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Discussion
Papers

Non-Take-Up of Means-Tested Social Benefits in Germany

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Non-Take-Up of Means-Tested Social Benefits in Germany

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Abstract

This paper presents non-take-up rates of benefits from the German Income Support for Job Seekers scheme, called Unemployment Benefit II (*Arbeitslosengeld II*). Eligibility to these benefits is simulated by applying a microsimulation model based on data from the Socio-economic Panel for the years 2005 to 2014. To ensure the quality of the results, feasible upper and lower bounds of non-take-up are shown for different simulation assumptions. By employing a binary choice framework, determinants of the decision (not) to take-up benefits are studied by means of a cross-sectional probit regression and a fixed effects linear probability model. The findings of this study indicate that rates of non-take-up are substantial and time-stable in the decade after the Hartz IV reform of 2005. On average, the share of households that do not claim benefits despite being eligible, amounts to 55.7 percent of all eligible households in that period. The issue of non-take-up has further important implications for the determination of the standard benefit rate. Since the legally defined calculation procedure does not account for non-take-up households in the reference group, the approximated consumption expenditure that is considered as necessary for a dignified life is calculated too low. The results of this study suggest that the legally defined monthly adult lump sum amount in the year 2014 would have been twelve euros higher if the issue of non-take-up was accounted for in the methodology. Based on the findings, the paper aims to give policy recommendations.

Keywords: welfare participation, take-up, social policy, microsimulation.

JEL classification: I38, H31, H53.

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Abbreviations

| | |
|---------------|--|
| SOEP | Socio-economic Panel |
| ALGII | Arbeitslosengeld II (Unemployment Benefit II) |
| OECD | Organisation for Economic Co-operation and Development |
| EVS | Einkommens- und Verbrauchsstichprobe (Income and Expenditure Survey) |
| NIEP | Niedrigeinkommenspanel (Low Income Panel) |
| STSM | Tax and Transfer Simulation Model |
| BA | Bundesagentur für Arbeit (Federal Employment Agency) |
| SGB | Sozialgesetzbuch (Social Code) |
| NTR | Non-take-up Rate |
| BER | Beta Error Rate |
| GDR | German Democratic Republic |
| BVerfG | Bundesverfassungsgericht (Federal Constitutional Court) |

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1 Introduction

1.1 Relevance of Non-take-up

The aim of the German Basic Income Support System is to ensure a minimum standard of living for everyone as guaranteed by the German constitution. The debate about the concrete fulfillment of this promise is ongoing and became an even more heated topic after the last federal election in 2017. The major social policy reform of 2005, the Hartz IV reform, which included the amalgamation of the former unemployment and social welfare benefits, is still controversially discussed over a decade later. The reforms of the Hartz concept were a path-modification by the Social Democrats and the Green Party as a response to high unemployment rates and economic stagnation. They were intended to make the German labor market more flexible, reduce structural unemployment and subordinate the social assistance to the market-logic more strongly. In the aftermath of a poor performance of the German Social Democrats in the election of 2017, the Hartz reforms, first and foremost Hartz IV, were referred to by the media as the party’s “long-term trauma” [Lauck, 2018, own translation]. Since then, critical voices have been raised to completely reform or even abolish the current social assistance system in the medium term.¹ As in many other European countries, the German debate is founded (and has been before the Hartz reforms) on a fundamental tension between the socio-democratic belief that benefits of the welfare state are a constitutional right that should be available to everyone in need and the subordination of the social assistance schemes towards market mechanisms that require a lean and activist welfare state by determining the “truly needy” and promoting work incentives. Hence, the principle of solidarity conflicts with a complex and bureaucratized administration that demands the full disclosure of the private lives of the claimants and leads to stigmatization [van Oorschot, 1991]. Instead of being recognized as legitimate holders of rights which are claimable, indigent people are perceived as clients or supplicants to the job agencies. A passive and complex administration as well as the value of personal responsibility, a moral obligation to be self-sufficient, are key factors to understanding the issue of non-take-up of social benefits. The term non-take-up refers to households not claiming benefits despite being eligible to them, a behavior seeming irrational in the context of standard economic theory. Unlike the determination of the benefit amounts or welfare fraud, this topic has gotten little coverage in the public debate about the reform of the Basic Income Support system.

Nevertheless, the issue of non-take-up is highly problematic from a policy perspective. As many economically poor people do not make full use of the benefits available to them, measures to combat poverty will not reach their desired goal. Hence, a high number of non-take-up households indicates ineffectiveness of the welfare system, which is failing to ensure the implementation of self-imposed objectives like poverty alleviation or equal opportunities for children. As a result, policy makers face “different distributive implications than intended” [Whelan, 2010]. Moreover, non-take-up generates injustice among the claiming and the non-claiming households [van Oorschot, 1991]. In addition, policy simulations of the cost and distributional effects of reform scenarios that involve benefits with high non-take-up rates are not reliable if the issue of non-take-up is disregarded.

¹Considered alternatives from the political centre-left spectrum comprise, for example, a solidarity-based basic income or wage subsidies for long-term unemployed people [compare Lauck, 2018].

By analyzing non-take-up over the years 2005 to 2014 in this paper, I will build on existing research to examine the development after the Hartz reforms up to the most recent available survey year. Eligibility to benefits is determined by applying a microsimulation model that uses data from the German *Socio-Economic Panel (SOEP)*. This study focuses on the extent and determinants of non-take-up of the Basic Income Support for Job Seekers (*Grundsicherung für Arbeitssuchende*) that is part of a wider Basic Income Support system in Germany. The benefits of the Income Support for Job Seekers scheme, colloquially referred to as Hartz IV, are called *Arbeitslosengeld II* (unemployment benefit type II), henceforth abbreviated *ALGII*. Despite the misleading name of the program, *ALGII* assistance is not only paid to unemployed people or job seekers, but also to low-income households whose resources are not sufficient to cover their needs.

1.2 Overview of the Basic Income Support for Job-Seekers

The Basic Income Support scheme (*Grundsicherung*) is subject to the subsidiarity principle: Payments are only granted if households cannot help themselves by using their own income or assets and if other social benefits like housing benefit, child benefit or additional child benefit are not sufficient to cover the monetary needs. As a last-resort protection, the aim of the basic income support is to secure the right to human dignity materially (Article 1 (1) Basic Law) in conjunction with the welfare state principle of Article 20 (1) Basic Law. The German Social Code distinguishes between three different schemes aimed at different target groups: elderly or disabled persons (*Grundsicherung im Alter und bei Erwerbsminderung*), job seekers, employed or self-employed persons (*Grundsicherung für Arbeitssuchende*) and persons with temporary full disability as well as people in institutions and children under the age of 15 years (*Hilfe zum Lebensunterhalt*). Benefits of the Basic Income Support for Job Seekers are means-tested, non-contributory and not time-limited but linked to certain compulsory measures for reintegration into the labor market, i.e., counselling, retraining programs or accepting any reasonable job offer at hand. Individuals who become unemployed are usually first eligible to support from the unemployment insurance, that in most cases is paid for one year and whose amount depends on the former labor market status of the recipient. In 2016, 3.27 million households received benefits from the Income Support for Job Seekers program. The annual total benefit expenditure excluding administrative expenses amounted to 29.4 billion euros in that year.²

1.3 Previous Findings and Methodological Approaches

The academic focus on the problem of non-take-up first came up with the expansion of the welfare state in many European countries in the boom-period after the Second World War. In the beginning, research was primarily dominated by data collection through small-sample interviews combined with theoretical models trying to determine the process and factors of (non)-claiming conducted by psychologists and sociologists like van Oorschot [1991], Hartmann [1981] and Hauser and Hübinger [1993]. Later, economists introduced rational utility maximizing consumer behavior to the models to explain the determinants of non-take-up [for example, Moffitt, 1983, Ashenfelter, 1983, Anderson and Meyer, 1997]. More recent analyses are predominantly conducted by means of observable variables from large panel surveys in conjunction with newly developed microsimulation models.

²See figure B.1 of the appendix for the development of needs units and benefit expenditure over time.

The latest developments in the field highlight the importance of the benefit amount for determining the take-up decision. Moreover, a much debated topic is the endogeneity of the take-up decision with respect to the benefit amount. This is important for policy simulation, as Wiemers [2015] or Currie [2006] show in their work. Hernanz et al. [2004] give an overview of non-take-up rates in member countries of the Organisation for Economic Co-operation and Development (*OECD*), finding estimates within a range of 0.4 to 0.8 for housing and social assistance benefits and 0.6 to 0.8 for unemployment benefits. Bargain et al. [2012] suggest that countries known for developed welfare states like Germany or Scandinavian countries seem to have particularly high rates of non-take-up.

For West Germany, research was first conducted by Knechtel [1960] who focused on low-income families with children and Bujard and Lange [1978] studying non-take-up among the elderly. After the reunification, Riphahn [2001] and Kayser and Frick [2000] show non-take-up rates of 63 percent using data from the German Income and Expenditure Survey (*Einkommens- und Verbrauchsstichprobe (EVS)*) of 1993 and from the *SOEP* of 1996, respectively. Becker and Hauser [2005] provide a range of estimates for the years 1998 and 1999 by using a variation of different data sources. They emphasize the importance of the underlying survey by providing results using a comparable model across data sets and using individually optimized models for each survey. Frick and Groh-Samberg [2007] find a non-take-up rate of 67 percent with the *SOEP* for the year 2002. They conduct a variety of quality checks and highlight the role of measurement error and model sensitivity. The most recent contributions in the field of non-take-up in Germany were made by Bruckmeier and Wiemers [2012] and Bruckmeier et al. [2013], who assess the take-up behavior before and after the Hartz reforms using data from the *SOEP* as well as from the *EVS*. The authors find rates of non-take-up ranging from 41 to 49 percent during the years 2005 to 2007 and a range of non-take-up between 34 and 43 percent for the year 2008. Overall, non-take-up rates are substantial and significant but vary largely across countries and even within countries using different data or methodology (see table 1.1 for a summary of findings for Germany). The range of results is an indicator for the degree of uncertainty associated with simulating benefits and the sensitivity of the outcome to the research design.

Table 1.1: Previous findings on non-take-up rates in Germany

| Author | Year | Non-take-up Rate | Year of Analysis | Data Source |
|------------------------|------|------------------|------------------|-----------------------------|
| Hartmann | 1981 | 0.48 | 1979 | survey of 25,000 households |
| Neumann and Hertz | 1998 | 0.52 | 1995 | SOEP/ Official Statistics |
| Riphahn | 2001 | 0.63 | 1993 | EVS |
| Kayser and Frick | 2001 | 0.63 | 1996 | SOEP |
| Becker and Hauser | 2005 | 0.46-0.60 | 1998-1999 | EVS/NIEP/SOEP |
| Wilde and Kubis | 2005 | 0.43 | 1999 | NIEP |
| Frick and Groh-Samberg | 2007 | 0.67 | 2002 | SOEP |
| Bruckmeier and Wiemers | 2012 | 0.41 - 0.49 | 2005-2007 | SOEP |
| Bruckmeier and Wiemers | 2013 | 0.338 - 0.43 | 2008 | EVS |
| Wiemers | 2015 | 0.386 - 0.480 | 2005 - 2011 | SOEP |

The *Niedrigeinkommenspanel (NIEP)* is a German low income panel.

Source: own presentation.

1.4 Contributions

Analyzing the rate of non-take-up of *ALGII* benefits in Germany over the years 2005 to 2014, I find substantial and time-stable results ranging from 54.0 to 57.7 percent with an average non-take-up rate of 55.7 percent for the period. Compared to the findings of Wiemers [2015] who conducted his analysis based on the same survey data for the years 2005 to 2011, results are in scale higher by about ten percentage points. However, non-take-up rates are considerably smaller than the findings of Frick and Groh-Samberg [2007], Kayser and Frick [2000] or Riphahn [2001] for the time before 2005. Applying different sensitivity checks yields a reasonable lower bound for the non-take-up rate of 41.6 percent and an upper bound of 70.6 percent. The most important determinants for households not to claim benefits are unawareness of eligibility, stigma and small benefit amounts that do not offset the cost of claiming. Moreover, non-take-up has important implications for the determination of the standard rates by indirectly influencing the benefit amount of take-up households. Due to the current calculation methodology that does not account for the issue of non-take-up, the standard adult rate is defined too low by around three percent in 2014, translating into a difference of 12.30 euros.

The rest of the paper is organized as follows: the second chapter outlines the microsimulation framework used to determine eligibility to *ALGII* benefits and shows first descriptive statistics of non-take-up. Chapter three analyzes the quality of the simulation by outlining alternative model specifications and addressing the issue of measurement error. The fourth chapter examines the determinants of (non-)take-up in the context of a discrete choice model by applying regression analyses. Chapter five discusses the policy implications of the results and points out the relevance of non-take-up to the calculation of the standard rates. Conclusions are drawn in the final chapter six.

2 Microsimulation of Benefits

In the following chapter, entitlement to *ALGII* benefits is simulated using the *Tax-Transfer-Simulation-Model (STSM)*. The *STSM* is a simulation model based on micro-household-data depicting the distributive as well as budgetary effects of the German tax, statutory social security and transfer systems. The model has been modified and extended for the purpose of this evaluation.¹ The latest documentation of the *STSM* was conducted by Steiner et al. [2012]. The simulation of *ALGII* benefits is based on the legal regulations of the Social Code Book II (*Sozialgesetzbuch II, henceforth SGBII*). Eligibility is determined in four steps: First, general entitlement criteria like age limits or the ability to work are assessed. For a household to be in principle eligible, at least one member must fulfill these criteria, otherwise the household may qualify for other benefits such as the *Old-Age Basic Income Support*. Subsequently, the monthly needs of the household and its income minus certain allowances are calculated. If the income resources are not sufficient to cover the needs, the difference will be paid to the household as a benefit if it actively files a claim. Lastly, a wealth test is performed to exclude those households from social assistance that can use up part of their assets to cover the cost of living by themselves.

2.1 Data

The microsimulation is based on the data of the Socio-economic panel. The *SOEP* is a representative study of private households in Germany. It covers multiple subjects like the household composition, income developments, living conditions or subjective characteristics, for instance, life or health satisfaction. For the analysis of the years 2005 to 2014, the wave v32 is used, containing data from the survey periods 2006 to 2015. The weighted samples are representative of the German population [Wagner et al., 2008]. The total sample size after applying the standard data cleansing procedure of the *STSM* varies between 9,469 households in 2008 and 16,133 households in 2012. To assess the representativeness of the *SOEP* concerning households claiming *ALGII* benefits, table 2.1 compares the weighted number of *ALGII* needs units and the annual benefit expenditure with the official statistics from the Federal Employment Agency (*Bundesagentur für Arbeit (BA)*).

