perspective of benefit targeting, the diagonal cells (1) "take-up" and (4) "ineligible" households are not problematic. Households that do not report receipt of SA but are simulated as eligible constitute the group most interesting for this paper, i.e., (2) "non-take-up" households. Finally, we also find households that are simulated as not eligible for SA, but in fact do report receipt of SA. These households might be referred to as "over-consumption" of SA or as "misusing" the social security system. However, this interpretation is only valid if the strong assumption holds that our simulation of eligibility as well as the responses to the receipt of SA question are correct and, thus, that those households must have been underreporting their income to the SA agency in order to become eligible for SA. We do not believe that these strong conditions can be met by our simulation of eligibility and by the information available on SA receipt. On these grounds – to be elaborated in more detail below – we prefer to label those households as (4) "beta error" households.

What is problematic in applying the cross-classification of eligibility and SA receipt to our data is not only the uncertainty of the simulation model with respect to eligibility (given that information is somewhat incomplete and contaminated by measurement error), but also with

respect to the information on SA receipt. For the time of the interview, to which all other information refers, we only have information on the general receipt of some kind of SA within the household. In other words, we cannot distinguish between receipt of regular SA (HLU) and SA for special living conditions (HbL) for the time of interview. Data from the following panel wave (gathered in survey year 2003) contains more detailed retrospective information on the household receipt of regular SA (HLU), SA for special living conditions (HbL) and one-time supplements (or any combination thereof) during the calendar year 2002. Since this information is not at all available for dropouts between 2002 and 2003, and there might also be problems with changing household composition as well as recall errors, this data was not considered regularly in the classification algorithm. Rather, we assume that a general reporting of SA receipt for the time of interview does in fact indicate receipt of *regular* SA (HLU) at least for those households that are simulated as eligible.[9]

However, in cases of "beta error", i.e., households being simulated as ineligible although reporting receipt of SA, we consulted the detailed retrospective information on the types of SA benefit received, if at all available, and re-classified households as "ineligible" that solely reported the receipt of special SA (HbL). Furthermore, using additional information on SA receipt is only one of several checks that were performed in cases of beta errors. As already described above, we also corrected for "too restrictive" application of the wealth check (see section 4.4). Moreover, we also checked for too restrictive applications of the income testing, e.g., we corrected the eligibility simulation in cases of allowable incomes exceeding the needs threshold only by a small amount of up to €50. The same is done in cases of "beta error" households for which monthly net incomes were missing for the time of interview and imputed from yearly incomes.

[9] Note that in panel surveys, only individuals can be traced across time, whereas households might change or even dissolve. Thus, the use of retrospective information on SA receipt collected at the following wave of the panel is only possible for persons in stable households, i.e., those with unchanged composition in 2002 and 2003. In all other cases of persons leaving the household or new persons entering the household (except for newborn children), we cannot be sure that the information from the household questionnaire 2003 really applies to the situation of the reference person in 2002. Actually, more than 90% of the population lived in stable households from 2002 to 2003. Comparing actual receipt of SA with retrospective information yields rather little deviation, but the deviation is somewhat greater for households with unstable household composition. Almost all households that reported currently receiving SA in 2002 also did so retrospectively for 2002 – only for six persons with a changing household composition was the current report of SA in 2002 not "validated" by retrospective information. On the other hand, one-third of the persons that retrospectively reported receiving SA in 2002 did not report SA receipt at the time of interview in 2002. This might of course be due to temporary receipt of SA or intermittant SA receipt at the time of interview. However, this was true for more than 50% of all persons with unstable household compositions, and for only 30% of persons in stable households.

All these "post-simulation corrections" of beta error households are based on the general assumption that the occurrence of beta errors is mainly due to incomplete or incorrect survey information, rather than indicating that these households reported true incomes and assets to the SOEP but misreported their true incomes and assets to the SA agency. Households initially classified as "beta error" might in fact either simply be "ineligible" households, if the information on SA receipt was wrong, or "take-up" households, if the eligibility simulation was wrong due to incomplete or incorrect data on incomes and wealth.

Table 4.4 gives an overview of the corrections performed in cases of beta errors (upper panel). The sequence of these corrections is relevant since there are also cases with conflicting uncertainties, e.g., beta error households with only wealth exceeding the exemption limits (but income below needs) and retrospective information indicating that only SA for special living conditions was received. Thus, the order of the corrections follows the ranking of data quality, with the information most likely to contain measurement error corrected first.

Table 4-4:
"Post Simulation Corrections" of Beta Error and Non-Take-Up Households

corrections with respect to …	Description	new classification	no. of HH (persons) affected
1. imputed income	re-classification as eligible if income was imputed	"take up"	1 (1)
2. receipt of SA	re-classification as no SA receipt if only HbL mentioned in retrospective information (only stable households)	ineligible	3 (7)
3. wealth check	re-classified as eligible if income<needs (case-wise checking)	"take up"	6 (11)
4. income testing	re-classified as eligible if income only slightly above needs	"take up"	9 (21)
total number of corrected "beta error" households (persons)			*19 (40)*
5. "non-take-up"	"non-take-up" households in 2002 retrospectively reporting HLU receipt during 10-12 months of 2002 in the following panel wave 2003 (only stable households)	"take up"	19 (48)

Source: SOEP 2002 (unweighted)

As can be seen from the lower panel of Table 4.4, a final check with respect to the information on SA receipt was also performed in cases of non-take-up households. Making use of the retrospective SA information only in correcting for beta error would obviously produce a bias. In order to re-classify a non-take-up household as take-up household, a rather strong criterion of minimally 10 months receipt of regular SA in 2002 is applied. Thus, in these cases, classifying households as non-take-up would be misleading. Again, this correction is only performed for persons in stable households.

5 Descriptive Results: Non-Take-Up and Measurement Error

In the following section, we (1) present descriptive results on non-take-up rates for our "reference simulation model" and (2) investigate the variation in non-take-up rates according to various modifications of the simulation model. In the next step (3), we analyse the impact of potential measurement errors in our measures of income and needs by applying flat rates of variation as well as random errors.

