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Thanks, but No Thanks

A Microsimulation of BAföG Eligibility and Non-Take-Up

Alexander Eriksson Byström & María Sól Antonsdóttir

Department of Economics

Lund University School of Economics and Management

Supervisor: Petra Thiemann

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Abstract

While the body of literature on the non-take-up of public aid has grown substantially in recent years, a notable gap remains in the literature of non-take-up rates for student aid programs, where research is still extremely limited. This paper examines the non-take-up rate of Germany's federal student aid program BAföG by creating a microsimulation based on data from the German Socio-Economic Panel for the period 2007–2021. Using the outcome of our microsimulation, we estimate three specifications of binary choice models to examine how individual characteristics relate to take-up decisions. Our findings indicate that non-take-up has increased over the past decade, with an average rate of approximately 60% for our study period. Several factors contribute to this pattern. Students who expect only a small award are much more likely to forgo BAföG, while those who are more familiar with the programme, for example through a sibling who has already claimed, tend to have lower non-take-up rates. We also observe notable regional differences as students from East Germany are more likely to apply than those from West Germany, which may reflect differing attitudes toward state support. Age and partnership status are also associated with higher non-take-up, whereas we do not find evidence that behavioural traits such as risk preference, patience, or impulsiveness play a substantial role.

Keywords: Non-take-up, Microsimulation, SOEP, Student Aid, Student Loans, BAföG, Education Funding.
JEL codes: I22, I23, I24, I38, H53

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Contents

1 Introduction

In Germany, access to higher education is primarily supported through BAföG, a means-tested financial aid program designed to provide equal opportunities for students from low-income families. In recent years, however, the proportion of eligible students receiving support has gradually declined. This trend has received increasing attention in both academic research and policy discussions, with ongoing debate about whether BAföG is achieving its intended goals (Gwosć and van der Beek, 2022; Meier et al., 2024a).

Several structural factors contribute to the persistent issue of low take-up. A central obstacle is the complexity of the application process, which imposes substantial informational burdens on students. These burdens can deter applications, particularly given that BAföG support rates are widely viewed as insufficient relative to students' actual cost of living. In addition to these economic and informational barriers, existing research points to behavioural factors that may further discourage take-up, especially in the face of procedural complexity. Together, these intertwined factors pose a significant challenge for policymakers aiming to expand BAföG's reach and effectiveness (Bhargava and Manoli, 2015; Bolland et al., 2024; Staack, 2017).

This paper investigates the factors influencing non-take-up of BAföG among eligible students in Germany, focusing on economic, informational, and behavioural aspects. The analysis focuses on higher education students aged 18 and above, whose circumstances and relevant policy considerations differ from those of younger students and individuals in vocational training. There has been little focused research on the non-take-up of BAföG among eligible students, and recent trends over the past decade have yet to be systematically examined. This is particularly important given the further decline in take-up rates in recent years. By analysing microdata from 2007 to 2021, this study adds to the understanding of non-take-up among eligible students, taking into account more recent years.

To address this, we develop a microsimulation model using data from the German SOEP panel survey (Goebel et al., 2024). The model collects income and background information for relevant individuals and applies the appropriate statutory rules in effect at each point in time, before assessing BAföG eligibility. By comparing simulated eligibility

with reported receipt, we measure non-take-up and use three binary choice model specifications to analyze the factors associated with take-up among eligible students. Our analysis incorporates covariates for expected subsidy amounts, informational constraints, and proxies for attitudes toward government support, among others.

Our results indicate that the non-take-up rate among theoretically eligible students ranged from approximately 50 to 70% during the period, averaging around 60%, which is higher than estimates reported in earlier studies. A slight upward trend in non-take-up can be observed in recent years. Students with weaker social capital are less likely to take up the support, highlighting the role of informational barriers in non-take-up. Existing concerns remain that BAföG may not fully achieve its objective of ensuring equal access to education.

Our findings emphasize the limitations of incremental financial aid adjustments and point to the need for more fundamental reforms. In recent years, BAföG support rates have not kept pace with the rising cost of living for students. Future reforms could include ensuring that support levels are regularly adjusted to reflect actual student expenses, alongside simplifying application procedures and improving the accessibility of information. Taken together, these insights contribute to ongoing policy discussions about how to design student aid models that are both adequate and accessible, in order to promote educational equity and ensure that support reaches those who need it most.

2 Literature review

As a form of social benefit, federal student aid such as BAföG faces similar challenges as other public support programs. One of the main challenges is ensuring that eligible individuals actually claim the assistance available to them. When those who qualify for support do not apply, the effectiveness of the policy is reduced. This can have broader consequences, since the overall goals of social programmes, such as reducing poverty or acting as automatic stabilisers during economic downturns, depend on reaching those in need (Goedemé and Janssens, 2020). Furthermore, if individuals who would benefit the most are not reached, both the efficiency and equity of social policy may be compromised.