The number of needs units is underrepresented between two and 19 percent in the survey data compared to the official statistics, depending on the year of analysis. This could stem from the fact that the low-income sector is likely to be underrepresented in general [Frick and Groh-Samberg, 2007]. Additionally, as a problem of household-centered survey data, multiple needs units living together in the same household will not be identified as such. This issue is discussed in more detail in the following section. The same pattern is observed for the total annual benefit expenditure. Using the reported benefit receipt of the month of the interview, the annual expenditure is aggregated assuming that entries into and exits out of the system balance out during the year. The total expenditure according to the *SOEP*² lies only between 58 and 74 percent of the officially reported numbers. This lives up to the fact that in comparison to the question of receipt (yes/no), the exact amount is subject to a high number of non-response cases.

¹For the purpose of the analysis, the observed take-up decision from the *SOEP* is incorporated in the *STSM* and different specifications concerning the housing costs, the wealth test, the needs unit and the time reference are introduced.

²Only considering regular benefits, additional payments and housing costs, without administrative expenses.

Table 2.1: Needs units and annual benefit expenditure in the SOEP and official statistics

| | needs units, million | | | people in needs units, million | | | expenditure, billion euros | | |
|------|----------------------|------|----------|--------------------------------|------|----------|----------------------------|------|----------|
| | SOEP | BA | Δ | SOEP | BA | Δ | SOEP | BA | Δ |
| 2005 | 3.45 | 3.56 | 97% | 6.91 | 6.54 | 106% | 19.9 | 26.8 | 74% |
| 2006 | 3.24 | 3.97 | 82% | 6.40 | 7.46 | 86% | 18.8 | 30.6 | 62% |
| 2007 | 3.16 | 3.72 | 85% | 5.83 | 7.36 | 79% | 18.1 | 29.6 | 61% |
| 2008 | 2.90 | 3.58 | 81% | 5.48 | 7.04 | 78% | 16.5 | 28.5 | 58% |
| 2009 | 2.97 | 3.56 | 83% | 5.82 | 6.88 | 85% | 19.5 | 28.9 | 67% |
| 2010 | 2.90 | 3.59 | 81% | 5.46 | 6.86 | 80% | 18.1 | 28.9 | 63% |
| 2011 | 2.93 | 3.43 | 85% | 5.35 | 6.49 | 82% | 18.5 | 27.8 | 66% |
| 2012 | 3.14 | 3.34 | 94% | 5.86 | 6.29 | 93% | 20.3 | 27.5 | 74% |
| 2013 | 3.17 | 3.34 | 95% | 6.03 | 6.28 | 96% | 21.0 | 28.2 | 75% |
| 2014 | 3.23 | 3.32 | 98% | 5.97 | 6.26 | 95% | 20.9 | 28.7 | 73% |

Δ is the share of the *SOEP* aggregate compared to the numbers reported by the Federal Employment Agency (*BA*). *SOEP* variables on the basis of data reported during the month of the interview.

Source: *SOEP* v.32 with household weights and German Federal Employment Agency.

Using a retrospective variable from the *pequiv* dataset of the *SOEP* that applies imputation for non-response cases, the annual benefit expenditure is remarkably higher, amounting to 74 to 99 percent of the official data.

2.2 Eligibility Conditions

The § 7 of *SGB II* governs who is in principle entitled to benefits for employable persons and who might for example qualify for a different program of the Basic Income Support. To be generally eligible, a person must be aged between 15 years and the yearly defined retirement age that is step-wise raised to 67 years. In addition, claimants must be employable, i.e., fit to work for at least three hours a day, and have a permanent residence in Germany. Not eligible for *ALGII* benefits are old-age pensioners, people living in institutions such as nursing homes and asylum seekers who can apply for support through the *Asylbewerberleistungsgesetz*. As a matter of principle, vocational trainees and students are also ineligible for *ALGII* benefits because they are not available to the labor market. In the simulation model, the aforementioned groups of people are excluded for eligibility. Moreover, people living in a *needs unit* (*Bedarfsgemeinschaft*) with a person eligible for *ALGII* can also be entitled to benefits, in this case called *Sozialgeld*. For example, the needs of children below the age of 25 who are unable to earn a living from their own income or assets are considered in the determination of the transfer amount. Furthermore, the needs of the partner of an eligible person will be considered. The German Social Code defines a partnership as a relation of two people living in the same household who share the mutual will to take responsibility for each other. For a partnership to be constituted, it is sufficient if partners live together for longer than one year, take care of children or relatives in the household or if they can command over the joint income. Consequently, a household can comprise several needs units. Besides the needs unit, the Social Code also defines the *household unit* (*Haushaltsgemeinschaft*) (§ 39 SGBXII). The legislator assumes that if people live together, related or not, and manage their budget jointly, they will also take care of each other's monetary needs. Since it is not possible to observe separate needs units in the data, I use the household with all the household members as the unit of analysis. It is assumed that households either form a needs unit or that they conduct their business jointly and are then

considered a household unit. The only exception is made for non-related people living together, for example, in the form of shared flats. For the sake of simplicity, hereafter speaking of households refers to the *needs unit* or *household unit* as stipulated in Social Code Book II.

2.3 Simulating Needs

The needs of a household are simulated in three steps: First, regular standard needs, a monthly lump sum amount to cover expenditures for nutrition, clothing, household goods and personal needs of daily life, are determined. Besides the physical existence minimum, the standard rate should also enable the social and cultural participation of the claiming household to a reasonable extent (§ 20 SGBII). The amounts of the regular needs are stipulated by law for the following groups: single adults, adult couples, children below the age of six, children between six and fourteen years and youths from 15 until 18 years. They are revised on a yearly basis according to the *Regelbedarfsermittlungsgesetz*. Chapter five deals with the calculation of the standard rates and its criticism in the light of non-take-up in more detail.

Second, additional needs are granted for expectant mothers after the twelfth week of pregnancy, for single parents with underage children, employable disabled people taking part in labor market reintegration measures, cost-intensive special diets or decentralized hot water supply (§ 21 SGBII). In the simulation, only single-parents are easily identified; their add-on payments are precisely predictable as they are defined as a percentage surcharge of the adult standard rate. The needs of single parents with underage children are either increased by twelve percent per child or alternatively, by 36 percent if one child is below the age of seven years or two or three children are below the age of 16, depending on what is more favorable. The maximum surcharge is set at 60 percent of the regular needs (§ 21 (3) SGBII).

Third, needs for housing as well as heating and warm water are determined. The costs are directly paid for by the local agencies. If the actual cost for housing exceeds the recognized cost by the job agencies and there is no case of hardship, tenants or home owners must reduce the expenditure within six months, i.e., by moving to a cheaper apartment or by subletting rooms. Determining the upper limit of housing cost considered acceptable by job agencies is difficult since the local rent levels differ substantially between regions in Germany. Hence, there are no uniformly defined reference values, but it is the responsibility of local authorities to lay down the upper boundary of an appropriate rent. Adequacy is subject to the number of people in the household, the living space, the price per square meter and the type of heating. *ALGII*-eligible home owners are generally allowed to continue living in their homes if the size and the cost are appropriate to the household. Instead of the rent, agencies cover all burdens associated with the necessary maintenance of the dwelling. The simulation uses the imputed rent variable from the *SOEP* survey as the approximated cost if a household reports to be owning a home.³

³The imputed rent consists of a fictitious market rent for owner-occupiers, deducting all owner related costs, i.e., operating and maintenance cost, interest payments on mortgages as well as property tax. For the implementation in the *SOEP* see Frick and Grabka [2001].

Since housing cost account for a large share of the total needs and hence, play a crucial role in determining eligibility, three different measures are computed to test the sensitivity of the simulation in chapter three. In the default model, the appropriate housing cost of eligible households are obtained by limiting the reported rents in the *SOEP* by the mean gross rent of comparable households. The reference groups are determined by the number of household members and the type of living area (urban or rural). To validate the approach, I compare the simulated upper cost limits with the average recognized housing cost per needs unit as reported by the Federal Employment Agency. In the year 2014, the average appropriate housing cost amounts to 307 euros for a single household, 405 euros for two household members and 478 euros for three household members, while the simulated upper limit was set at 380, 474 and 557 euros, respectively. Hence, the average recognized costs are at a good distance below the imputed upper bounds to allow variation in individual cases.

A more restrictive approach is to use the upper cost limit defined in the Housing Benefits Act of 2009. On average, the simulated housing needs are much lower applying these limits to the reported rents compared to the first method (see table A.1 of the appendix). For many cases, this will not be feasible because especially in metropolitan areas, claimants will be unable to find accommodation at that price. Although the provisions of the Housing Benefits Act serve as an official guideline for appropriateness if adequate limits cannot be determined otherwise, job agencies must usually adapt their limits upwards to meet the circumstances of the local housing markets. In a third, most generous specification, housing cost as reported in the *SOEP* are fully accounted for in the simulation.

2.4 Simulating Allowable Income

According to § 11 *SGBII*, income considered in the calculation of *ALGII* benefits includes net income from dependent employment, self-employment, rent and pensions, income from assets, income from military service and monthly non-recurrent income, income from alimony payments, unemployment benefits type I as well as income from other public transfers like housing benefit, child benefit or additional child benefit. In the default simulation, income measures are used as reported in the *SOEP* at the month of the interview and aggregated to the household level if necessary.⁴ Since monthly measures are only available for the net-incomes from employment, for other types of income monthly averages from the previous year are used instead. Additionally, chapter three gives alternative results of non-take-up rates if annually simulated net-incomes are employed. To decrease the marginal burden for low-income earners and promote work incentives, part of the income from dependent work is disregarded in the calculation of entitlement (compare § 11b *SG-BII*). For working people, a lump-sum exemption of 100 euros per month is granted. Income in excess thereof up until 800 euros is deducted from social assistance by a rate of 80 percent. Income between 800,01 and 1200 euros (1500 euros for households with dependent children) is accounted for by 90 percent. Moreover, income from working opportunities with additional expenses compensation (*Arbeitsgelegenheit mit Mehraufwandsentschädigung*), also referred to as “One-euro job”, are fully exempted. Non-working people can deduct an amount of 30 euros for private insurance

⁴A drawback of the simulation is that only regular income is accounted for since no information on one-off payments is available in the survey data.

and the lump-sum advertising allowance for themselves and for their children. Alimony payments to children or ex-partners are also deductible from the income and included in the model. Additionally, expenses for motor liability, the cost of public transportation for employed persons and contributions for old-age provision can be deducted (§ 11b *SGBII*). Due to non-availability of the information in the survey data, they are, however, not considered in the simulation.

2.5 Wealth Test

In accordance with the principle of subsidiarity, a household is not eligible for income support if it owns assets above the exemption limits (compare § 12(2) *SGBII*). In this case, the legislation requires households to use up assets first before becoming eligible for benefits. Adult household members are granted a basic allowance of 150 euros per year of life per person which is only transferable between partners. The maximum adult allowance is set at 9,750 euros for people born before 1958, at 9,900 euros for people born between 1958 and 1963 and at 10,050 euros for people born after 1963. Depending on the year of birth, the exemption amount can consequently range from 3,850 euros to 10,800 euros. Additionally, each underage child is granted an allowance of 3,100 euros. Additionally, savings of a “Riester” retirement plan are fully exempted and other private old-age provision is only accounted for partially. However, this is not considered in the simulation due to limited data availability. Furthermore, needs units have an allowance of 750 euros for each member to conduct necessary household purchases. To precisely simulate the wealth test, a good estimation of the households’ assets is crucial. Since wealth is not asked for in the standard *SOEP* questionnaires⁵, it is approximated by exploiting information on capital incomes. Underlying assets are deduced from these incomes by assuming an annual interest rate of three percent. The disadvantage of this method is that only interest-bearing wealth can be measured appropriately. As capital incomes are further affected by non-response cases (for example, 2.6 percent of all households in 2014), missing values are imputed by the survey provider.

As the wealth test is of high importance to the determination of eligibility [Wilde and Kubis, 2005, Riphahn, 2001], the appropriateness of the calculated wealth measure is validated using results from Beste et al. [2014] of the year 2013. In their study, the authors analyze savings of *ALGII*-households by evaluating the *PASS survey*, containing data on take-up households that are randomly selected from the records of the employment agencies. Table 2.2 shows that recipients’ wealth simulated on the basis of *SOEP* data for the year 2013 is more polarized in comparison to the *PASS survey*. The share of take-up households with either no savings in the first category or high savings in category three and four is remarkably higher using the *SOEP*. As wealth above 5,000 euros (category three and four) is potentially crucial for testing eligibility as it is at the boundaries of the exemption limits, measurement error in the simulation of assets might lead to the model being too restrictive. Therefore, results for three different test specifications are presented in chapter three. The default wealth test consists of the capital income-based test as described above. As a more restrictive specification, the test for capital income will be extended by a test for owner-occupied housing, determining the appropriateness based on the guidelines from the Federal Employment Agency. Residential property is categorized as appropriate if the living space is smaller than 130 square

⁵A supplementary survey on personal and household assets is conducted every five years by the *SOEP* which is for example used for wealth-testing by Bruckmeier and Wiemers [2012].

Table 2.2: Validating savings of take-up households for the year 2013

| category | savings, euros | percent of households | | |
|----------|----------------|-----------------------|-------------------|--------------------------|
| | | PASS ¹ | SOEP ² | SOEP (imp.) ² |
| 1 | none | 61.0 | 75.1 | 72.6 |
| 2 | under 5,000 | 37.7 | 11.3 | 13.8 |
| 3 | 5,001 - 20,000 | 1.2 | 12.3 | 12.4 |
| 4 | above 20,000 | 0.1 | 1.3 | 1.2 |

¹ Evaluation taken from Beste et al. [2014].

² Own calculations with STSM based on SOEP v.32, weighted.

meters, adding 20 additional square meters from the fifth person onwards living in the household. As a least restrictive model specification, the wealth test is fully neglected in the determination of eligibility.

In summary, the simulation of benefits (B_i) of the household i can be expressed as comparing the needs of the household, comprising regular needs (RN_i), additional needs (AN_i) and housing costs (HC_i), to its resources, consisting of income (y_i) reduced by general allowances (GA_i) and the income exemption ($AI_i(y_i)$), and applying a wealth test (comparing wealth (W_i) to the wealth allowance (AW_i)):

$$B_i = \begin{cases} \max [0, (RN_i + AN_i + HC_i) - (y_i - AG_i - AI_i(y_i))], & \text{if } W_i - AW_i \leq 0. \\ 0, & \text{otherwise.} \end{cases} \quad (2.1)$$

2.6 Identifying Non-Take-Up and Beta Error

After simulating eligibility to *ALGII* benefits for every household, to determine non-take-up this information is combined with the directly observed decision to claim or not to claim *ALGII* benefits. A household is defined as taking up benefits if at least one member reports receipt of *ALGII* in the month of the interview in the *SOEP* personal questionnaire or if receipt in the month of the interview is reported in the household questionnaire. All households that qualify as eligible for

Table 2.3: Determining Non-take-up and Beta Error

| | | Eligibility (STSM) | |
|----------------|-------|--------------------|-------------------|
| | | yes=1 | no=0 |
| Take-up (SOEP) | yes=1 | Take-up | Beta Error |
| | no=0 | Non-take-up | Ineligible |

benefits in the microsimulation are then either classified as take-up households if receipt is reported in the *SOEP* or as non-take-up households if the *SOEP*-take-up-dummy is zero (see table 2.3). Just as in Frick and Groh-Samberg [2007] or Bruckmeier et al. [2013], the non-take-up rate (*NTR*) is defined as the proportion of all non-take-up households to all eligible households:

$$Non\text{-}take\text{-}up\ Rate\ (NTR) = \frac{Take\text{-}Up = 0 \ \& \ Eligibility = 1}{Eligibility = 1} \quad (2.2)$$

While take-up and ineligibility are the unproblematic standard cases in which the reported behavior and the simulation coincide, the second combination on the diagonal of table 2.3 requests further investigation. Here, households are classified as not eligible according to the microsimulation although they report receiving benefits in the *SOEP*. Following Bruckmeier et al. [2013] and Frick and Groh-Samberg [2007], these implausible cases are referred to as the “Beta Error”. The concept is different from the beta error used in the context of hypotheses testing since one does not reject or confirm a null hypothesis. Yet, similar to the statistical meaning, the beta error measures the observable error of the simulation. Conversely, it is not possible to control for the number of households that are classified as eligible although they are in fact not, the equivalent to the alpha error, since only take-up but not eligibility can be observed in the data.