5.1 Results for the "Reference Simulation Model"

The resulting figures for our "reference simulation model" are shown in Table 5-1. The reference simulation model is characterised by housing costs incurred up to the estimated maximum threshold, considering the maximum information available on income deductions and also performing a wealth test. Also, the reference model includes the aforementioned corrections. We believe that this model is appropriate to our data, that is, it can be interpreted as a "best guess". However, in order to provide sensitivity analyses for the decisions underlying the reference model, we present estimates of non-take-up rates also based on a series of variations of the simulation model in the next section.

Table 5-1:
Descriptive Results ("Reference Simulation Model")

		n (observed)	N (weighted) in 1.000	in % of total HH
1.	Total number of private households	12,584	38,720	100.00
2.	Eligible for HLU	515	2,187	5.65
3.	thereof: with HLU receipt	189	719	1.86
4.	without HLU receipt	326	1,468	3.79
5.	HLU receipt although not eligible ("beta error")	36	104	0.27
→	**Non-Take-Up Rate (4. / (3.+4.)): 67.1%**	**confidence interval: 63.3% - 73.2%**		
→	**Beta Error Rate (5. / (3.+5.)): 12.6%**	**confidence interval: 9.6% - 14.7%**		

Note: 93%-Confidence intervals are calculated on the basis of a random-group approach (see Rendtel et al. 1995).
Source: SOEP 2002

The rate of non-take-up of SA is defined by the ratio of all eligible households that do not report receipt of SA and the total number of eligible households (take-up and non-take-up households together). The estimated rate of non-take-up of SA in Germany for the year 2002 amounts to as much as 67%. In addition to the point estimate, we also computed confidence intervals ranging from 63% to 73%. Compared to previous studies, this figure is located at the

upper bound of estimates of non-take-up in Germany (see section 3.1). This seems quite surprising given that the simulation model applied here includes a detailed wealth test, which should yield significantly lower non-take-up rates. The general expectation with regard to trends in non-take-up would, if anything, point towards a declining trend in non-take-up.[10]

The point estimate for the beta-error rate, defined as the ratio of ineligible households that report receiving SA and all eligible households, is quite low in our reference model, amounting to 12.6% within a confidence interval ranging from 10% to 15%. Although the beta-error rate should be regarded as an important and sensitive indicator for the quality and fit of the simulation model, so far it has rarely been reported separately, and even less frequently discussed in depth (see e.g. Becker/Hauser 2005: 70 and 101ff.).

Table 5-2 shows the high degree of accordance of needs, housing costs and income in our SOEP-based simulation with the "true" information available from the official statistics. For SOEP-households that we simulated as eligible and that reported SA take-up ("Take-Up"), the simulated needs match the official information perfectly, while housing costs appear to be slightly overestimated. Allowable incomes, on average, are very close resulting in simulated entitlements of €464 which is about €50 higher than the corresponding reference measure. Unsurprisingly, eligible households without take-up ("Non-Take-Up") on average show slightly less needs (and housing costs) than those who do take up SA, while allowable incomes are significantly higher, resulting in accordingly smaller entitlements.[11]

Finally, the group of "Beta Error" households exhibits by far the highest needs of all groups on average. At the same time, this group's income is much higher than that of all households simulated as eligible. This may point to the aforementioned problem of correctly identifying needs units within households. The combination of high needs and high allowable income gives some indication for beta error households often comprising several needs units. On the one hand, high needs at the household level may reflect that there are several needs units within the household, some of them being in severe need and consequently taking up SA. On the other hand, the high household income may result from a relatively "rich" needs unit liv-

[10] Moreover, first simulation models of non-take-up of SA for the preceding and subsequent years 2001 and 2003 also show a high and rather stable level of non-take-up.

[11] Despite the quality of the simulation of needs and income at the micro level, there is a clear under-reporting of the overall share of SA recipients based on SOEP as compared to official statistics (see also Table 4.1 above).

ing in that very same household, rendering the household as a whole ineligible for the simulation process.[12]

Table 5-2:
Amounts of Needs and Incomes (SOEP vs. Official Statistics)

	(1) Needs	(2) Housing Costs	(3) Allowable Incomes	(4) Entitlement Amount [=(1)+(2)-(3)]	n (weighted)
	averaged amount per household, in €				
Simulated households (SOEP)					
Ineligible	533	277	2240	-1403	36 728 912
Beta Error	767	344	1677	-543	104 739
Non-Take-Up	528	363	702	218	1 476 205
Take-Up	**578**	**370**	**494**	**464**	723 506
Official Statistics: regular SA					
Needs Units (All)	549	293	446	396	1 442 753
Needs Units with Head of Household	**573**	**313**	**473**	**413**	1 256 385

Source: SOEP 2002; StaBuA 2003, Tab. A.2.6.1

5.2 How to Evaluate the Quality of Simulation Models? – Variations of the "Reference Simulation Model"

Unless external data are available, it seems difficult to evaluate the quality of a given simulation model. However, the beta error rate may serve as an indicator of the quality of the simulation model, at least in combination with the corresponding variation in non-take-up rates. In principle, large beta errors may be seen as indication for the simulation model being too "restrictive", whereas high rates of non-take-up may indicate the opposite result of a too "generous" simulation of eligibility, at least if compared to lower non-take-up rates resulting from other simulation models. Thus, considering the *joint* variation in both beta error rates and non-take-up rates across several modifications of the simulation model provides us with a baseline for evaluating the quality of a given simulation model.

Table 5.3 presents comparative results for a number of variations in the reference simulation model (no. 9) in order to analyse the impact of the decisions underlying the reference simulation model on the estimated non-take-up rates. As already mentioned in Section 4 above, the

[12] A closer investigation of the number of potential needs units within SOEP households showed that beta error households comprise more than one needs unit in at least 30% of all cases, whereas this rate is about 10% for all households (confirming the results reported by Becker/Hauser 2005: 243ff. based on EVS data), but particularly lower (4%) for households simulated as eligible and reporting SA receipt. However, it is not possible to properly allocate the information on SA receipt as well as on income to the various needs units given that this information is only available at the aggregated level of the surveyed household (due to the fact that SA receipt and household income are surveyed in the household questionnaire to be filled in by the head).

most important and problematic decisions to be made concern housing costs, the wealth check and the definition of allowable incomes. As already discussed in section 3.4, there are three alternatives for dealing with housing costs, whereas the alternative for the reference model (incurring housing costs up to the estimated maximum threshold) lies in between the two extreme alternatives of incurring all housing costs and excluding households with housing costs exceeding the maximum eligibility threshold. With respect to the definition of allowable incomes, we had to decide between considering only the standard set of income deductions or to also include approximated additional deductions. For our reference model, we opted for the full deductions, and we also decided to simulate a wealth test instead of ignoring it.