This phenomenon, known as non-take-up, refers to situations where individuals meet the legal eligibility requirements but do not receive the benefit, often because they do not apply. This is different from "non-enrolment", which also includes individuals who do not meet the eligibility criteria to begin with. Non-take-up of social benefits can be understood as resulting from factors at three main levels: individual circumstances (such as awareness, perceived stigma, or attitudes toward the benefit), administrative practices, and the broader design or structure of benefit schemes (Van Oorschot, 2002).

While non-take-up can be shaped by factors at multiple levels, much of the economic literature places particular emphasis on the individual perspective. To frame our empirical analysis, we draw on economic models of welfare take-up, particularly those emphasizing the cost-benefit decision-making process of eligible individuals (Booij et al., 2012; Van Oorschot, 2002). In this context, the decision to claim aid is generally understood as a cost-benefit trade-off, where individuals weigh the expected benefits, both monetary and non-monetary, against the costs associated with claiming. These costs are typically grouped into three categories: informational, procedural, and psychological or social. This framework helps explain why eligible individuals might choose not to apply even when a financial benefit is available, since each type of cost can affect the decision in a distinct way:

- **Information costs** refer to the time and effort required to learn about available benefits, understand the eligibility rules, navigate the application process, and assess the possible consequences of claiming support. This may for example include

searching for reliable information or clarifying confusing requirements.

- **Process costs**, on the other hand, involve the resources spent during the actual application process. These can include filling out forms, providing documentation, traveling to relevant offices, waiting in lines, or facing other administrative hurdles.
- Finally, **social and psychological costs** capture the emotional and interpersonal challenges associated with claiming benefits. A key factor here is stigma, which can for example manifest as personal discomfort with claiming support or concern over how others may perceive the claimant. The extent to which stigma is felt can be shaped both by the way benefit programs are designed and by broader social attitudes.

It follows from the above that these costs of claiming tend to increase when procedures are complex or lack clear explanation. In line with this, standard economic theory predicts that individuals are more likely to claim benefits when the expected payout is large or long-lasting, and less likely when the application process is complicated or socially stigmatised (Booij et al., 2012; Janssens and Mechelen, 2022). This relationship between complexity, costs, and take-up is also highlighted by Akerlof (1978), who argues that while targeted welfare programs ("tagging") are theoretically efficient in resource allocation, the way such programs are structured in themselves often leads to the kinds of complexities and unintended incentives discussed above.

Among these different types of costs, recent research suggests that information costs may play a particularly important role in explaining non-take-up. Individuals who are unaware of available benefits are much less likely to claim them, and higher perceived information costs are consistently associated with lower take-up rates. In fact, studies such as Bolland et al. (2024) and Currie (2004) suggest that, compared to process complexity or stigma, information costs are the most significant predictor of non-take-up. In line with this, several studies suggest that stigma is generally less relevant in the context of student aid than in other forms of public support (see for example, Konijn et al. (2023), Currie (2004) and Bruckmeier and Wiemers (2012)).

While this view reflects traditional economic thinking, recent research suggests that non-take-up may persist even when financial and administrative barriers are minimal. For example, Bhargava and Manoli (2015) show that even when procedural barriers are low,

cognitive and behavioural factors can still lead to high levels of non-take-up. One important factor is present-bias, where individuals place greater weight on immediate costs or inconveniences compared to future benefits. As a result, relatively minor psychological obstacles, such as uncertainty about eligibility, confusing application steps, or unclear instructions, can discourage people from applying. Tasks like completing forms or gathering documents may feel disproportionately burdensome, causing individuals to delay or avoid the application process altogether, even when they recognize that receiving the benefit would be worthwhile in the long run (Currie, 2004). These findings support broader behavioural models that recognize limits to attention, self-control, and cognitive resources.

Considered collectively, the literature suggests that both informational and behavioural barriers may be relevant for explaining non-take-up, although studies vary in their assessment of the relative importance of each. Reflecting this, our analysis includes measures of both informational and behavioural factors, with the aim of providing additional evidence on their roles in the context of BAföG specifically.

Beyond the overall effects, evidence points to variation in how different groups are affected by these barriers. Complex application procedures have the strongest negative impact on take-up among low-income and otherwise disadvantaged groups, such as first-generation students and those less familiar with paperwork and official processes. Ironically, these groups are often the main targets of aid programs due to their greater need, yet they appear especially likely to miss out on support because of such barriers. Additionally, language barriers can further reduce take-up for students from migrant backgrounds (Bhargava and Manoli, 2015; Currie, 2004; Dynarski and Scott-Clayton, 2006).