The beta error can occur due to two different reasons: either non-eligibility is wrongly assigned by the simulation or households receive benefits although they would not qualify as eligible either by mistake or misjudgment of the agencies or by making false statements to the authorities. However, as van Oorschot [1991] and Frick and Groh-Samberg [2007] point out, the role of overconsumption and welfare fraud should not be overrated. Moreover, it is highly unlikely that households wrongly report benefit receipt in the *SOEP* survey, on the contrary, a negligible effect in the opposite direction can be assumed due to potential stigmatization of claimants. Hence, the size of the beta error can serve as a useful indicator for the quality of the simulation since it is an indicator of misspecification. Consequently, an overly restrictive simulation will lead to a higher number of beta error cases and a smaller number of eligible households. If less households are eligible due to a shift from the take-up to the beta error category, the non-take-up rate will be lower.

The beta error rate (BER) is in the following defined as the proportion of beta error cases to all take-up households:

$$\text{Beta Error Rate (BER)} = \frac{\text{Take-Up} = 1 \ \& \ \text{Eligibility} = 0}{\text{Take-Up} = 1} \quad (2.3)$$

The beta error rate portrays the ratio between the wrongly classified households to all households that report receipt in the *SOEP*. Building on the above described trade-off between beta error and non-take-up, chapter three uses this method to show sensitivity of the simulation results to a more or less restrictive simulation design.

2.7 Descriptive Statistics of Non-Take-Up

For the years 2005 to 2014, non-take-up rates vary between 64 and 66 percent for the default specification. The results are surprisingly steady over time and do not seem to follow a clear trend. For a first analysis, table 2.4 illustrates the non-take-up rates over time and for different household characteristics like the household type, the social position of the household head, the number of children in the household, the benefit amount, the sample region and the ownership status of the household. The rates of non-take-up vary considerably by the different characteristics and overall support the main findings of former research, for example, conducted by Riphahn [2001]. As expected, groups with higher needs like single parents and economically inactive persons have substantially lower rates of non-take-up. The non-take-up rate is also on average lower among the population in East Germany compared to West Germany. Moreover, households that might not

Table 2.4: Non-take-up rates by household characteristics

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| by household type¹ | | | | | | | | | | |
| Single | 0.47 | 0.49 | 0.42 | 0.44 | 0.42 | 0.51 | 0.47 | 0.48 | 0.46 | 0.49 |
| Single Parent | 0.46 | 0.45 | 0.61 | 0.51 | 0.51 | 0.54 | 0.53 | 0.57 | 0.47 | 0.44 |
| Childless Couple | 0.71 | 0.73 | 0.65 | 0.80 | 0.67 | 0.68 | 0.64 | 0.65 | 0.67 | 0.64 |
| Couple with Children | 0.59 | 0.59 | 0.58 | 0.59 | 0.60 | 0.62 | 0.62 | 0.62 | 0.59 | 0.63 |
| by social position² | | | | | | | | | | |
| Self-employed | 0.89 | 0.92 | 0.87 | 0.85 | 0.86 | 0.90 | 0.79 | 0.83 | 0.85 | 0.87 |
| Employee/ civil servant | 0.78 | 0.77 | 0.73 | 0.76 | 0.75 | 0.77 | 0.76 | 0.75 | 0.73 | 0.73 |
| Pensioner | 0.78 | 0.87 | 0.75 | 0.72 | 0.60 | 0.75 | 0.62 | 0.68 | 0.66 | 0.69 |
| Economically inactive | 0.23 | 0.21 | 0.18 | 0.23 | 0.18 | 0.19 | 0.32 | 0.23 | 0.21 | 0.25 |
| by number of children | | | | | | | | | | |
| No children | 0.55 | 0.57 | 0.51 | 0.55 | 0.50 | 0.54 | 0.51 | 0.52 | 0.52 | 0.52 |
| One child | 0.58 | 0.54 | 0.56 | 0.49 | 0.54 | 0.64 | 0.61 | 0.61 | 0.54 | 0.61 |
| Two children | 0.56 | 0.61 | 0.66 | 0.71 | 0.66 | 0.63 | 0.66 | 0.66 | 0.63 | 0.63 |
| Three and more children | 0.56 | 0.50 | 0.47 | 0.54 | 0.54 | 0.56 | 0.60 | 0.54 | 0.53 | 0.50 |
| by benefit amount | | | | | | | | | | |
| Up to 200 euros | 0.88 | 0.87 | 0.84 | 0.86 | 0.87 | 0.89 | 0.90 | 0.88 | 0.89 | 0.84 |
| 200 - under 600 euros | 0.64 | 0.67 | 0.64 | 0.66 | 0.63 | 0.71 | 0.68 | 0.70 | 0.62 | 0.58 |
| 600 - under 900 euros | 0.36 | 0.42 | 0.33 | 0.35 | 0.42 | 0.36 | 0.34 | 0.37 | 0.36 | 0.42 |
| Above 900 euros | 0.48 | 0.45 | 0.48 | 0.50 | 0.42 | 0.49 | 0.47 | 0.46 | 0.44 | 0.51 |
| by sample region | | | | | | | | | | |
| West Germany | 0.61 | 0.61 | 0.59 | 0.61 | 0.59 | 0.61 | 0.60 | 0.60 | 0.57 | 0.58 |
| East Germany | 0.42 | 0.40 | 0.40 | 0.42 | 0.42 | 0.47 | 0.44 | 0.46 | 0.44 | 0.49 |
| by ownership status | | | | | | | | | | |
| Home owner | 0.87 | 0.90 | 0.88 | 0.91 | 0.87 | 0.91 | 0.88 | 0.87 | 0.87 | 0.92 |
| Tenant | 0.47 | 0.46 | 0.44 | 0.45 | 0.45 | 0.47 | 0.46 | 0.48 | 0.45 | 0.46 |
| Total | 0.56 | 0.56 | 0.54 | 0.56 | 0.54 | 0.58 | 0.56 | 0.56 | 0.54 | 0.56 |

¹ Other household types not displayed due to low case numbers.

² Social position of household head.

Source: own calculations with STSM based on SOEP v.32, weighted.

be aware of the possibility to claim or feel less in need of support, for example, households with an employed or self-employed head, households owning a dwelling or households entitled to only a small benefit amount ⁶, are less likely to claim. Interestingly, the non-take-up rate increases for the group with the highest benefit entitlements. However, this effect can be mostly attributed to large household sizes. For these cases, it is particularly questionable whether the definition of the needs unit and the household coincide. Furthermore, the absolute benefit amount does not account for different needs of different household types. A more appropriate measure will be developed in chapter four, setting the size of the benefit into relation to the degree of household needs. In these simple descriptive statistics, the variation of the non-take-up rates by different characteristics will pick up a variety of effects. For example, the benefit amount is correlated with having children or being a single parent, as those factors increase the needs of the household. Consequently, the multivariate analysis conducted in chapter four will be more appropriate to identify the determinants of non-take-up.

⁶For the distribution of benefit amounts for take-up and non-take-up households see figure B.2 of the appendix.

To show the feasibility of the results by subgroups, table A.2 of the appendix summarizes the beta error rate for different household characteristics. For the total sample, the average proportion of incorrectly specified households reporting receipt lies between 14 percent in the year 2009 and 20 percent in the years 2014. Estimates of this magnitude were also found by Bruckmeier et al. [2013], reporting a beta error rate between 14.9 and 18.6 percent for the year 2008. In this work, the beta error rate is especially large for home owners and household heads that are self-employed, employed or pensioners. For economically inactive people, households with dependent children as well as tenants, the ratio of misspecification is considerably smaller. These results are favorable because one can argue that the simulation error is not as severe for the majority of the sample of interest. As Bargain et al. [2012] point out, eligibility can hence be simulated more accurately for groups with an increased risk of poverty, a desirable result for statements from a poverty research perspective. To validate the results obtained in this chapter and to justify the assumptions made, the following chapter assesses the quality of the simulation.

3 Quality of the Simulation

As every simulation is only a simplification of reality, it will occasionally not depict the subject matter appropriately or cannot provide correct results due to missing information in the survey data. To be able to make reliable statements, the following chapter addresses the quality of the simulation. The aim is to show feasible upper and lower bounds of non-take-up depending on the simulation specifications and to account for potential measurement error by showing results for flat deviations in income, needs and housing cost.

3.1 Sensitivity of the Results

To analyze the sensitivity of the estimated take-up rates to the model design, results from different specifications are compared to my baseline model [following Riphahn, 2001, Whelan, 2010]. Tested assumptions concern the definition of the needs unit, the housing cost, the wealth test and the time reference (table 3.1). Uncertainty in those fields stems either from the fact that authorities have some room for discretion, for example, in the case of housing cost, or it can be attributed to erroneous/ missing information in the data base, as the issue of multiple needs units in one household shows, or is a result of both.

Table 3.1: Possible model specifications

| | Needs Unit | Housing Cost Limit | Wealth Test | Time Reference |
|------------------|----------------------------------|--------------------------|-------------------------------|-------------------------------|
| Less Restrictive | - | actual rent (a) | no test (N) | previous year (Y) |
| Default | related household members | mean rent (m) | capital incomes (C) | month of interview (M) |
| More Restrictive | only core family | housing benefit law (hb) | add. test for home owners (O) | - |

Due to reasons of space, I will not present all possible combinations of the different specifications but focus on ten deviations from what I argue should be the baseline model. Since results are stable over time, the analysis is pooled across the years for better visualization. As described in section 2.3, the definition of appropriate housing cost is crucial to the final outcome. Hence, findings

Table 3.2: Analyzed model specifications

| Model | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------------------------------|-------|-------|--------------|-------|-------|-------|-------|-------|-------|-------|
| Time Period | M | M | M | M | M | M | M | M | Y | Y |
| Housing cost | hb | hb | m | m | m | a | a | m | m | m |
| Wealth Test | C | O | C | O | N | C | O | C | C | C |
| Core family | no | no | no | no | no | no | no | yes | no | yes |
| Eligible ¹ , Perc. | 13.09 | 12.30 | 14.58 | 13.64 | 17.72 | 21.83 | 18.59 | 14.89 | 11.72 | 11.79 |
| Non-take-up Rate, Perc. | 51.59 | 48.84 | 55.75 | 53.07 | 62.03 | 70.56 | 65.84 | 56.59 | 41.63 | 42.32 |
| Beta Error Rate, Perc. | 18.81 | 19.40 | 17.41 | 18.07 | 13.88 | 17.73 | 18.68 | 17.24 | 28.92 | 29.31 |

Model three is default specification (baseline model). Abbreviations as defined in table 3.1.

¹ Number of eligible households in percent of total households. Results pooled across years.

Source: own calculations with STSM based on SOEP v.32, weighted.

are shown in detail for the three different housing assumptions, in each case with the standard wealth test and the extended wealth test (see table 3.2 model 1-4 and model 6 and 7). With 70.56 and 65.84 percent, the highest rates of non-take-up are obtained if no limit on housing cost is applied at all. As eligibility is assigned less restrictively, the largest share of households qualify as eligible to *ALGII* benefits in these scenarios. Using the limits of the Housing Benefit Act, in contrast, decreases the non-take-up rate on average by four percentage points compared to the default specification. Simultaneously, slightly higher beta error rates can be observed, indicating that the assumption might be less appropriate. The same is true for the most restrictive wealth test. Although the non-take-up rate is slightly lower, the beta error rate increases in comparison to the standard model for all three housing limit specifications. Interestingly, the beta error rate is with 13.88 percent substantially lower if no wealth test is applied at all compared to the baseline model. This suggests that the wealth test is an important source of error with room for future advancement, for example, by incorporating information from the additional wealth questionnaire in the microsimulation.

Results of non-take-up are in addition shown considering the core family as the unit of analysis (model 8 and 10) and using the previous year as the time reference for the simulation (model 9 and 10). Independent of the chosen time specification, results are very stable concerning the definition of the needs unit. The lowest rates of non-take-up (41.63 and 42.23 percent) and eligibility (11.72 and 11.79 percent) are exhibited by the models using annual, retrospective data. The very high rate of beta error in these cases indicates that eligibility is assigned too restrictively, as households must on average have too few resources to cover their needs over the time-span of one year. Additional error might be for example introduced by the simulation of the net-income with the *STSM* compared to using the income as reported in the *SOEP*.

Summarizing the results of the different model specifications, figure B.3 of the appendix shows the trade-off between the pooled non-take-up rate and the pooled beta error rate for the different simulation models based on a visualization following Frick and Groh-Samberg [2007]. Depending on the assumptions made, the rate of non-take-up can be as small as 41.63 percent (model nine) and as large as 70.56 percent (model six). The baseline model (model three) achieves a good balance by being restrictive enough to keep the share of eligible households at a reasonable size while at the same time making a relatively small error.

3.2 Measurement Error

In the context of analyzing welfare participation, measurement error and misreporting are typical problems of interview-based data [Hernandez and Pudney, 2007]. To provide a feasible range of non-take-up rates in the event that income, needs or housing cost are measured with error, the impact of uniform deviations in these variables is investigated in the following. Eligibility is simulated repeatedly, sequentially increasing (decreasing) the aforementioned variables by five and ten percent in both directions at a time for each household. Pooled results over the years 2005 to 2014 are displayed in table 3.3. In accordance with the findings of Frick and Groh-Samberg [2007], non-take-up is most sensitive with respect to the measurement of income.

If income was measured too low and actual income is ten percent higher, the non-take-up rate

would decrease by three percentage points to 52.7 percent as more households become able to cover their needs with their own resources and do not qualify as eligible anymore. On the other hand, if income was measured too high and actual income is ten percent lower, the non-take-up rate would increase to 59.9 percent accordingly. The findings are more sensitive to an overestimation of income than an underestimation. This is consistent with the fact that the distribution of the gap between needs and income is skewed and more households fall just short of eligibility than only just being eligible to small entitlements (see figure B.4 of the appendix). The effects for the variation in needs and housing cost point in the opposite direction. As higher needs increase the chance of being eligible to benefits, the rate of non-take-up increases. If needs and housing cost were measured too low by ten percent, the rate of non-take-up would increase to 58.0 and 57.4 percent, respectively. In the other case, non-take-up can be as small as 53.6 and 54.1 percent. The beta error develops parallel in the expected directions.