Table 5-3:
Variations of Simulation Models

No.	Housing costs	Wealth check	Allowable incomes	--- before corrections ---		--- after corrections ---	
				Non-take up	Beta error	Non-take up	Beta error
1.	all conceded	no	restricted deduct.	0.778	0.190	0.751	0.138
2.	conceded up to maximum	no	restricted deduct.	0.759	0.192	0.730	0.138
3.	Ineligible if HC>maximum	no	restricted deduct.	0.742	0.356	0.665	0.140
4.	conceded up to maximum	yes	restricted deduct.	0.709	0.237	0.662	0.139
5.	Ineligible if HC>maximum	yes	restricted deduct.	0.678	0.380	0.581	0.140
6.	all conceded	no	full deductions	0.788	0.189	0.759	0.126
7.	conceded up to maximum	no	full deductions	0.770	0.191	0.738	0.126
8.	Ineligible if HC>maximum	no	full deductions	0.754	0.355	0.676	0.128
9.	conceded up to maximum	yes	full deductions	0.721	0.236	0.671	0.126
10.	Ineligible if HC>maximum	yes	full deductions	0.693	0.378	0.594	0.128

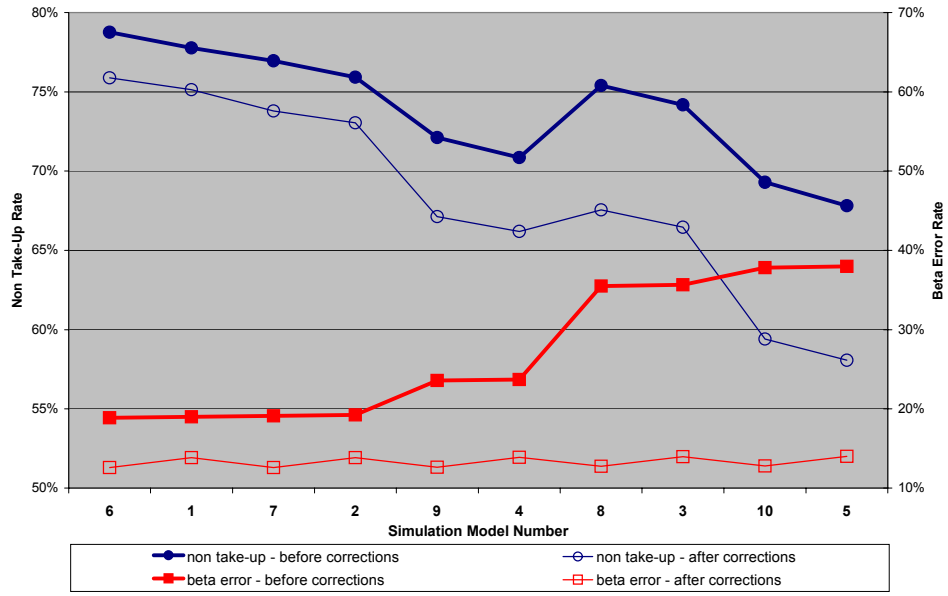
Source: SOEP 2002

The resulting non-take-up and beta error rates for the various modifications of the simulation model are shown before and after the "post-simulation corrections" as described in section 4.6. Of course, after correcting for beta errors, they become very similar across the various modifications of the simulation models. The only remaining source of variation comes from the definition of allowable income.

The results in Table 5-3 are also shown in graphical form in Figure 5-4, where the simulation models are ordered according to the incidence of beta errors. As can be seen, the four models with the lowest beta error rates also show by far the highest non-take-up rates, in particular after corrections. Thus, it can be argued that these four simulation models overestimate needs and/or underestimate the economic resources of the households. Not surprisingly, these models (no. 6, 1, 7 and 2) do not entail the wealth check and deal rather generously with high housing costs. For models 9 and 4, we observe a slight increase in beta error rates, but a considerable decline in non-take-up rates. Most important, the remaining models, if compared to

models 9 and 4, show a strong increase in the beta error rates, although the non-take-up rates even increase in models 8 and 3, and only slightly decrease in models 10 and 5. In other words, models 8, 3, 10 and 5 appear not only restrictive but misleading in defining eligibility, since the increase in the beta error rates – indicating restrictive simulations – are not accompanied by the corresponding decrease in non-take-up rates that we would have expected from the general trade-off between beta error rates and non-take-up rates. This is due to the common feature of these four models in excluding households with housing costs exceeding the maximum thresholds from eligibility.

Figure 5-4:
Non-Take-Up and Beta Error Rates for Various Simulation Models



Source: SOEP 2002

This pattern provides a solid guideline to "internally" evaluate the quality of the simulation models, at least compared to each other. Models 9 and 4 seem to perform best, given that beta error rates as well as non-take-up rates are still quite low. In greater detail, simulation models assuming housing costs to be incurred up to the maximum thresholds perform better than models considering total housing costs as needs as well as those models rejecting eligibility if housing costs exceed maximum thresholds. Last but not least – and unsurprisingly – all simulation models that include a simulated wealth check perform better than those without.

With respect to the definition of allowable income, differences between simulation models with restrictive vs. generous income allowances seem only to be modest, and in line with the expected trade-off between beta-error and non-take-up rates. The final decision for model 9 as

the reference simulation model is mainly based on the result of lower beta errors after the post-simulation corrections.

Furthermore, what we have learned about the effects of the post simulation corrections is, first, that differences in beta-error rates across simulation models are completely cancelled out, with the only exception of persistent, but rather small differences due to the definition of allowable income. However, this difference is now slightly larger than it was prior to these corrections. Second, the differences in non-take-up rates across models are now even more marked, with the surprising exception of diminishing differences between models 9 and 8.