Table 3.3: Flat variations in income, needs and housing cost

| | Income | | Needs | | Housing | |
|----------|------------------|-----------------|------------------|-----------------|------------------|-----------------|
| | Non-take-up Rate | Beta Error Rate | Non-take-up Rate | Beta Error Rate | Non-take-up Rate | Beta Error Rate |
| +10 % | 0.527 | 0.187 | 0.580 | 0.164 | 0.574 | 0.166 |
| +5 % | 0.542 | 0.181 | 0.568 | 0.168 | 0.565 | 0.170 |
| 0 | 0.557 | 0.174 | 0.557 | 0.174 | 0.557 | 0.174 |
| -5 % | 0.577 | 0.167 | 0.547 | 0.180 | 0.550 | 0.177 |
| -10 % | 0.599 | 0.162 | 0.536 | 0.184 | 0.541 | 0.181 |

Results pooled over the years 2005-2014.

Depiction based on Frick and Groh-Samberg [2007].

Source: own calculations with STSM based on SOEP v.32, weighted.

4 Determinants of Non-take-up

After discussing the extent of non-take-up, the aim of this chapter is to examine what drives this phenomenon: Why does over half of the eligible population deliberately or otherwise waive their right to claim social assistance? The individual decision-making is a complex process to understand, factors like misinformation, household attitudes and sentiments, intertemporal issues, the structure of the job agencies or imprecise and nontransparent legislation may play a role. The advantages of large panel surveys lie in the variety of household-related variables which can be utilized for the analysis and the large number of observations that ensures representativity of the data to the population. Nevertheless, the quantity of the observations certainly cannot supplant the quality of interviews with questions especially designed to study this topic, for example, conducted by Bujard and Lange [1978] or Hartmann [1981]. Having said this, to make full use of the data available, it is unavoidable to employ models that illustrate the decision process as well as possible. The first class of models was developed on the basis of Kerr's Threshold Model in the late 1970s and 1980s [Craig, 1991]. Kerr's model is build around six thresholds that must be passed sequentially for a household to claim benefits. Addressing welfare participation from the viewpoint of a psychologist, the decision process focuses on the beliefs, attitudes and expectations of households [Kerr, 1982]. Van Oorschot [1991] expanded on the model by incorporating different paths that may lead to a claim. The advanced set-up consists of a threshold requiring basic knowledge and perceived eligibility as prerequisites, a trigger event and subsequently, a trade-off between costs and utility of filing a claim. The majority of recent household-panel studies on welfare participation work with a simplification of the Threshold-Trade-Off-Trigger-Model (Three-T-Model) to develop a regression design. Since it is impossible with large household surveys to decompose the decision process into different thresholds in retrospect, authors usually use simple binary choice models [for example, Blundell et al., 1988, Frick and Groh-Samberg, 2007, Whelan, 2010]. Here, the decision to claim is made in a single step by weighing up the cost and benefits of a claim assuming that households have full information and make rational decisions. In the following section, I will set up a binary choice framework following Whelan [2010] to analyze the decision process using *SOEP* household variables as proxies. Additionally, I will incorporate the possibility of households being unaware of their potential eligibility in the model and discuss suitable variables for the regression.

4.1 Binary Choice Model

The take-up decision of a household t_i can be interpreted in the context of a latent variable approach [Cameron and Trivedi, 2005]. The observable discrete outcome (decision to claim = 1, decision not to claim = 0) is a reflection of an underlying, continuous propensity to claim that is determined by the household's characteristics and attitudes. A household decides to claim if the underlying propensity t_i^* exceeds a certain threshold T :

$$t_i = \begin{cases} 1, & \text{if } t_i^* > T. \\ 0, & \text{otherwise.} \end{cases} \quad (4.1)$$

The expectation of observing take-up conditional on a vector of the household's characteristics X can be expressed as the probability of take-up conditional on X with F being a functional form of the probability distribution.

$$\mathbf{E}[t_i = 1|X] = Pr(t_i = 1|X) = F(X) \quad (4.2)$$

In the following, a suitable form of the function F will be discussed. Assuming rational decisions of agents, households will claim benefits if the received utility outweighs the costs of the claim. Household utility is modeled as the utility of the overall budget, consisting of the benefit amount and the income from other sources, depending on the household characteristics. Let y denote the net-household income before benefits and B the amount of the benefit entitlement of household i :

$$u_i^T \equiv u_i(y_i + B_i, X) \quad (4.3)$$

If the household does not claim and forgoes benefits, the utility can be rewritten as:

$$u_i^{NT} \equiv u_i(y_i, X) \quad (4.4)$$

The costs associated with the claim are often divided into the direct cost, in the following also referred to as application cost, and the perceived disutility in the form of stigma [Moffitt, 1983]. Analogous to the utility, the impact of costs on the propensity to claim also depends on the characteristics of the household, as will be described in detail in section 4.2. For the model set up, disutility from claiming is expressed as

$$c_i(X) \quad (4.5)$$

and later decomposed when discussing suitable proxy variables. If one assumes an additive random utility model, the utility for take-up and non-take-up households (assuming common parameters for both groups) can be rewritten with constant α , income coefficient β and coefficient vector for the household characteristics γ . Analogous to this, the costs consist of a constant term δ_0 and a coefficient vector δ_1 for the household characteristics.

$$u_i^{NT} = \alpha + y_i\beta + x_i'\gamma + \varepsilon_i^{NT} \quad (4.6)$$

$$u_i^T = \alpha + (y_i + B_i)\beta + x_i'\gamma + \varepsilon_i^T \quad (4.7)$$

$$-c_i = \delta_0 + x_i'\delta_1 + u_i \quad (4.8)$$

Rational utility maximization yields a positive take-up if the utility of claiming u_i^1 outweighs the utility of not claiming u_i^0 and hence, if the utility of claiming minus the costs is positive.

$$t_i = \begin{cases} 1 \Leftrightarrow u_i^T - c_i \geq u_i^{NT} \Leftrightarrow u_i^T - c_i - u_i^{NT} \geq 0 \\ 0 \Leftrightarrow u_i^T - c_i < u_i^{NT} \Leftrightarrow u_i^T - c_i - u_i^{NT} < 0 \end{cases} \quad (4.9)$$

Inserting the additive utility components from above yields:

$$Pr(t_i = 1) = Pr(u_i^T - c_i - u_i^{NT} \geq 0) \quad (4.10)$$

$$= Pr(B_i\beta + \delta_0 + x_i'\delta_1 + u_i - \varepsilon_i^{NT} + \varepsilon_i^T) \geq 0 \quad (4.11)$$

$$= Pr(v \geq -(\delta_0 + B_i'\beta + x_i'\delta_1)) \quad (4.12)$$

with $v = u_i - \varepsilon_i^{NT} + \varepsilon_i^T$. If the error term v is standard normal distributed one can write:

$$Pr(t_i = 1) = 1 - \Phi(-(\delta_0 + B_i'\beta + x_i'\delta_1)) \quad (4.13)$$

$$= \Phi(\delta_0 + B_i'\beta + x_i'\delta_1) \quad (4.14)$$

with $\Phi(\bullet)$ being the cumulative distribution function of the standard normal distribution. If the error term is in fact standard normal distributed, the probit function is a feasible link between the probability of take-up and the utility components. Up until now, the household benefit entitlement B_i is taken as exogenously given. This assumption will likely not hold in practice since unobserved household characteristics that determine the take-up decision will be correlated with benefit entitlement. The household income has, for example, a direct effect on the benefit amount and is presumably also correlated with the unobserved household attitudes towards work. Wooldridge [2010] outlines some general ideas on how to deal with this endogeneity problem in probit estimations. For the context of non-take-up, Whelan [2010] uses an instrumental regression approach and Wilde and Kubis [2005] estimate a take-up and a labor supply equation simultaneously. Although this is an important issue and a concern for the following analysis, due to reasons of space, endogeneity will not be further addressed in this work.

4.2 Proxy Variables for Utility and Costs of Claiming

Following Bruckmeier et al. [2013] and Frick and Groh-Samberg [2007], the proxy variables ¹ displayed in table 4.1 depict the underlying take-up decision and enable the regression estimation of the model developed in the last section. Utility from claiming is determined by the actual and perceived neediness of the household and by the expected duration of the income spell. A strong indicator for the household's needs is the household-specific *relative poverty gap* [Frick and Groh-Samberg, 2007], also referred to as the poverty degree by Riphahn [2001]. The measure is adopted from the poverty gap index used in poverty research [Coudouel et al., 2002, p. 35]. While the poverty index describes by how much aggregated household consumption on average falls short of the poverty line, the relative poverty gap in this work indicates the share of household-specific needs that cannot be covered by the income of the household. Hence, in contrast to just using the benefit amount itself, it determines the relative neediness of a household by setting the benefit amount in relation to the overall needs. The poverty gap lies between zero (household can cover all of its needs by itself) and one (household cannot cover any of its needs). Additional to the actual needs, being a single parent or having young children below the age of six may increase the perceived needs as parents feel more responsible for the upbringing of their children. Additionally, the variable *satisfaction with the household income* captures the subjective perception of the income situation

¹See table A.3 of the appendix for a detailed description of all variables.

and as a consequence also influences the perceived needs. It is measured on a scale from 0 (low satisfaction) to 10 (high satisfaction). Since in some subsamples of the *SOEP* waves 2010, 2011 and 2014 the question was not asked, a weighted average satisfaction of 4.95 is assumed for 361, 141 and 361 cases, respectively. As a second major category of determinants, the expected duration of eligibility plays an important role. If utility from claiming is expected to be gained over a longer period, it will more likely offset the fixed costs, in particular the application cost. The expected duration of eligibility is approximated by characteristics that have an impact on the labor market situation of the household. Assuming that the household head is the main breadwinner, her or his employability is assessed as representative for the needs unit. Being well educated and below the age of 35 generally increases the chances on the labor market and hence, the expected duration of receipt will be shorter compared to households with an older or less educated household head. Moreover, living in the East of Germany is used as a more general indicator for an overall worse labor-market situation [Wiemers, 2015] that is likely to prolong the period of receipt. However, it must be noted that the area of residence can also affect the attitudes towards the welfare state because of the different former political systems in the East and West. Neumann and Hertz [1998] point out that the social assistance program of the former German Democratic Republic (*GDR*) used to have a strong negative connotation which might still impact the perceived stigma today, especially for older households. However, more recent research suggests that the “original ‘GDR’ effect may have run out” [Frick and Groh-Samberg, 2007] or is at least outweighed by the increased needs of the East German households.

On the disutility side, the cost of the claim can either result from the process of the application itself or from the stigma attached to *ALGII* receipt. Application costs comprise all one-time fixed costs like the information costs of whether, where and how to file a claim, the cost of getting to the job agencies, the opportunity cost of the time spent preparing the claim and costs associated with legal advice or filing an objection. These costs can be especially high for households with a migration background or a low educational status, for example, due to language barriers, higher research costs or unfamiliarity with the legislation and the public authorities. As single proxy variables affect utility and disutility simultaneously, the overall effect on the take-up decision is not always clear. For example, less educated households may expect a longer duration of receipt but at the same time face higher application costs. In these cases, the total effect is indicated as “?” in table 4.1. Moreover, costs will be higher for working household heads and single parents as they might find it harder to take the time to prepare a claim. The same applies for households in rural areas as their nearest job agency will be further away. Furthermore, stigma is also likely to be higher in those areas compared to urban areas due to closer community networks that exercise informal social control more strongly. On the basis of socially required norms like self-responsibility, work ethic and mutual financial assistance in family and community networks, recipients of *ALGII* and their families are often defamed as lazy, personally failed, useless or fraudulent [Mianguan and Robert, 2017]. Besides the social stigma, disutility also arises through the administration, for example, by being forced to fully disclose ones financial situation and living conditions or by imposing sanctions on recipients when they do not comply with the labor market reintegration measures. Consequently, stigma costs will be higher for male household heads because of still prevalent gender stereotypes that attribute them the role of the family provider. The same applies to working household heads.

Table 4.1: Observed proxy variables for the theoretical determinants of take-up

| Variable | Utility from claiming | | Disutility from claiming | | Unawareness | Total Effect |
|-----------------------------------|-----------------------|----------|--------------------------|-------------|-------------|--------------|
| | Needs | Duration | Stigma | Application | | |
| Poverty Gap | + | | | | | + |
| Young Children | + | | | | | + |
| Single Parents | + | + | - | + | | + |
| Satisfaction with Income | - | | | | | - |
| Unwilling to Work | | + | | | | + |
| Low Educated ¹ | | + | | + | | ? |
| High Educated ¹ | | - | | - | | ? |
| Young Household Head ² | | - | | | | - |
| Old Household Head ² | | + | | | | + |
| East Germany | + | + | | | | + |
| Rural Area | | | + | + | | - |
| ALGII in district | | | - | - | | + |
| Migration Background | | | + | + | + | - |
| Male Household Head | | | + | | | - |
| Working Household Head | - | | + | + | + | - |
| Home Owner | - | | | | + | - |

In the utility (disutility) column + stands for increased utility (disutility) and hence, higher (lower) probability to claim, the opposite is true for -. In the column total effect + (-) stands for the increased (decreased) probability of take-up.

¹ Omitted Category: Medium Education.

² Omitted Category: Middle Aged Household Head.

Own representation based on Bruckmeier and Wiemers [2012].

In theory, these groups are less likely to take-up benefits since claiming might be perceived as a failure to care for oneself and ones relatives independently. Further, following Frick and Groh-Samberg [2007], a high concentration of claiming households in the neighborhood can not only reduce the individual information costs but also the disutility from welfare stigma. Both effects point in the same direction of lowering the costs of claiming and hence, a large number of *ALGII* needs units in the district should increase the probability of take-up.

As an addition, I will partly drop the assumption that households have perfect information and include variables that reflect potential unawareness of the possibility to claim. However, this is not tested for sequentially but included in the regression set-up as a form of disutility instead. Two groups that are potentially uninformed or misinformed about their right to claim are households whose head is working and home owners. The former might be discouraged by the misleading name “unemployment benefit II” or not aware of the possibility to claim because of the complex process of comparing income and needs to determine eligibility. The latter group is often afraid to be forced to move out of their homes or unsure if they would pass the wealth test.

4.3 Empirical Results

To test the hypotheses about the determinants of non-take-up derived in the previous section, multivariate correlations between the claiming decision and the characteristics of the household are analyzed. By identifying observable characteristics that are associated with the non-take-up decision, the underlying behavior can be approximated with the help of the model. However, since the decision process is complex and certain characteristics influence utility and disutility

simultaneously, demonstrating a clear or causal relationship is impossible. In the following, the relevant sample of analysis includes all households that are eligible for *ALGII* benefits according to the microsimulation.

4.3.1 Cross-Section Probit Model

As argued in section 4.1, I first apply a cross-section probit estimator with heteroscedasticity robust standard errors to estimate the binary outcome variable *take-up* (yes=1/no=0). Analyzing the marginal effects, the variables depicting the household's needs have a particularly strong and significant effect on the take-up decision (compare table A.4 of the appendix). Most notable is the impact of the *relative poverty gap*: being fully dependent on social assistance increases the probability of take-up by 28 (2014) to 44 (2011) percentage points compared to being fully able to cover ones needs independently. Further, the perception of the income situation has a negative and time-stable effect on the claiming decision. As expected, the probability of take-up decreases on average if the household is subjectively happier with its current income situation. Contrary to the theory developed in the last section, the marginal effect of living with at least one child below the age of six in the household does not point in a clear direction and is also insignificant for most of the years. Moreover, the impact of the single parent dummy is also relatively small and only significant for the years 2010, 2013 and 2014 but shows the expected direction. Evaluating the proxy variables for the expected benefit duration, well-educated people seem to face shorter unemployment or underemployment spells and hence, tend to take-up benefits less often on average. The opposite holds for households with a low educational status which increases the probability to claim by three (2007) to twelve (2011) percentage points. Consequently, the increased needs of this group offset the higher application cost less educated households may face. The included age dummies do not show any noteworthy effect. Living in East Germany has a strong and significant impact, increasing the take-up probability by ten (2011) to 18 (2009) percentage points.

Looking at the cost side of the household's decision problem, in contrast to the East Germany dummy, residing in a rural area only has a small and insignificant effect. Unexpectedly, households with a migration background are on average more likely to claim benefits, although this effect is not significant for all years. Similar to the less-educated households, the increased application cost might be compensated by a longer duration of dependence on social assistance. Being a male household head does not seem to have any significant or time-stable impact on the decision to take-up benefits. The marginal effect of the number of *ALGII* recipients in the district points in the expected direction of lowering costs, however is very small and only significant in the years 2011, 2012 and 2014. An additional 10,000 *ALGII* needs units in the surrounding area, increase the probability to claim benefits by 0.1 to 0.3 percentage points. However, the district as the geographic level of analysis is likely chosen too large to detect a clear effect. As there are only 401 districts in Germany, it would be favorable in future research to conduct this analysis on a smaller level. Lastly, the variables that reflect possible lack of information in the claiming decision seem to be of high importance. For example, a working household head decreases the probability of filing a claim by 18 (2012) to 25 (2009) percentage points. The same effect can be observed for the group of home owners. Here the effect ranges from a 20 (2005) to a 33 (2014) percentage points decrease.

After calculating the impact of certain household characteristics on the decision to claim *ALGII* benefits, I can predict a propensity to claim for every household simulated as eligible in the microsimulation. For the 0-1 classification of the take-up decision, 0.5 is chosen as the cut-off value for the underlying probability because both take-up and non-take-up are more or less equally likely to occur. The share of correctly classified households is high, lying between 77.7 percent in 2014 and 82.3 percent in 2010 of all eligible households with an average of over 80 percent correctly classified cases (see table A.4 of the appendix).

4.3.2 Cross-Section Linear Probability Model

As a robustness check, a linear probability estimator is further applied. Since the dependent variable is Bernoulli distributed and as a result the variance of the error terms is not constant across observations, heteroscedasticity robust standard errors are used for inference. Comparing the coefficients of the linear probability model with the marginal effects of the probit model, results are in the same order of magnitude and direction as well as similarly significant. As was the case in the probit model, the strongest effects on the decision to take-up are exhibited by the relative poverty gap, the East Germany dummy, the working household head dummy and the dummy for owning a dwelling (table A.5 of the appendix). Moreover, the impact of living in a rural area, the number of *ALGII* needs units in the district of residence, the unwilling to work dummy and the age dummies have similar to the probit estimation only a small and insignificant impact on the outcome.

The major problem of the linear probability approach is that the probability is only defined on an interval in the range of 0 and 1 and consequently, should not be linearly linked to continuous independent variables. Otherwise, the explanatory variables can possibly drive the probability below zero or above one, generating results that cannot be interpreted in this context. Predicting the take-up probability of the households in the sample, no such effect occurs as predicted values are within a range between zero and one for all years. A more general drawback of the cross-section approach used so far is that it only examines the data at one point in time. Therefore, a fixed effects linear probability model is applied in the next section to make full use of the panel structure of the data.

4.3.3 Linear Probability Model with Fixed Effects

Exploiting the panel structure of the data allows to take advantage of two different types of information: The cross-sectional information reflecting differences between the households and the time series dimension depicting changes within households over time. If the assumption holds that the regression parameters are common to the different years, one can expect efficiency gains since the explanatory variables can vary across two different dimensions [Wooldridge, 2010]. Further, applying a fixed effects estimator allows to control for unobserved heterogeneity, i.e., omitted household-invariant variables, and consequently reduces the bias of the estimation. As it is not favorable to use the probit estimator in combination with fixed effects ², a linear probability model with fixed effects is applied instead (see table A.6). Inference is based on household-clustered

²The maximum likelihood estimator is inconsistent and substantially biased if the length of the panel is fixed (Incidental Parameter Problem) [Cameron and Trivedi, 2005, p.781-82].

standard errors which are robust to serial correlation. Besides employing the same proxy variables as in the cross-section models, I add year dummies to control for year-specific effects capturing the influence of aggregated time trends like economy-wide changes. Household variables that are almost time-invariant, such as the education dummies, the migration background as well as the binary variables for living in East Germany, living in a rural area or the sex of the household head do not give interpretable results due to the construction of the within estimator of the fixed effects analysis that only uses household-specific variation over time.

Analyzing the take-up decision of households over the ten-year time period, the poverty rate and the satisfaction with the household income remain significant determinants at the 0.01 percent level. Controlling for unobserved household characteristics, such as household-specific tastes and attitudes towards welfare, the relative poverty gap still has a strong but slightly smaller impact on the outcome compared to the cross-section results. A household being fully dependent on social assistance increases its probability to claim benefits by 30 percentage points compared to being able to cover its own needs. Moreover, a working household head and the home owner dummy exhibit significant negative effects on the decision to take-up benefits. Analyzing the year dummies indicates time-specific effects compared to the base category of 2005. The probability to claim benefits seems to be lower on average for all succeeding years, although the effect is only significant for the years 2011, 2012 and 2014. When applying the linear probability model to panel data, the same problems arise as in the cross-section case.

In summary, the regression analyses emphasize the importance of the degree of relative needs for the decision to claim benefits. As already discussed in section 2.7, small benefit amounts seem to be left unclaimed more often on average. This is in support of the theory developed in the first part of this chapter, as the utility from claiming increases with higher benefit amounts. My results are in line with previous findings for Germany that also stress the role of the relative household needs for the participation decision [for example, Frick and Groh-Samberg, 2007]. The expected duration of receipt, approximated by the area-specific and individual economic situation of households, is an additional strong determinant of the probability to claim. Even when controlling for living in a rural area in the regressions, the coefficient of the dummy for East Germany remains large and significant in the cross-section models. On the side of the disutility, the higher application costs of less educated households do not seem to outweigh the increased expected duration of benefit receipt. Additionally, a working household head and owning a dwelling has a strong and significant negative impact on the welfare participation decision. This supports previous research by Wiemers [2015] and Bruckmeier et al. [2013], who find comparable effects for Germany. After having discussed the determinants of non-take-up of *ALGII* benefits in this chapter, the next chapter looks at the policy implications based on these findings and builds on the microsimulation of non-take-up households to critically discuss the currently applied calculation procedure of the adult standard benefit rate.

5 Policy Relevance

The rate of non-take-up of *ALGII* benefits should be a concern to policy makers as it can serve as an indicator for the effectiveness of the welfare state and the trust in political institutions. The debate about potential reforms of the system design, the size of the benefit amount and the degree of redistribution is important although to some extent irrelevant if benefits do not reach over half of the eligible population. In the public debate, the problem of non-take-up seems largely unknown or at least neglected. Since the target group of *ALGII* benefits are unemployed people as well as low-income earners, identifying and reducing non-take-up is an important measure to combat poverty and distributional injustice. Contemporaneously, social benefits act as important macroeconomic stabilizers maintaining household consumption in a crisis. As an advantage, benefits are not subject to large implementation lags and run out automatically if the economic situation improves [Eurofound, 2015]. Building on the findings of former research on the topic, some countries already reformed their welfare schemes to address this issue. The following section will introduce some ideas on how to reduce non-take-up in Germany on the basis of the obtained results.

5.1 Policy Advise

At first, it must be mentioned that reducing non-take-up is not a popular policy option because of the increasing public expenditure attached to it. From a policy perspective, addressing benefit fraud is easier to sell [Eurofound, 2015]. However, it is also clear that increasing participation in the *ALGII* system does not increase costs proportionately because the average benefit amount for non-take-up households is smaller than for take-up households. For the baseline model, annual public benefit expenditure would almost double from 24.9 billion euros to 49.6 billion euros if the take-up rate is assumed to be 100 percent instead of 44.3 percent in the year 2014. In return, it is argued that long term cost for society will be lower if take-up is high because the income support system helps to alleviate poverty traps and creates the foundation for reintegration into the labour market [Eurofound, 2015].

The European Foundation for the Improvement of Living and Working Conditions [Eurofound, 2015] suggests several reforms to improve take-up in the member states of the European Union. The authors recommend policy makers to learn from the experiences of affected people and to strengthen the cooperation between public administration, local service providers and non-governmental organizations. A key element to increase welfare participation is to legislate and communicate understandable, uniform and transparent rules. For Germany, the findings of this paper suggest that reforms should be especially targeted at working household heads and home owners among which take-up is particularly low due to being un- or misinformed about the claiming possibility.

Moreover, the authors recommend that criteria should be as homogeneous as possible across regions and a central point of contact can simplify the process as agencies are fragmented and locally operating. Information cost can be further reduced if the administration acts pro-active by, for instance, informing potentially eligible households of their possibilities to claim. Additionally, offering digital application as an alternative to the conventional written request does not only reduce the time-cost associated with the claim, but also the stigma cost of going to the job agency.

These points are relevant to tackle the issue of non-take-up in Germany because the local structure of job agencies can increase the application and information costs. The results of chapter four indicate that households with a lower educational status as well as households with a migration background will profit most from improvements in this area.

To decrease the disutility from stigma, policy makers should also consider to decouple certain benefits from the social welfare system [Eurofound, 2015]. This can be supported by the results of this paper since working-household heads, who are likely to be exposed to higher stigma cost, have a significant lower probability to claim benefits. Consequently, the disutility from claiming benefits can be decreased by dissociating the income support for low-wage earners from the welfare scheme. Besides these general issues that will be common to many European countries, high rates of non-take-up raise another problem, specific to the German context. As will be shown in the following section, neglecting the issue of non-take-up in the calculation of the standard benefit rates will result in a downward bias of the legally set benefit amounts of *ALGII*.

5.2 Calculation of *ALGII* Standard Rates

In 2010, the Federal Constitutional Court (*Bundesverfassungsgericht (BVerfG)*) declared the standard needs of the Social Code as unconstitutional on the grounds that they do not ensure a humane minimum subsistence level as stipulated in Article 1 of the Basic Law. In its judgement the court states that the standard benefit rate must not only cover the physical subsistence minimum but it has also to enable the social and cultural participation of the recipient (BVerfG, 1 BvL 1/09). Besides other points of criticism, noteworthy, the problem of non-take-up households for the calculation of the benefit amount is explicitly mentioned in the ruling. As a consequence, the court gives the order to provide empirical certainty about the extent of non-take-up and the impact it has on the standard rates to improve on the future calculation methodology if necessary. In the aftermath of the ruling, the legislators passed the *Regelbedarfsermittlungsgesetz*, a new law that revises the determination of the standard rates. However, the fundamental procedure remains unchanged as the constitutional judges confirm the methodology of the *Statistical Model* [Rothkegel, 2011]. Standard needs of households are calculated accordingly, by analyzing the relevant expenditure of a reference group of households that lie just above the legally defined subsistence minimum. Households reporting to live solely on income from social assistance are excluded from the calculation. Under the new law, the reference group for single adults is the income bottom 15 percent of all single households. For family households, comprising two adults and one child, the income bottom 20 percent of households with the corresponding composition is used. The analysis is based on data from the Income and Expenditure Survey (*EVS*), a cross-sectional survey conducted every five years by the Statistical Office. The *EVS* enables insights into the detailed income and expenditure structure of households in Germany. To calculate the standard needs of *ALGII* recipients, only a fraction of the observed expenses of the reference group is recognized as relevant for a dignified life by the legislator. For example, the expenditure for alcohol, indoor plants, Christmas trees or pet supplies are not considered relevant [Martens et al., 2016]. On average, only 69 percent of the overall consumption of the adult reference group is classified as relevant and covered by the standard rates of *ALGII* [Becker, 2011].¹

¹See also [Becker, 2011, p. 61] for a comprehensive list of not considered expenditure categories and their amounts.

To justify the application of the *Statistical Model* in its current form, two premises must hold: First, the reported expenditures in the *EVS* must reflect the households' needs and second, all low-income earners of the reference group can actually consume above the legally defined existence minimum. As Becker [2010] argues, the observed consumption is likely to reflect only a share of the actual needs because expenditure at the lower end of the income distribution is to a large extent driven by the budget restriction. Moreover, since the current calculation method does not account for the existence of non-take-up households in the reference groups, the first assumption is clearly violated. If households are eligible to *ALGII* benefits, their income does not cover their needs and they will consume below the existence minimum without claiming their transfers. Observing rates of non-take-up between 54 and 58 percent, expenditure in the reference groups will be substantially biased downwards, leading to lower standard rates for claimants. It represents a conceptual contradiction to include the spending of people falling short of the subsistence income and who do not claim benefits to calculate the standard rates that should ensure the subsistence minimum. Although the problem has been raised since the judgment of the constitutional court at the latest and the impact of non-take-up households on the standard rates has been confirmed by a study commissioned by the Federal Ministry of Labor and Social Affairs, the legislator has not yet responded and adjusted the calculation method, despite consistent and high rates of non-take-up.

In the study carried out in response to the ruling of the constitutional court, Bruckmeier et al. [2013] found increased expenditure of the reference group of two percent for single households and five percent for families with one child if non-take-up households are excluded in the year 2008. More recent work by Becker [2015] suggests that the basic benefit rate for single adults must have been twelve euros per month higher if the issue of non-take-up was accounted for in the calculation. Using the available results of non-take-up from the simulation, I perform a similar analysis for the year 2014 with the *SOEP* survey to show the difference in the adult standard rate when including and excluding non-take-up households from the reference group. However, as the methodology for the determination of the standard rates is tailored to the *EVS* survey, it is only possible to show the relative size of the effect but not an accurate estimate for the level. To determine the change in the benefit amount, the percentage difference is applied to the legally defined adult standard rate of 2014. A major shortcoming of the *SOEP* for this analysis is the unavailability of expenditure information. As an approximation, I use the observed household net income instead. Since the interest is in low-income households, this simplification is justifiable because saving rates are close to zero or even negative.² As the *Regelbedarfsermittlungsgesetz* stipulates, all households reporting receipt of *ALGII* or *Old-Age-Security* and which do not have any other sources of income are excluded from the reference group.³

²For example, Späth and Schmid [2018] find negative saving rates for the first three income decile classes and comparably low rates of 0.8 and 2.9 percent for the fourth and fifth decile.