5.3 Measurement Error in Income and Needs

Rates of non-take-up vary considerably according to the specification of the simulation model and the extent of post-simulation corrections. The final corrections already attempt to capture measurement errors, especially with respect to wealth, income and the receipt of SA. In this section, the impact of measurement error in income and needs will be addressed in more detail.

In a first step, the impact of flat-rate variations in the measures of income, needs and housing costs is analysed. Thus, assuming that income as well as housing costs and needs are generally measured too high or too low in terms of a certain rate of deviation from the "true" income, we calculate the impact of these deviations on non-take-up rates and beta error rates. The observed needs and income are assumed to represent "true" needs and income, respectively, in this counterfactual exercise.

Results reported in Table 5.5 show that non-take-up rates as well as beta error rates are less sensitive to measurement errors in housing costs and most sensitive to variations in income. Thus, potential measurement errors in income measures will have the strongest impact on the estimated rates. This is important since measurements errors are at the same time most likely to occur in income measures, rather than in measures of needs, which appear to be rather straightforward to simulate. However, housing costs, which are also highly affected by measurement problems, will not cause serious problems in the estimation of non-take-up.

Furthermore, the impact of measurement errors on non-take-up rates is almost the same for initial simulation results as well as for corrected results. In other words, the corrections employed after the simulation process do not already correct for measurement error. However,

for beta error rates, we find that the corrections also affect the sensitivity to measurement error. Variations in the underlying measures have a stronger impact on the corrected results of beta errors than on initial results.

Table 5-5:
Non-Take-Up and Beta Error Rates for Flat Variations in Needs and Incomes

			-15%	-5%	Ref	+5%	+15%	range
Non-take-up Rates	before corrections	Needs	0.662	0.701	0.721	0.736	0.765	0.103
		Housing	0.683	0.713	0.721	0.729	0.743	0.060
		Income (-)	0.624	0.688	0.721	0.754	0.801	0.177
	after corrections	Needs	0.614	0.662	0.671	0.689	0.719	0.106
		Housing	0.636	0.669	0.671	0.682	0.696	0.060
		Income (-)	0.580	0.647	0.671	0.707	0.761	0.180
Beta-Error Rates	before corrections	Needs	0.276	0.236	0.236	0.224	0.195	0.081
		Housing	0.254	0.236	0.236	0.226	0.212	0.042
		Income (-)	0.281	0.256	0.236	0.212	0.168	0.113
	after corrections	Needs	0.190	0.166	0.126	0.116	0.087	0.103
		Housing	0.167	0.142	0.126	0.122	0.113	0.054
		Income (-)	0.219	0.180	0.126	0.106	0.060	0.159

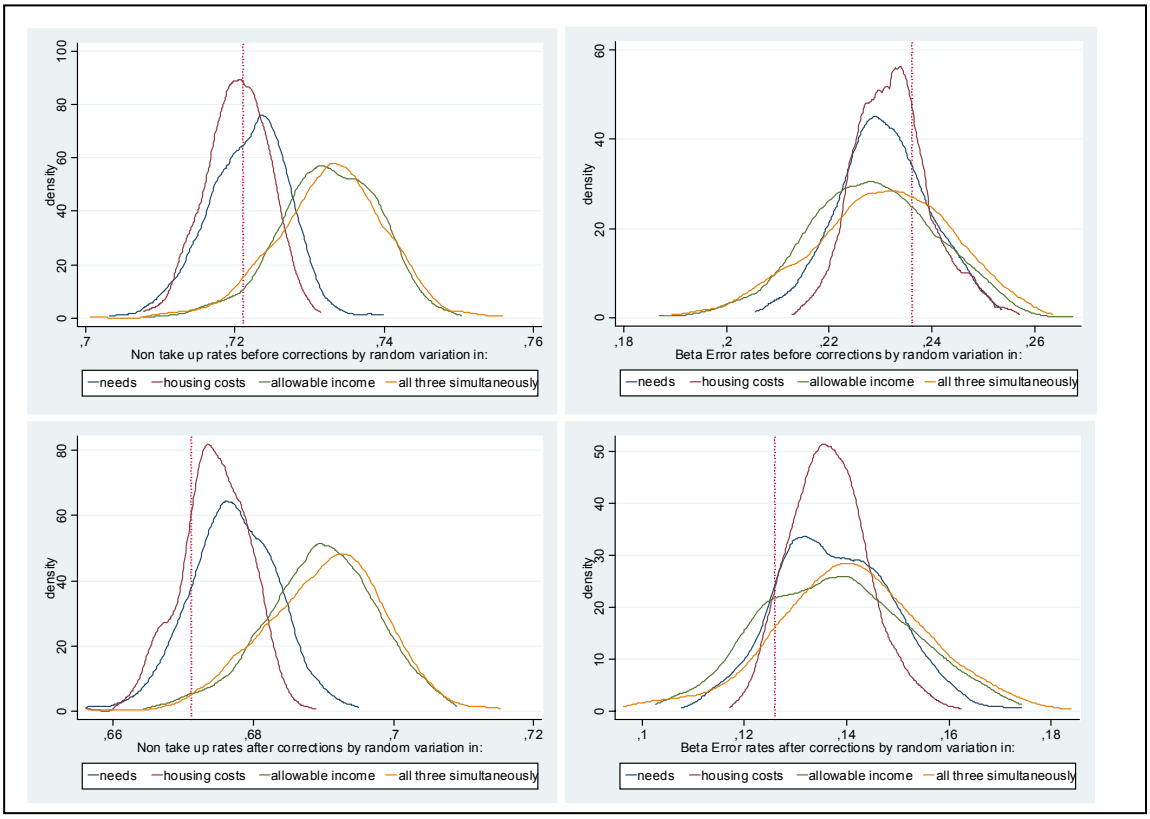
Source: SOEP 2002

In a next step, we assume random or "classical" measurement error. Again, taking the observed measures as "true" measures, we now apply a random variation to our measures of needs, housing costs and income separately, and also to all three components simultaneously, but assuming independent errors. The error is specified by means of a deviation factor of the "true" measure that is normally distributed with mean zero and standard deviation 0.1. We draw 500 random errors for each of the three measures and also 500 sets of independent errors for the three components simultaneously. The resulting distributions of non-take-up rates and corresponding beta error rates – again, before and after the post-simulation corrections – are shown in graphical form in figures 5.6a-d.