³This leaves households with low income below the existence minimum that are eligible to additional benefits of the Basic Income Support, the so-called "*Aufstocker*", in the reference group. As a result, analogous to the problematic of non-take-up, the reasoning behind the determination of the standard rates is circular [DGB Bundesvorstand, 2011]. Completely excluding all eligible recipients of *ALGII* and *Old-Age-Security* from the reference group in the sample at hand would lead to an unfeasible increase of the adult standard rate by 55.5 percent.

As a starting point, one can approximately reproduce the reference group under the applicable law by defining the income bottom 15 percent of the single household population and excluding all households that live solely on social assistance as reported in the *SOEP*. Their average monthly income amounts to 423 euros. After further excluding all non-take-up households without any other income sources, the average income increases to 440 euros per month. According to the findings of Becker [2011], an average share of 69 percent of overall expenditure is considered as relevant for the subsistence minimum. However, this excludes the costs for housing and warm water since they are covered separately by the agencies and therefore must be deducted from the net income for calculation. Following this approach, the adult standard rate would be 3.14 percent higher if non-take-up households are excluded from the reference group. Considering the legally defined adult standard rate of 391 euros in 2014, this corresponds to benefits being calculated too low by 12.28 euros per month per adult.

The effect of non-take-up on the standard rates is likely to be amplified by the endogenous relationship between the amount of the entitlement and the decision to take-up benefits. Since small benefits are more often left unclaimed, downward biased standard rates in return increase the share of non-take-up. One solution to this problem is to reform the calculation process and disregard households found eligible to social benefits by microsimulation or at least set a lower bound of income for households in the reference group. Alternatively, the demand-oriented approach is discussed as a completely different method of calculation. Needs of households would be determined according to a basket-of-goods found relevant for a dignified life. However, this approach is highly subjective to the judgment of the experts who arrange the basket. Research by Thießen and Fischer [2008] and Hausstein [2015] on that topic enforce the issue that there is no “true need” because suggested adult benefit rates vary strongly between 132 and 734 euros per month. Hence, it is desirable to revise the *Statistical Method* and improve the consistency of the calculation process.

6 Conclusion

This paper finds that between 2005 and 2014 over half of the eligible households have not made use of their right to claim *ALGII* benefits in Germany. Aside from generating injustice between the claiming and the non-claiming households, non-take-up indicates an ineffective welfare state as the constitutionally anchored goal to ensure a minimum standard of living for everyone cannot be achieved fully. The large share of households that do not claim benefits is a severe social problem as it concerns people living below the legally defined minimum level of subsistence. However, persistently high non-take-up rates suggest that little has been done in the past to tackle this issue. Employing the *STSM* microsimulation model on the basis of data from the Socio-economic panel, I find an average non-take-up rate of 55.7 percent for the time period. Sensitivity checks concerning the simulation assumptions yield a conservatively estimated range of non-take-up between 41.6 and 70.6 percent. Results are especially reliable for groups with a higher risk of poverty, since the beta error of the simulation is substantially smaller for economically inactive households.

Theory explains the decision to take-up benefits as weighing up the utility which arises from the enlargement of the budget restriction, and the disutility from claiming, comprising fixed application cost and cost from social or administrative stigma. Important determinants for the decision-making are found to be the relative benefit amount, the educational status, being a household with a working household head and owning a dwelling. Especially the last two characteristics are important to policy makers as they reflect a lack of information among potential recipients about the possibility to claim, a deficit which could be addressed comparably easy. However, it must be considered that increasing the participation in the welfare program is not a popular policy option. Assuming full take-up of *ALGII* benefits for the year 2014 would almost double the simulated benefit expenditure.

Specific to the German context, the issue of non-take-up has an additional, indirect effect on households which claim *ALGII* benefits because the lump-sum transfer to cover the regular needs is calculated too low. Since the calculation procedure laid down in the *Regelbedarfsermittlungsgesetz* does not account for non-take-up households in the reference group, the approximated consumption expenditure that is considered as necessary for a dignified life is biased downwards. This study suggests that the standard adult benefit amount would have been three percent higher in the year 2014 if the issue of non-take-up was included in the calculation methodology. Overall, the findings of this paper indicate that a socially inclusive welfare state remains an unrealized goal in Germany. Now that the future of the Basic Income Support system is back on the political agenda, the opportunity should be taken to address the issue of non-take-up.

Bibliography

- Anderson, Patricia M. and Meyer, Bruce D.** Unemployment insurance takeup rates and the after-tax value of benefits. *The Quarterly Journal of Economics*, 112(3):913–937, 1997.
- Ashenfelter, Orley.** Determining participation in income-tested social programs. *Journal of the American Statistical association*, 78(383):517–525, 1983.
- Bargain, Olivier; Immervoll, Herwig, and Viitamäki, Heikki.** No claim, no pain. Measuring the non-take-up of social assistance using register data. *The Journal of Economic Inequality*, 10(3):375–395, 2012. URL <https://doi.org/10.1007/s10888-010-9158-8>.
- Becker, Irene.** Bedarfsbemessung bei Hartz IV zur Ableitung von Regelleistungen auf der Basis des “Hartz-IV-Urteils” des Bundesverfassungsgerichts. *WISO Diskurs. Friedrich Ebert Stiftung: Bonn*, 2010.
- Becker, Irene.** Bewertung der Neuregelungen des SGB II. (Methodische Gesichtspunkte der Bedarfsbemessung vor dem Hintergrund des “Hartz-IV-Urteils” des Bundesverfassungsgerichts - Gutachten für die Hans-Böckler-Stiftung)., 2011.
- Becker, Irene.** Der Einfluss verdeckter Armut auf das Grundsicherungsniveau. Arbeitspapier, Arbeit und Soziales 309, Hans-Böckler-Stiftung, 2015. URL <http://hdl.handle.net/10419/119792>.
- Becker, Irene and Hauser, Richard.** Dunkelziffer der Armut. Ausmaß und Ursachen der Nicht-Inanspruchnahme zustehender Sozialhilfeleistungen., 2005.
- Beste, Jonas; Bethmann, Arne, and Gundert, Stefanie.** Sozialstruktur und Lebensumstände: Materielle und soziale Lage der ALG-II-Empfänger. IAB-Kurzbericht 24, Institut für Arbeitsmarkt- und Berufsforschung (IAB) der Bundesagentur für Arbeit, 2014.
- Blundell, Richard; Fry, Vanessa, and Walker, Ian.** Modelling the Take-up of Means-Tested Benefits: The Case of Housing Benefits in the United Kingdom. *The Economic Journal*, 98(390): 58–74, 1988. ISSN 00130133, 14680297. URL <http://www.jstor.org/stable/2233304>.
- Bruckmeier, Kerstin and Wiemers, Jürgen.** A new targeting: a new take-up? *Empirical Economics*, 43(2):565–580, Oct 2012. URL <https://doi.org/10.1007/s00181-011-0505-9>.
- Bruckmeier, Kerstin; Pauser, Johannes; Walwei, Ulrich, and Wiemers, Jürgen.** Simulationsrechnungen zum Ausmaß der Nicht-Inanspruchnahme von Leistungen der Grundsicherung: Studie im Auftrag des Bundesministeriums für Arbeit und Soziales zur Abgrenzung und Struktur von Referenzgruppen für die Ermittlung von Regelbedarfen auf Basis der Einkommens- und Verbrauchsstichprobe 2008. IAB-Forschungsbericht 05, Institut für Arbeitsmarkt- und Berufsforschung (IAB), Nürnberg, 2013. URL <https://EconPapers.repec.org/RePEc:iab:iabfob:201305>.
- Bujard, Otker and Lange, Ulrich.** *Theorie und Praxis der Sozialhilfe: Zur Situation der einkommensschwachen alten Menschen*. Kohlhammer, Stuttgart, 1978.
- Cameron, A. Colin and Trivedi, Pravin K.** *Microeconometrics: methods and applications*. Cambridge university press, 2005.

- Coudouel, Aline; Hentschel, Jesko S., and Wodon, Quentin T.** Poverty measurement and analysis. *A Sourcebook for poverty reduction strategies*, 1:27–74, 2002.
- Craig, Peter.** Costs and benefits: A review of research on take-up of income-related benefits. *Journal of Social Policy*, 20(4):537–565, 1991.
- Currie, Janet.** The take up of social benefits. In Auerbach, Alan J.; Card, David, and Quigley, John M., editors, *Public Policy and the Income Distribution*, pages 80–148. Russell Sage Foundation, New York City, 2006.
- DGB Bundesvorstand, Abteilung Arbeitsmarktpolitik.** Menschenwürdiges Existenzminimum ist weiterhin nicht gewährleistet: Wie weiter mit den HartzIV Regelbedarfen? Arbeitsmarkt aktuell 7, Berlin, 2011.
- Eurofound,** . Access to social benefits: Reducing non-take-up. *Publications Office of the European Union, Luxembourg*, 2015.
- Frick, Joachim and Groh-Samberg, Olaf.** To Claim or Not to Claim: Estimating Non-take-up of Social Assistance in Germany and the Role of Measurement Error. SOEPpapers on Multidisciplinary Panel Data Research 53, DIW Berlin, The German Socio-Economic Panel (SOEP), 2007. URL https://EconPapers.repec.org/RePEc:diw:diwsop:diw_sp53.
- Frick, Joachim R. and Grabka, Markus M.** Der Einfluß von Imputed Rent auf die personelle Einkommensverteilung. 221(3):285–308, 2001. URL <http://hdl.handle.net/10419/67333>.
- Hartmann, Helmut.** Sozialhilfebedürftigkeit und “Dunkelziffer der Armut”: Bericht über das Forschungsprojekt zur Lage potentiell Sozialhilfeberechtigter. *Schriftenreihe des Bundesministers für Jugend, Familie und Gesundheit*, 98, 1981.
- Hauser, Richard and Hübinger, Werner.** *Arme unter uns. 1. Ergebnisse und Konsequenzen der Caritas-Armutsuntersuchung*. Lambertus, Freiburg, 1993.
- Hausstein, Lutz.** Was der Mensch braucht: Empirische Analyse zur Höhe einer sozialen Mindestsicherung auf der Basis regionalstatistischer Preisdaten. 2015. URL <https://www.grundeinkommen.de/wp-content/uploads/2015/06/lutz-hausstein-studie.pdf>.
- Hernandez, Monica and Pudney, Stephen.** Measurement error in models of welfare participation. *Journal of Public Economics*, 91(1):327 – 341, 2007. URL <http://www.sciencedirect.com/science/article/pii/S004727270600079X>.
- Hernanz, Virginia; Malherbet, Franck, and Pellizzari, Michele.** Take-Up of Welfare Benefits in OECD Countries. (17), 2004. URL <https://www.oecd-ilibrary.org/content/paper/525815265414>.
- Kayser, Hilke and Frick, Joachim R.** Take it or leave it: (Non-) take-up behavior of social assistance in Germany. DIW Discussion Papers 210, DIW Berlin, 2000. URL <http://hdl.handle.net/10419/18180>.

- Kerr, Scott A.** Deciding about Supplementary Pensions: A Provisional Model. *Journal of Social Policy*, 11(4):505–517, 1982.
- Knechtel, Erhard.** Die Zahl der einkommensschwachen kinderreichen Familien in der Bundesrepublik. *Soziale Welt*, 11(4):330–339, 1960.
- Lauck, Dominik.** Die SPD und ihr Langzeittrauma. <https://www.tagesschau.de/inland/spd-hartz-debatte-101.html>, 2018. Accessed: 2018-05-28.
- Martens, Rudolf; Puls, Jennifer; Rock, Joachim; Schneider, Ulrich, and Woltering, Christian.** Regelsätze 2017: Kritische Anmerkungen zur Neuberechnung der Hartz IV-Regelsätze durch das Bundesministerium Arbeit und Soziales und Alternativberechnung der Paritätischen Forschungsstelle. Expertise, Der Paritätische Gesamtverband, 2016.
- Mianguan, Li and Robert, Walker.** Shame, stigma and the take-up of social assistance: Insights from rural China. *International Journal of Social Welfare*, 26(3):230–238, 2017. URL <https://onlinelibrary.wiley.com/doi/abs/10.1111/ijsw.12242>.
- Moffitt, Robert.** An Economic Model of Welfare Stigma. *American Economic Review*, 73(5): 1023–35, 1983. URL <https://EconPapers.repec.org/RePEc:aea:aecrev:v:73:y:1983:i:5:p:1023-35>.
- Neumann, Udo and Hertz, Markus.** *Verdeckte Armut in Deutschland: Forschungsbericht im Auftrag der Friedrich-Ebert-Stiftung*. Inst. für Sozialberichterstattung und Lebenslagenforschung, 1998.
- van Oorschot, Wim.** Non-Take-Up of Social Security Benefits in Europe. *Journal of European Social Policy*, 1(1):15–30, 1991. URL <https://doi.org/10.1177/095892879100100103>.
- Riphahn, Regina T.** Rational Poverty or Poor Rationality? The Take-up of Social Assistance Benefits. *Review of Income and Wealth*, 47(3):379–398, 2001. URL <https://onlinelibrary.wiley.com/doi/abs/10.1111/1475-4991.00023>.
- Rothkegel, Ralf.** Hartz-IV-Regelsätze und gesellschaftliche Teilhabe. Die geplanten Änderungen im Lichte des Urteils des Bundesverfassungsgerichts. ZFSH/SGB. *Zeitschrift für die sozialrechtliche Praxis*, 2(2011):69–84, 2011.
- Späth, Jochen and Schmid, Kai Daniel.** The distribution of household savings in Germany. *Jahrbücher für Nationalökonomie und Statistik*, 238(1):3–32, 2018.
- Steiner, Viktor; Wrohlich, Katharina; Haan, Peter, and Geyer, Johannes.** Documentation of the Tax-Benefit Microsimulation Model STSM: Version 2012. Data Documentation 63, DIW Berlin, 2012.
- Thießen, Friedrich and Fischer, Christian.** Die Höhe der sozialen Mindestsicherung: eine Neuberechnung “bottom up”. *Zeitschrift für Wirtschaftspolitik*, 57(2):145–173, 2008.
- Wagner, Gert G; Göbel, Jan; Krause, Peter; Pischner, Rainer, and Sieber, Ingo.** Das Sozio-oekonomische Panel (SOEP): Multidisziplinäres Haushaltspanel und Kohortenstudie für Deutschland—Eine Einführung (für neue Datennutzer) mit einem Ausblick (für erfahrene Anwender). *AStA Wirtschafts- und Sozialstatistisches Archiv*, 2(4):301–328, 2008.

- Whelan, Stephen.** The take-up of means-tested income support. *Empirical Economics*, 39(3): 847–875, Dec 2010.
- Wiemers, Jürgen.** Endogenizing take-up of social assistance in a microsimulation model. A case study for Germany. *International Journal of Microsimulation*, 8(2):4–27, 2015. URL <https://EconPapers.repec.org/RePEc:ijm:journl:v:8:y:2015:i:2:p:4-27>.
- Wilde, Joachim and Kubis, Alexander.** Nichtinanspruchnahme von Sozialhilfe. Eine empirische Analyse des Unerwarteten / Non-take-up Behavior of Social Assistance in Germany. An Empirical Investigation of Unexpected Reactions. *Jahrbuecher fuer Nationaloekonomie und Statistik*, 225(3):347–373, 2005. URL <https://EconPapers.repec.org/RePEc:jns:jbstat:v:225:y:2005:i:3:p:347-373>.
- Wooldridge, Jeffrey M.** *Econometric Analysis of Cross Section and Panel Data*. MIT Press, 2010. URL <http://www.jstor.org/stable/j.ctt5hhcfr>.

Appendix

A. Tables

Table A.1: Average simulated monthly gross housing cost (euros)

| limit household size | Mean Gross Rent | | | | Housing Benefit Act | | | | Actual Rents | | | |
|----------------------------|-----------------|-----|-----|-----|---------------------|-----|-----|-----|--------------|-------|-------|-------|
| | 1 | 2 | 3 | 4+ | 1 | 2 | 3 | 4+ | 1 | 2 | 3 | 4+ |
| urban area | | | | | | | | | | | | |
| 2005 | 302 | 396 | 430 | 486 | 209 | 275 | 320 | 363 | 1,109 | 2,683 | 2,267 | 2,796 |
| 2006 | 312 | 397 | 427 | 498 | 204 | 269 | 316 | 374 | 1,081 | 2,675 | 2,457 | 2,606 |
| 2007 | 305 | 391 | 431 | 491 | 214 | 270 | 320 | 380 | 1,114 | 2,615 | 2,521 | 2,959 |
| 2008 | 320 | 404 | 432 | 506 | 227 | 269 | 316 | 389 | 1,249 | 2,934 | 2,685 | 2,871 |
| 2009 | 334 | 409 | 439 | 493 | 226 | 293 | 340 | 408 | 1,169 | 1,954 | 1,439 | 1,959 |
| 2010 | 335 | 415 | 461 | 523 | 217 | 292 | 344 | 414 | 1,228 | 2,196 | 1,693 | 2,154 |
| 2011 | 329 | 431 | 467 | 542 | 223 | 297 | 337 | 427 | 1,117 | 2,288 | 1,835 | 2,360 |
| 2012 | 332 | 424 | 491 | 546 | 225 | 295 | 352 | 440 | 924 | 2,271 | 1,803 | 2,314 |
| 2013 | 283 | 372 | 440 | 509 | 227 | 285 | 347 | 442 | 1,072 | 2,416 | 2,044 | 2,359 |
| 2014 | 307 | 405 | 473 | 519 | 223 | 302 | 348 | 431 | 985 | 2,371 | 2,240 | 2,411 |
| non-urban area | | | | | | | | | | | | |
| 2005 | 258 | 331 | 346 | 383 | 173 | 241 | 261 | 290 | 980 | 2,357 | 2,096 | 2,649 |
| 2006 | 262 | 320 | 355 | 389 | 181 | 245 | 285 | 274 | 1,094 | 2,258 | 2,388 | 2,525 |
| 2007 | 262 | 339 | 362 | 409 | 198 | 256 | 300 | 299 | 958 | 2,392 | 2,262 | 2,678 |
| 2008 | 278 | 312 | 365 | 389 | 208 | 233 | 254 | 326 | 1,118 | 2,315 | 2,576 | 2,836 |
| 2009 | 280 | 348 | 369 | 403 | 208 | 263 | 296 | 351 | 1,183 | 1,778 | 1,915 | 2,114 |
| 2010 | 262 | 352 | 364 | 428 | 193 | 269 | 291 | 364 | 1,217 | 1,900 | 1,687 | 2,218 |
| 2011 | 272 | 361 | 393 | 440 | 207 | 264 | 313 | 367 | 1,246 | 2,126 | 1,946 | 2,668 |
| 2012 | 272 | 363 | 404 | 448 | 206 | 269 | 327 | 380 | 1,066 | 2,151 | 1,979 | 2,643 |
| 2013 | 221 | 298 | 328 | 370 | 195 | 250 | 289 | 354 | 851 | 2,243 | 2,101 | 2,628 |
| 2014 | 235 | 318 | 338 | 395 | 196 | 259 | 295 | 389 | 872 | 1,804 | 2,134 | 2,755 |

Source: own calculations with STSM based on SOEP v.32, weighted.

Table A.2: Beta Error rate by household characteristics

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| by household type¹ | | | | | | | | | | |
| Single | 0.16 | 0.16 | 0.21 | 0.17 | 0.15 | 0.21 | 0.20 | 0.19 | 0.20 | 0.23 |
| Single Parent | 0.04 | 0.05 | 0.24 | 0.16 | 0.15 | 0.13 | 0.10 | 0.13 | 0.16 | 0.12 |
| Childless Couple | 0.21 | 0.41 | 0.23 | 0.31 | 0.16 | 0.20 | 0.23 | 0.27 | 0.31 | 0.30 |
| Couple with Children | 0.15 | 0.16 | 0.14 | 0.11 | 0.12 | 0.12 | 0.16 | 0.12 | 0.12 | 0.13 |
| by social position² | | | | | | | | | | |
| Self-employed | 0.47 | 0.34 | 0.19 | 0.18 | 0.09 | 0.29 | 0.17 | 0.11 | 0.04 | 0.31 |
| Employee/ Civil Servant | 0.20 | 0.23 | 0.21 | 0.16 | 0.17 | 0.16 | 0.13 | 0.11 | 0.18 | 0.14 |
| Pensioner | 0.52 | 0.75 | 0.64 | 0.53 | 0.41 | 0.55 | 0.51 | 0.68 | 0.61 | 0.70 |
| Economically Inactive | 0.08 | 0.09 | 0.10 | 0.09 | 0.08 | 0.09 | 0.14 | 0.10 | 0.09 | 0.08 |
| by number of children | | | | | | | | | | |
| No children | 0.19 | 0.24 | 0.21 | 0.21 | 0.17 | 0.22 | 0.22 | 0.22 | 0.23 | 0.24 |
| One child | 0.15 | 0.16 | 0.20 | 0.12 | 0.12 | 0.15 | 0.17 | 0.13 | 0.13 | 0.13 |
| Two children | 0.05 | 0.07 | 0.17 | 0.09 | 0.11 | 0.04 | 0.08 | 0.09 | 0.10 | 0.13 |
| Three and more children | 0.08 | 0.07 | 0.04 | 0.02 | 0.03 | 0.05 | 0.08 | 0.07 | 0.06 | 0.09 |
| by sample region | | | | | | | | | | |
| West Germany | 0.17 | 0.18 | 0.19 | 0.17 | 0.13 | 0.19 | 0.21 | 0.20 | 0.21 | 0.20 |
| East Germany | 0.12 | 0.18 | 0.19 | 0.14 | 0.16 | 0.13 | 0.14 | 0.13 | 0.14 | 0.18 |
| by ownership status | | | | | | | | | | |
| Home Owner | 0.41 | 0.47 | 0.30 | 0.33 | 0.23 | 0.35 | 0.29 | 0.35 | 0.32 | 0.39 |
| Tenant | 0.13 | 0.16 | 0.18 | 0.15 | 0.13 | 0.16 | 0.18 | 0.16 | 0.18 | 0.19 |
| Total | 0.15 | 0.18 | 0.19 | 0.16 | 0.14 | 0.17 | 0.19 | 0.18 | 0.19 | 0.20 |

¹ Other household types not displayed due to low case numbers.

² Social position of household head.

Source: own calculations with STSM based on SOEP v.32, weighted.

Table A.3: Variable descriptions

| Variable | Category | Definition | Description |
|--------------------------|------------|--|---|
| Relative Poverty Gap | continuous | interval [0,1] | household needs that cannot be covered by own income in relation to total household needs |
| Young Children | dummy | 0= no, 1= yes | at least one dependent child below the age of six years living in the household |
| Single Parent | dummy | 0= no, 1= yes | household head with at least one dependent child and without a partner living in the household |
| Satisfaction with Income | ordinal | scale 0 to 10 | <i>SOEP</i> concept <i>pzuf</i> of the household questionnaire |
| Unwilling to Work | dummy | 0=no, 1=yes | <i>SOEP</i> variables <i>Actively Sought Work Last 4 Weeks</i> = no and <i>Could Start Immed.-Acceptable Position</i> = no |
| Low Educated | dummy | omitted category: education of household head middle vocational, vocational and Abitur | education of household head inadequately, general elementary education or still in school, <i>SOEP</i> concept <i>isced97</i> |
| High Educated | dummy | omitted category: education of household head middle vocational, vocational and Abitur | education of household head higher vocational, higher education, <i>SOEP</i> concept <i>isced97</i> |
| Young Household Head | dummy | omitted category: household head aged 35 to 50 years | household head below the age of 36 years |
| Old Household Head | dummy | omitted category: household head aged 35 to 50 years | household head older than 50 and below the age of 65 years |
| East Germany | dummy | 0= West Germany, 1= East Germany | household living in the area of the former <i>GDR</i> , Berlin differentiated in East and West Berlin |
| Rural Area | dummy | 0= urban area, 1= rural area | <i>SOEP</i> concept <i>regtype</i> , spatial category by the <i>Bundesamt für Bauwesen und Raumordnung</i> |
| <i>ALGII</i> in District | count | | number of <i>ALGII</i> needs units in the district (<i>Kreis</i>) of residence according to statistics by the Federal Employment Agency |
| Migration Background | dummy | 0= no, 1= yes | household head has a direct migration background, <i>SOEP</i> concept <i>migback</i> |
| Male Household Head | dummy | 0= female, 1= male | |
| Working Household Head | dummy | 0= no, 1= yes | household head is in dependent employment, civil service, self-employed or in training |
| Home Owner | dummy | 0= no, 1= yes | <i>SOEP</i> variable <i>Tenant or Owner of Dwelling</i> |

Table A.4: Marginal effects of the pooled probit estimation, years 2005-2014

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Relative Poverty Gap | 0.329 (0.024)** | 0.346 (0.024)** | 0.324 (0.026)** | 0.331 (0.025)** | 0.324 (0.028)** | 0.427 (0.018)** | 0.438 (0.017)** | 0.426 (0.019)** | 0.371 (0.020)** | 0.280 (0.022)** |
| Young Children | 0.035 (0.031) | 0.091 (0.028)** | 0.094 (0.033)** | 0.086 (0.033)** | -0.020 (0.037) | 0.017 (0.019) | 0.033 (0.019) | -0.002 (0.021) | -0.007 (0.020) | 0.002 (0.022) |
| Single Parent | 0.005 (0.027) | 0.028 (0.027) | -0.008 (0.029) | 0.021 (0.028) | 0.021 (0.031) | 0.058 (0.020)** | 0.018 (0.019) | 0.035 (0.020) | 0.067 (0.019)** | 0.091 (0.020)** |
| Satisfaction with Income | -0.031 (0.004)** | -0.027 (0.004)** | -0.031 (0.005)** | -0.030 (0.004)** | -0.033 (0.005)** | -0.027 (0.003)** | -0.022 (0.003)** | -0.021 (0.003)** | -0.025 (0.003)** | -0.028 (0.003)** |
| Rural Area | 0.006 (0.024) | 0.016 (0.024) | 0.046 (0.026) | -0.008 (0.026) | 0.005 (0.028) | 0.021 (0.017) | 0.034 (0.016)* | 0.027 (0.018) | 0.037 (0.019)* | 0.038 (0.019)* |
| East Germany | 0.146 (0.025)** | 0.172 (0.024)** | 0.145 (0.026)** | 0.149 (0.025)** | 0.183 (0.027)** | 0.113 (0.018)** | 0.096 (0.017)** | 0.106 (0.019)** | 0.097 (0.020)** | 0.099 (0.020)** |
| Migration Background | 0.061 (0.028)* | 0.095 (0.028)* | 0.097 (0.031)** | 0.082 (0.030)** | 0.068 (0.034)* | 0.052 (0.022)* | 0.035 (0.020) | 0.064 (0.023)** | 0.042 (0.018)* | 0.093 (0.019)** |
| Male Household Head | 0.001 (0.023) | -0.036 (0.024) | -0.059 (0.026)* | -0.075 (0.025)** | -0.009 (0.027) | -0.021 (0.020) | -0.006 (0.019) | 0.002 (0.020) | 0.020 (0.019) | 0.012 (0.020) |
| ALGII in District | 0.000 (0.001) | 0.001 (0.001) | 0.003 (0.002) | 0.002 (0.002) | 0.001 (0.002) | 0.002 (0.001) | 0.002 (0.001)* | 0.003 (0.001)* | 0.002 (0.001) | 0.003 (0.001)** |
| Unwilling to Work | 0.011 (0.045) | -0.031 (0.046) | -0.038 (0.046) | -0.109 (0.043)* | 0.061 (0.057) | -0.002 (0.029) | -0.054 (0.027)* | 0.027 (0.031) | -0.022 (0.029) | -0.029 (0.028) |
| Low Educated | 0.048 (0.025) | 0.081 (0.025)** | 0.032 (0.029) | 0.108 (0.027)** | 0.117 (0.029)** | 0.108 (0.019)** | 0.123 (0.018)** | 0.088 (0.020)** | 0.087 (0.019)** | 0.079 (0.020)** |
| High Educated | -0.095 (0.029)** | -0.075 (0.027)** | -0.115 (0.028)** | -0.051 (0.029) | -0.075 (0.032)* | -0.061 (0.023)** | -0.060 (0.021)** | -0.102 (0.023)** | -0.144 (0.023)** | -0.173 (0.023)** |
| Young Household Head | -0.028 (0.026) | -0.025 (0.027) | -0.004 (0.030) | -0.044 (0.030) | 0.020 (0.032) | 0.017 (0.019) | 0.001 (0.019) | -0.029 (0.021) | 0.008 (0.020) | -0.010 (0.022) |
| Old Household Head | 0.035 (0.026) | 0.011 (0.025) | 0.067 (0.026)* | 0.037 (0.026) | 0.030 (0.028) | 0.017 (0.022) | 0.020 (0.019) | 0.009 (0.020) | 0.044 (0.020)* | 0.008 (0.020) |
| Working Household Head | -0.252 (0.018)** | -0.189 (0.019)** | -0.204 (0.021)** | -0.212 (0.020)** | -0.253 (0.020)** | -0.182 (0.016)** | -0.184 (0.015)** | -0.181 (0.017)** | -0.204 (0.016)** | -0.200 (0.017)** |
| Home Owner | -0.199 (0.024)** | -0.224 (0.025)** | -0.227 (0.027)** | -0.242 (0.026)** | -0.220 (0.028)** | -0.255 (0.021)** | -0.270 (0.019)** | -0.276 (0.022)** | -0.313 (0.024)** | -0.332 (0.023)** |
| N | 1,364 | 1,394 | 1,189 | 1,150 | 1,017 | 2,243 | 2,641 | 2,468 | 2,548 | 2,327 |
| Correctly Classified | 80.7 % | 80.4 % | 79.0 % | 80.7 % | 81.8 % | 82.3 % | 81.1 % | 79.5 % | 77.8 % | 77.7 % |

* p-value < 0.05; ** p-value < 0.01, standard errors of marginal effects in parentheses, regression on unweighted data. Estimate for constant not displayed.