Again, a clear picture appears with respect to the different degree of sensitivity of non-take-up rates to measures of needs, housing costs and income. Whereas a random variation in housing costs does not affect the resulting level of non-take-up rates much, the variation in incomes shows a strong impact. Most striking is the result that the non-take-up rates based on erroneous income measures are substantially higher than non-take-up rates based on "true" incomes. This can be explained by two factors, one rooted in the nature of the applied error, and one rooted in the income distribution. Given that we apply an error term as a percentage deviation from true incomes, the absolute amount of this error will be larger for higher incomes and smaller for lower incomes. Subtracting 10% from an income of, say, 1000 yields an income of

900, whereas adding 10% to an income of 900 yields 990. In other words, even if income was equally distributed around the needs threshold, we would be making more households eligible than ineligible. In fact, the second main reason for the observed result is that income is in fact not equally distributed around the needs thresholds. There are more households just above the needs threshold than there are just below it. This also reinforces the outcome that, after applying the random error, more households will become eligible than the other way around, resulting in a sharp increase in eligibility and, subsequently, in non-take-up rates (given that the majority of these households do not report SA receipt).

Figure 5-6:
Non-Take-Up and Beta Error Rates Assuming Random Error



Source: SOEP 2002. Dotted constants indicate the according results of the "reference" model, based on observed values.

To sum up, the Monte-Carlo like simulations of the effects of random error on estimated non-take-up rates clearly shows that classical measurement error results in an overestimation of non-take-up as well as beta error rates. Thus, even if we had a perfect simulation model of eligibility, measurement error in our data would result in biased estimates of non-take-up. The open question remains whether and how one should correct for this bias in estimating non-take-up of social benefits.

6 Correlates of Non-Take-Up of SA: Regression Analyses

Given that non-take-up of SA seems to be widespread among the population that – according to our simulation – is eligible for SA, it is of utmost importance to identify observable characteristics that are related to the claiming behaviour, and whether it is possible to detect the mechanisms driving the non-take-up decision. When non-take-up of SA was first addressed in Germany in the early 1980s, most researchers related this phenomenon to the elderly, especially elderly women, and argued that the main causes for non-take-up were shame and fear of stigmatisation as well as informational deficits about their eligibility and the fear of relatives being made responsible for financial support.

Recent research on non-take-up paints a somewhat different picture. These studies have highlighted the fact that most non-take-up households are entitled to claim rather small amounts, which might not be sufficient to compensate for the costs of claiming in the eyes of many households. Turning to a dynamic perspective, this should be the case particularly for those who expect their economic situation to improve in the very near future. This kind of "rational" non-take-up behaviour may already explain the lion's share of non-take-up and may be seen as less severe a problem from a social policy perspective in contrast to prior explanations of this behaviour as being driven mainly by fear, stigma and ignorance. On the other hand, the recent literature has also stressed the relevance of factors at the level of social administration such as insufficient information policies and humiliating treatment of clients, and barriers to take-up inherent to the scheme itself, such as its complexity and intimacy. If this were the case, it would again move the responsibilities for large non-take-up rates to the institutional area, i.e., social policy. Of course, such barriers to take-up the level of social administration and benefit schemes are hard to identify at the micro level of individual households.

Furthermore, in recent times, social policy has emphasized the responsibility of individuals to attain independence from social transfers and has attempted to strengthen their capacity for self-sufficiency by promoting labour force participation and workfare policies. The underlying assumption is often that recipients of SA and other social benefits tend to rely on SA rather than looking for work.

In this section we try to address the issue of the potential determinants of non-take-up of SA by means of multivariate analysis. We start from a rather simple specification of non-take-up employing a set of covariates that serve as proxies for the utility derived from SA and the

costs of claiming it before extending this model by introducing aggregated information on SA receipt at the regional level, on the one hand, and by controlling for selection into the stage of eligibility by means of a Heckman selection model (Heckman 1979).

6.1 Model Specification: Approximating Needs and Costs of Claiming SA

Building on the existing literature, we estimate a simple probability model of non-take-up of SA as a starting point for our multivariate regression analysis (see formula 1, page 12). As independent variables, we include a set of proxy variables aiming to capture the utility from claiming, which depends on the amount of the expected benefit as a function of the degree of needs and the expected duration of staying in need. A second set of variables serves as proxy information for all kinds of costs related to claiming benefits, such as informational costs, stigma costs, or barriers arising from negative attitudes towards social security benefits. In a second step, we extend this simple probability model in two ways. First, we address the potential selectivity of being eligible and claiming for SA due to low motivation to work by means of a Heckman selection model. Second, we also include external aggregated information on the population share of SA recipients at the regional level[13] as an independent variable in order to capture at least some of the relevant processes at the level of the SA agency. Above and beyond this institutional control issue, one may also argue that stigmatisation poses less of a problem for an individual in a given community if there is an above-average level of SA receipt there. In other words, "it is easier for me to claim SA if there are more people around me also claiming SA".

Table 6.1 gives an overview on the right-hand side variables used in the regression models as proxies on utility and costs of claiming (see also Becker/Hauser 2005: 146 and Riphahn 2001: 392f.). The utility from claiming SA is represented in our model by the amount of SA that a household is eligible for according to our simulation. Given that the total amount of SA will be different in value for households of different sizes, we normalize this information for use as a RHS-variable by means of division of this simulated entitlement by the overall "need". This variable is referred to as a "relative poverty gap" (interpreting the needs threshold as a poverty line) and by definition, it ranges from 0 to 100 percent.

[13] Information is given as the share of the population receiving HLU in the county the household resides in (StaBuA: Statistik regional. Ausgabe, 2006).