Source: own calculations with STSM based on SOEP v.32.

Table A.5: Linear probability estimation, years 2005-2014

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|--------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Relative Poverty Gap | 0.387 (0.029)** | 0.413 (0.028)** | 0.383 (0.032)** | 0.393 (0.031)** | 0.370 (0.033)** | 0.510 (0.024)** | 0.527 (0.023)** | 0.493 (0.025)** | 0.429 (0.024)** | 0.315 (0.025)** |
| Young Children | 0.044 (0.034)* | 0.106 (0.030)** | 0.102 (0.036)** | 0.085 (0.036)* | -0.011 (0.039) | 0.026 (0.019) | 0.038 (0.019)* | 0.003 (0.022) | -0.004 (0.021) | 0.000 (0.023) |
| Single Parent | 0.013 (0.029) | 0.043 (0.029) | -0.013 (0.032) | 0.021 (0.030) | 0.028 (0.03) | 0.071 (0.021)** | 0.026 (0.019) | 0.043 (0.020)* | 0.076 (0.020)** | 0.096 (0.021)** |
| Satisfaction with Income | -0.032 (0.005)** | -0.031 (0.005)** | -0.033 (0.005)** | -0.033 (0.005)** | -0.036 (0.005)** | -0.029 (0.003)** | -0.025 (0.003)** | -0.022 (0.003)** | -0.026 (0.003)** | -0.030 (0.004)** |
| Rural Area | 0.013 (0.024) | 0.022 (0.024) | 0.056 (0.026)* | -0.006 (0.026) | 0.004 (0.028) | 0.021 (0.018) | 0.033 (0.017)* | 0.025 (0.018) | 0.032 (0.019) | 0.040 (0.020)* |
| East Germany | 0.154 (0.027)** | 0.180 (0.026)** | 0.153 (0.028)** | 0.156 (0.027)** | 0.185 (0.030)** | 0.122 (0.019)** | 0.102 (0.018)** | 0.114 (0.020)** | 0.105 (0.020)** | 0.104 (0.021)** |
| Migration Background | 0.068 (0.030)* | 0.105 (0.030)** | 0.104 (0.035)** | 0.092 (0.034)** | 0.069 (0.037) | 0.057 (0.024)* | 0.040 (0.022) | 0.064 (0.024)** | 0.046 (0.019)* | 0.098 (0.020)** |
| Male Household Head | 0.005 (0.024) | -0.027 (0.025) | -0.061 (0.027)* | -0.078 (0.026)** | -0.003 (0.028) | -0.017 (0.021) | -0.004 (0.019) | 0.001 (0.020) | 0.017 (0.019) | 0.011 (0.020) |
| ALGII in District | 0.000 (0.001) | 0.001 (0.002) | 0.003 (0.002) | 0.002 (0.002) | 0.001 (0.002) | 0.002 (0.001) | 0.003 (0.001)* | 0.003 (0.001)* | 0.002 (0.001) | 0.003 (0.001)* |
| Unwilling to Work | 0.010 (0.054) | -0.037 (0.051) | -0.036 (0.051) | -0.125 (0.053)* | 0.058 (0.060) | 0.001 (0.030) | -0.042 (0.027) | 0.024 (0.030) | -0.012 (0.029) | -0.023 (0.028) |
| Low Educated | 0.057 (0.028)* | 0.100 (0.028)** | 0.042 (0.031) | 0.135 (0.029)** | 0.128 (0.032)** | 0.120 (0.021)** | 0.130 (0.019)** | 0.104 (0.021)** | 0.099 (0.019)** | 0.092 (0.021)** |
| High Educated | -0.088 (0.027)** | -0.067 (0.026)** | -0.108 (0.027)** | -0.038 (0.027) | -0.071 (0.031)* | -0.076 (0.023)** | -0.074 (0.021)** | -0.107 (0.022)** | -0.139 (0.022)** | -0.163 (0.022)** |
| Young Household Head | -0.032 (0.027) | -0.020 (0.029) | 0.003 (0.032) | -0.046 (0.032) | 0.026 (0.033) | 0.017 (0.021) | 0.001 (0.020) | -0.027 (0.022) | 0.005 (0.021) | -0.013 (0.023) |
| Old Household Head | 0.030 (0.026) | 0.014 (0.026) | 0.063 (0.027)* | 0.032 (0.026) | 0.034 (0.028) | 0.023 (0.022) | 0.021 (0.019) | 0.011 (0.019) | 0.049 (0.019)* | 0.009 (0.020) |
| Working Household Head | -0.317 (0.025)** | -0.242 (0.025)** | -0.254 (0.028)** | -0.267 (0.027)** | -0.315 (0.028)** | -0.233 (0.020)** | -0.226 (0.019)** | -0.227 (0.021)** | -0.232 (0.019)** | -0.236 (0.020)** |
| Home Owner | -0.211 (0.025)** | -0.237 (0.026)** | -0.245 (0.028)** | -0.259 (0.026)** | -0.226 (0.029)** | -0.249 (0.019)** | -0.266 (0.018)** | -0.265 (0.019)** | -0.303 (0.020)** | -0.303 (0.020)** |
| Adjusted R2 | 0.41 | 0.41 | 0.42 | 0.44 | 0.42 | 0.46 | 0.44 | 0.40 | 0.38 | 0.36 |
| N | 1,364 | 1,394 | 1,189 | 1,150 | 1,017 | 2,243 | 2,641 | 2,468 | 2,548 | 2,327 |

* p-value < 0.05; ** p-value < 0.01, standard errors in parentheses, regression on unweighted data. Estimate for constant not displayed.

Source: own calculations with STSM based on SOEP v.32.

Table A.6: Linear probability estimation with fixed effects, years 2005-2014

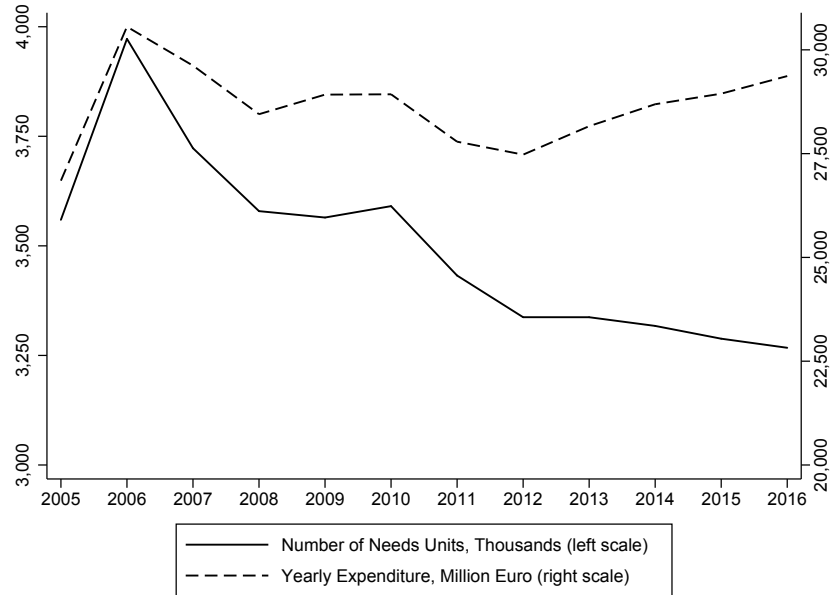
| Variable | Take-up | Variable | Take-up |
|--------------------------|---------------------|-------------------------|---------------------|
| Relative Poverty Gap | 0.299 (0.016)** | Household Head Working | -0.113 (0.011)** |
| Young Children | 0.005 (0.013) | Owner-Occupied Housing | -0.062 (0.027)* |
| Single Parent | 0.024 (0.022) | Year 2006 | -0.016 (0.011) |
| Satisfaction with Income | -0.010 (0.002)** | Year 2007 | -0.010 (0.013) |
| Rural Area | 0.021 (0.055) | Year 2008 | -0.026 (0.014) |
| East Germany | 0.062 (0.074) | Year 2009 | -0.023 (0.015) |
| Migration Background | -0.054 (0.082) | Year 2010 | -0.040 (0.015)** |
| Male Household Head | -0.020 (0.040) | Year 2011 | -0.040 (0.015)** |
| ALGII in District | -0.001 (0.003) | Year 2012 | -0.040 (0.016)* |
| Unwilling to Work | -0.015 (0.012) | Year 2013 | -0.029 (0.016) |
| Low Education | -0.004 (0.067) | Year 2014 | -0.043 (0.017)* |
| High Education | -0.015 (0.049) | Adjusted R ² | 0.11 |
| Young Household Head | -0.006 (0.021) | N | 18,341 |
| Old Household Head | 0.020 (0.015) | | |

* p-value < 0.05; ** p-value < 0.01, standard errors in parentheses, regression on unweighted data. Estimate for constant not displayed.

Source: own calculations with STSM based on SOEP v.32.

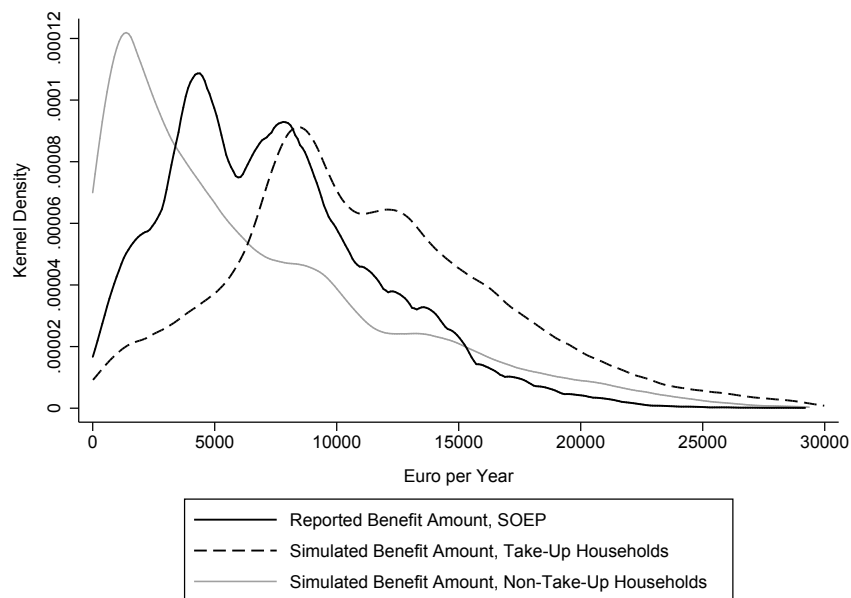
B. Figures

Figure B.1: Development of needs units and benefit expenditure, 2005-2016



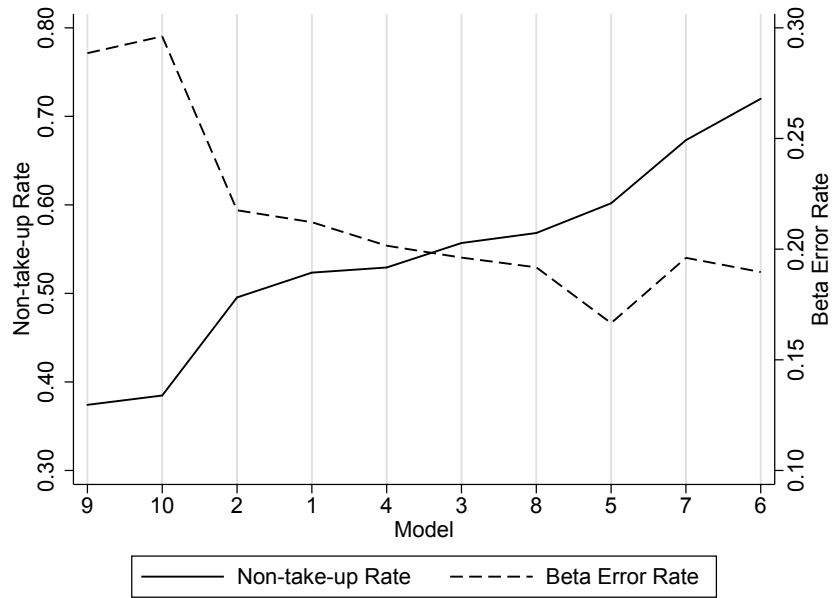
Expenditure excluding administrative expenses.
Source: Official statistics of the Federal Employment Agency.

Figure B.2: Distribution of simulated benefit amounts



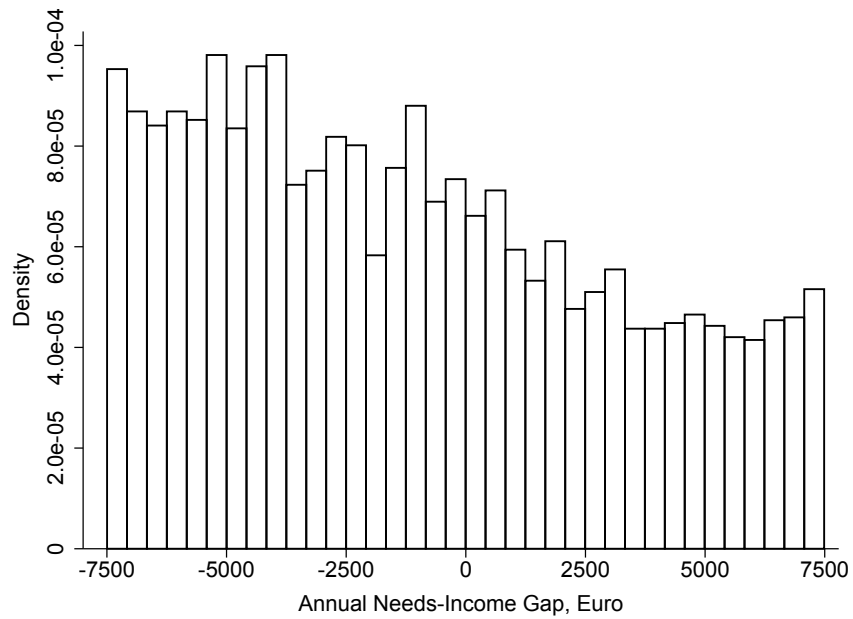
Source: Own calculations with STSM based on SOEP v.32.

Figure B.3: Non-take-up and beta error rate by model specification



Source: Own calculations with STSM based on SOEP v.32.

Figure B.4: Distribution of households at the boundary of eligibility



Source: Own calculations with STSM based on SOEP v.32.