Table 6-1:
Proxies of Utility and Costs of Claiming and their Assumed Relationship

	Utility from SA:		Claiming Costs:	
	degree of needs	duration of needs	information costs	stigma costs
Relative poverty gap (continuous)	+			
Single parents (Ref: hh w/o children)	+	+	-	-
Family with children (Ref: hh w/o children)	+			+
Number of children (cont.)	+	+		
Person in need of care in HH	+	+		
Disability of household head	+	+	-	-
Young household (Ref: middle age HH)		-		-
Pensioner household (Ref: middle age HH)		+	+	+
High education (Ref: intermediate education)		-	-	
Low education (Ref: intermediate education)		+	+	
Sex of household head (male)				+
Migration background (household head)			+	+
Rural area (Ref: intermediate area)	-		+	+
Metropolitan area (Ref: intermediate area)			-	-
East Germany			+	
Negative attitudes towards social security	-			+

Besides the utility expressed in monetary terms, a set of additional variables indicates the urgency and degree of need as well as its expected duration. We assume that single parents and households with children or persons in need of care are in more urgent need of help than other households, given that there are "dependent" persons within the household for whom the head of household is responsible. Households headed by a disabled person are also assumed to be in greater need. All these variables also indicate a longer duration of need and thus eligibility for SA, since the presence of dependent persons in the household as well as disability of the household head will lower labour market chances and participation. The stability of the living conditions (and thus eligibility) is also assumed to depend on the current stage of the family cycle as well as on educational level of the household head. We expect that "young" households face higher instabilities in their living conditions, so that claiming SA might not pay off in a long-term perspective, whereas the opposite is true for pensioner households. Labour market chances are also approximated based on the education level of the household head.

Indeed, some of the aforementioned variables may serve not only as proxies of needs, but for claiming costs as well. In some cases, this will even strengthen the expected overall impact on non-take-up behaviour, but in others, both effects may point in very different directions, so that the overall effect on non-take-up behaviour becomes difficult to hypothesise. For single parents and for disability of the household head, we assume that both information costs and

stigma costs are lower, given that those households are commonly regarded as relying on outside support. In contrast, for families with children, we assume higher stigma costs due to social norms of self-sufficiency and parents' responsibility for the economic security of their offspring. As such, one can assume that the net effect is rather small given that higher needs induced by the children on the one hand and higher costs of claiming (due to stigma) on the other hand might cancel out each other. However, with the number of children rising, the additional needs will exceed the effect of stigma costs.

Contradicting effects on needs versus costs can also be expected with respect to education and age of the household head. Low-educated household heads might expect longer durations of needs, but at the same time information costs are higher, whereas more highly educated household heads will find it easy to apply for SA, but at the same time might also expect to increase labour income in the near future, thus experiencing only a short episode of SA dependency. Households with young heads, which often face rapid changes in their living conditions, will also face lower stigma costs in a situation of need, given the transitory stage within the life course or family cycle. On the other hand, for the elderly, previous studies have frequently reported high non-take-up rates mostly due to ignorance, fears and stigma aversion. However, one can expect these effects to level off with longer-lasting periods of eligibility.

A final set of covariates is used to approximate information and stigma costs only. These are assumed to be higher for male household heads (social norms), for immigrants (ignorance and fear of stigmatisation), households living in small towns or rural areas (higher social control) and for household heads that report negative attitudes towards social security. Moreover, households living in rural areas might also rely on home production (e.g., growing fruits and vegetables on their plot) and mobilise social networks in situation of needs, lowering the utility from claiming SA. This might also be the case for household heads with strongly negative attitudes toward the welfare state's social security system.[14]

6.2 Estimation Results: Simple Probit Model

Estimation results for the simple probit model – together with those of the other two models – are reported in Table 6.2. The simple probit model (1) is based on the population of all households deemed eligible for SA in our simulation (n=515) and the dependent variable is "non-

take-up" of SA. The estimation contains the aforementioned variables as proxies for needs and or costs of claiming. We find highly significant effects for several needs indicators. First of all, relative poverty has a strongly negative impact on non-take-up of SA. Households with needs of nearly 100 percent of their respective needs threshold (or "poverty line"), e.g. for households without own income, the estimated probability of non-take-up is only 90 percent of the level for households with a relative poverty gap of nearly zero percent, e.g. households that are just below their needs threshold (see the column with "marginal effects" for model 1). Moreover, we find highly significant effects for our measures of the degree and expected duration of need. Households or needs units with a disabled household head, those with persons in need of care, as well as those with two or more children all show a lower non-take-up rate. Although the main effect for families with children is positive and significant, the results controlling for the number of children living in the household indicate that each additional child reduces the probability of non-take-up by about 17 percent. After controlling for the effect of children, we still find an additional negative effect for single parents, although it is not statistically significant.

We find no significant effects for the household head's age or educational level. As laid out above, we expect this finding to result from contradicting effects on the expected duration of the need situation and on stigma and application costs, so that significant net effects in either direction are less likely. With respect to the magnitude of the estimated effects, we find a positive tendency for pensioners as well as for low-educated household heads to take up SA. This might be interpreted in terms of the expected longer durations of needs paying off the assumed higher information and application costs. However, especially with regard to the pensioners, it may also indicate that stigma costs have decreased somewhat in the past decades, compared to what the literature tells us about the fears and barriers of the elderly in claiming SA.

While the estimated effects for the "needs" proxies by and large confirm our hypothesis, the estimation results for our cost proxies perform rather differently. The only statistically significant effect we find is the expected negative effect for living in a metropolitan area. All other effects are basically close to zero. Although not significant, the effect for living in a small community is also negative, as is the effect for living in East Germany. Based on previous

[14] This variable combines responses on two questions about whether the state or private forces should be re-

studies, we expected positive effects due to higher stigma and higher information costs, respectively. However, our findings suggest that for East Germany, the original "GDR" effect may have run out, i.e., East Germans may by now understand the (West German) SA system very well. Above and beyond this interpretation, one should also keep in mind that the underlying (eligible) population has changed due to selective migration from East to West Germany since unification. Finally, in light of all the other controls, the variable indicating negative attitudes towards social security shows no relevant effect at all on non-take-up behaviour.

Table 6-2:
Estimation Results: Correlates of Non-Take-Up of SA

	Model 1: Simple Probit non-take-up			**Model 2**: Extended Probit non-take-up			**Model 3**: Heckman Selection non-take-up		eligibility	
Characteristics of HH (Head)	beta	SE	mfx	beta	SE	mfx	beta	SE	beta	SE
relative poverty gap (cont.)	**-0,026***	0,003	-0,009	**-0,023***	0,003	-0,008	**-0,021 ***	0,004		
single parents (Ref: hh w/o children)	-0,205	0,217	-0,076	-0,240	0,216	-0,088	0,016	0,254	0,644 ***	0,090
family with children (Ref: hh w/o children)	**0,589**	0,268	0,195	**0,551**	0,269	0,179	0,414	0,274	-0,226 **	0,108
no. of children (cont.)	**-0,451***	0,093	-0,165	**-0,467***	0,102	-0,168	**-0,328**	0,129	0,304 ***	0,042
person in need of care in hh	**-0,765**	0,313	-0,297	**-0,599**	0,311	-0,231	-0,478	0,299	0,089	0,123
disability	**-0,393**	0,202	-0,150	-0,312	0,201	-0,117	-0,238	0,198	0,096	0,078
young household (Ref: adult hh)	-0,052	0,213	-0,019	0,045	0,205	0,016	0,221	0,226	0,495 ***	0,101
pensioner household (Ref: adult hh)	-0,310	0,199	-0,117	**-1,312***	0,358	-0,488	**-0,972**	0,408	0,438 ***	0,086
high education (Ref: intermediate)	-0,157	0,150	-0,058	-0,119	0,141	-0,043	0,038	0,168	0,377 ***	0,065
low education (Ref: intermediate)	-0,350	0,263	-0,134	-0,380	0,317	-0,144	**-0,525**	0,261	-0,236 ***	0,091
male	0,054	0,162	0,020	0,033	0,151	0,012	-0,035	0,157	-0,147 **	0,058
migration background	-0,001	0,160	-0,001	0,013	0,160	0,005	0,247	0,191	0,584 ***	0,065
rural area (Ref: intermediate area)	-0,124	0,197	-0,046	-0,293	0,232	-0,109	**-0,360**	0,195	-0,271 ***	0,079
metropolitan area (Ref: intermediate area)	**-0,413**	0,171	-0,157	-0,058	0,214	-0,021	-0,034	0,197	0,050	0,086
East Germany	-0,219	0,175	-0,082	-0,149	0,171	-0,055	-0,101	0,174	0,091	0,071
negative attitudes towards social security	-0,093	0,260	-0,034	-0,050	0,289	-0,018	-0,017	0,247	0,043	0,103
part-time working (Ref: fulltime working)				**-0,805**	0,356	-0,306	-0,259	0,451	1,085 ***	0,090
unemployed (ILO) (Ref: fulltime working)				**-1,155***	0,345	-0,433	-0,375	0,561	1,652 ***	0,095
not working (Ref: fulltime working)				**-1,326***	0,329	-0,487	-0,597	0,539	1,471 ***	0,086
self employed (Ref: fulltime working)				-0,644	0,579	-0,249	-0,471	0,525	0,381 ***	0,136
second job				0,347	0,419	0,113	0,137	0,389	-0,451 ***	0,145
regional SA ratio				**-0,127***	0,043	-0,046	**-0,102**	0,043	0,036 **	0,016
PC without internet (Ref: no PC)									-0,293 ***	0,073
PC with internet (Ref: no PC)									-0,695 ***	0,077
Constant	**1,811***	0,205		**3,146***	0,375		1,401	1,123	-2,529 ***	0,104
Observations	515			515			12548			
Pseudo R-squared	0,252			0,304						
rho (LR-Test rho=0)							rho=0,503		p=0,128	

Source: SOEP 2002

6.3 Extending the Simple Probit Model

By and large, the results of the simple probit model confirm the results of previous studies on the correlates of non-take-up. In the following, we add to the existing literature by extending the simple probit model. On the one hand, we seek to further examine the role of information

sponsible for the provision of social security for families and for the unemployed.

and stigma costs by means of introducing regional information on the share of SA recipients. Regional concentration of SA recipients of course also indicates lower income chances and higher degrees of need at an aggregated level. Indeed, given that we measure the needs situation of the households at the micro level of individual households quite well, the introduction of this variable should have a particular impact on the effects of our stigma and information cost measures. We assume that a higher dispersion of SA receipt among the regional population will lower the stigma as well as information costs for any individual household in this region. Thus, we expect that the effect of community size will diminish once regional SA ratios are controlled for.

Assessing the estimation results for model 2, we find – as expected – that considering information about local SA receipt reduces the effect of living in a metropolitan area. The effect is now close to zero, whereas a strong effect is found for the regional SA ratio. An increase in the SA ratio of about two percentage points yields a decrease of the non-take-up probability of about 10 percent. For all other variables, we do not find any relevant change due to the introduction of regional SA ratios.

Most important, model 2 also includes information on current employment status of the household head.[15] So far, the regression models ignored the discussion about work incentives and social benefits that have motivated workfare reforms in many European and non-European countries. The underlying assumption of many of these reforms is that households may refrain from searching for (low-paid) jobs and rely on social benefits instead. Consequently, take-up households will differ from non-take-up household with respect to labour force participation: i.e., take-up households should show stronger orientation towards work. This is in fact what we find by entering employment status in the regression model. The effect of pensioner households now becomes strongly significant, because the reference category changes to fulltime employment rather than the middle age cohorts.

Of course, the strong and significant effect of employment status might also operate through its impact on the expected utility and the costs of claiming, rather than reflecting solely the impact of work orientations. At the same time, employment status is also an important predictor for becoming eligible for SA, e.g., in the case of long-term unemployment once the person

[15] We have also run separate models including either regional SA ratios or employment status. The changes that each of these variables caused in the effects of the remaining variables did not overlap, so for reasons of efficiency we present only one model introducing both variables at the same time.

is no longer eligible for benefits from the upstream unemployment insurance system. More generally, in assessing non-take-up behaviour conditional on eligibility we effectively select on the impact of the same set of variables. For this reason, in model (3) we apply a Heckman type selection model based on the full sample (n=12,548 households) and the full set of explanatory variables.[16] Most of the variables included show a strong and significant effect on the sample selection into eligibility, although the overall correlation between the error terms of both equations (rho) just falls short of significance. Controlling for sample selection, we find substantial changes in the coefficients of the variables as compared to the previous estimations. We observe a weakening in the effects of some of the proxy variables of the expected utility from claiming SA (family, children, disability and care), whereas other variables turn to show a significant impact: Low education and living in a rural area now show significant negative effects on non-take-up, while younger households and those with a migration background now show the expected positive impact on non-take-up, although coefficients are not significant. Most strikingly, the effects on employment status lose significance, although the coefficients are still large in size. Thus, after controlling for the fact that all eligible households share an employment profile different from ineligible households, the net effect of, e.g., unemployment is substantially smaller than before.[17] Last but not least, households living in regions with high SA receipt are found to be significantly more likely to claim SA, as this is what they see around them. At the same time these households also show a higher risk of being eligible for SA due to the weak economic environment.

7 Concluding Remarks

In this paper we estimate the degree of non-take-up of SA in Germany in 2002, and analyse potential determinants of non-take-up behaviour. We find non-take-up of SA to be extremely widespread, with a rate of 67% of all (simulated) eligible households not receiving SA according to self-reported information in the underlying survey data of the German SOEP.

[16] To identify the selection process, we added two variables indicating the access to a personal computer and Internet. The variable “relative poverty gap” was dropped, of course, from the selection equation because it perfectly predicts eligibility.

[17] Of course, this still may not account properly for potential endogeneity problems. For example, if an unemployed household head chooses to refrain from working (e.g., in a low-paid job) and prefers instead to claim SA, the impact of unemployment on non-take-up will be overestimated. See Wilde/Kubis 2005 for an alternative approach by simultaneously estimating labour force participation and take-up behaviour.

Compared to previous studies, it seems like non-take-up of SA has increased in recent times in line with the overall increase in poverty and SA receipt in Germany since the mid 1970s. However, consistent time series analyses on non-take-up of SA are not available for Germany, and thus any inference on trends remain uncertain due to comparability problems across different studies.

Concerning the simulation of eligibility and the identification of non-take-up households, emphasis is given to the role of measurement error. We show how the rate of "beta errors" – e.g., households reporting SA receipt although being simulated as not eligible – may be used as an internal indicator for the quality of the simulation model, and how much the modification of several parameters of the simulation model affects estimated non-take-up rates. In addition to the important impact of considering a wealth test in the simulation process, also the way in which housing costs are considered plays a crucial role. Moreover, in identifying non-take-up households based on the eligibility criterion derived from our simulation, the information on actual SA receipt given by respondents is another source of potential misclassification.

Clear evidence can be provided with respect to the important role of measurement error in the survey information on income, housing costs, and needs. As expected, measurement errors in income are most important, clearly dominating the overall effects of simultaneous measurement errors in all relevant survey information. In principle, the effect of an assumed random error in income on the estimated non-take-up rates is an overestimation of non-take-up. This result is mainly driven by the fact that introducing *randomly* distributed measurement errors in the lower part of the income distribution – thus around the eligibility threshold – will push more households below the eligibility thresholds than the other way around, given the skewed distributional form at the lower tail of the income distribution and the fact that a proportional error factor results in larger total amounts of the error in the upper parts of the distribution. However, unless we lack exact information on the distribution of measurement errors in the lower part of the income distribution, we should be cautious in interpreting the results that were obtained from applying simply random or "classical" measurement errors.

Regression analysis on non-take-up confirms the results of previous studies and our expectations about the relevance of the expected utility of claiming SA as well as the information and stigma costs associated with this process. We find clear evidence that non-take-up of SA is higher for lower degrees of need and in case of more optimistic prospects on leaving the state

of eligibility for SA fairly soon. Keeping in mind our results on the impact of measurement error, especially the sensitivity of estimated non-take-up rates to incomes just around the eligibility threshold, we may conclude that a substantial part of the puzzling picture of non-take-up can be explained by "rational poverty" (Riphahn 2001). In other words for households (just) below the eligibility threshold, the costs of claiming do not pay off the utility they can expect from claiming, at least not in the short run.

Thinking further along these lines and keeping in mind the recent increase in poverty and income inequality in Germany (see, e.g., Frick et al 2005) may also help understand our rather high estimates for non-take-up in 2002 as compared to those found in previous studies. The secular trend of increasing income poverty may lead to an increase not only in the observed rates of SA recipients, but even more so to a pronounced increase in (temporarily) eligible households or households on the edge of eligibility, thus resulting in an increase in the non-take-up rate as well. As a matter of endogeneity, measures of relative income poverty may have been increased due to eligible households forgiving their SA entitlements.

Indeed, even if this hypothetical scenario might explain the change in non-take-up rates, the high level of non-take-up observed in Germany throughout the past decades as such still remains a puzzle. The proxy information available in surveys to indicate information and stigma costs seems insufficient to detect the mechanism driving non-take-up behaviour. Although we employ a wide range of proxies including attitudes towards social security, the regression results on non-take-up are rather disappointing. However, enhancing the estimations by adding aggregated regional information on SA ratios has allowed us to validate the stigma-reducing effects of living in an area with high SA dependency.

Correcting for potential sample selection according to Heckman (1979) indicates that the impact of our proxies for utility is slightly overestimated and also masks the impact of other variables. We did not account in detail for endogeneity problems that may arise from the interrelation between low working orientations and high affinity to take up social benefits. While this has been mentioned in the literature as a potential source for biased estimates (e.g., Wilde/Kubis 2005, Kayser/Frick 2001) it should be noted that strong work disincentives arising from generous social benefits may indeed be well suited to explain take-up behaviour, but not high levels of *non-take-up* of SA conditional on eligibility.

Future work along these lines may include panel analyses exploiting the longitudinal nature of the micro-data at hand. The German SOEP also provides information on eligibility status and

claiming behaviour in other years besides 2002. Especially the identification of otherwise unobservable individual and household characteristics (by means of random and fixed effects models) may help to further reduce the impact of measurement error which has been found to be of substantial importance.

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