Although several studies emphasise that migrant students may be especially hindered by informational or language barriers, the empirical evidence is mixed. Herber et al. (2019) report higher take-up among migrant students in Germany, and Konijn et al. (2023) find a similar pattern for the Netherlands. These divergent results suggest that the relationship between migration background and take-up may depend on the specific institutional and socio-economic context.

Taken together, the factors discussed in this chapter can affect take-up rates substantially. While research on non-take-up of student aid is still remarkably limited, the literature body on non-take-up of other social benefits has grown substantially in recent years.

Non-take-up of means-tested benefits specifically appears to be a widespread and persistent phenomenon across different countries and programs. Some studies have suggested that non-take-up rates rarely fall below 20%, even in relatively well-studied contexts (Van Oorschot, 2002). In a recent paper by Goedemé and Janssens (2020), high non-take-up levels for means-tested social assistance schemes are highlighted, often ranging between 30 to 70%. To illustrate the issue of non-take-up, we present recent selected findings for a range of social benefits in Table 1.

Author(s)	**NTU (%)**	**Year of Data**	**Country**	**Program Type**
Herber et al. (2019)	36–40	2002–2013	Germany	BAföG
Konijn et al. (2023)	24	2019	Netherlands	Student Aid
Frick and Groh-Samberg (2007)	67	2002	Germany	Social Assistance
Fuchs (2007)	49–61	2003	Austria	Social Assistance
Goedemé (2022)	60	2019	Belgium	Social Assistance
Harnisch (2019)	56	2005–2014	Germany	Income support
Domingo and Pucci (2014)	68	2010	France	Earnings supplement

Table 1: Selected international estimates of non-take-up (NTU) rates for social benefit programs. Program types are abbreviated or summarized for clarity.

Notably, for student aid programs, only a small number of studies such as Herber et al. (2019) for Germany and Konijn et al. (2023) for the Netherlands provide concrete non-take-up estimates. For many other student aid schemes, published measures of non-take-up rates are limited, and the relative lack of research in this area is noteworthy. Much of the existing literature instead focuses on the factors influencing take-up decisions rather than quantifying its overall prevalence.

In the end, it is a complex interaction of multiple different factors, including scheme structure, administrative practices and individual factors, that ultimately determines non-take-up. The research literature shows that the specific combination of factors shaping non-take-up varies across different benefit schemes, target groups, administrative contexts, and over time. This interconnectedness helps explain why studies focusing on similar issues often arrive at different conclusions. It also emphasizes that responsibility for non-take-up does not rest solely with individuals, but is shared by administrators and policymakers who shape the broader environment in which claiming decisions are made (Van Oorschot, 2002). This is why efforts to increase take-up in social benefit programs have often been found to fall short when they focus on removing individual administrative

barriers in isolation. Research has shown that meaningful improvements are more likely when multiple obstacles are addressed together (Currie, 2004). This perspective highlights the need for policymakers to consider the entire application process from the applicant's point of view, rather than relying on isolated changes that may leave other important barriers in place.

Building on these insights, the next section focuses on BAföG, outlining the institutional and policy context relevant to student aid provision in Germany.

3 Background

The federal training assistance act (de. Bundesausbildungsförderungsgesetz, BAföG) is a public student aid system supplied by the German Federal Ministry of Education and Research (BMBF). BAföG is designed to financially support students, with the primary aim to promote equal opportunities in the education system and unlock educational potential (Meier et al., 2024a). The eligibility criteria for the loan is therefore relatively strict to make sure that only students who are genuinely in need of the loan have access to it.

Since the introduction of BAföG, the aid has adhered to the principle of subsidiarity in its basic conception, which is in line with traditional welfare policies in Germany. That is the principle that smaller local units perform their own tasks and a central authority only provides help when necessary, i.e. has a subsidiary function. In the context of BAföG, this means that first, in order to finance their studies, students must rely on their own income and assets. The next larger social units to be held accountable are spouses or partners, and next the parents become financially responsible. Only after these social units have been exhausted can students seek support from the state through BAföG. It is important to note that this support is not granted automatically; students must actively apply for the entitlement themselves (Staack, 2017). By contrast, countries such as those in the Nordic region tend to provide more universal benefits, reflecting a broader role for the state in supporting students (Gwosć and van der Beek, 2022; Schwarz and Rehburg, 2004). Thus, differences in student aid systems reflect deeper variations in welfare philosophies across countries.

These contrasting approaches are often described in terms of two main design principles for public student funding. The first is the provision principle, where financial aid is narrowly targeted to specific groups, most often through means-testing. This approach is reflected in the design of Germany's BAföG, which is primarily targeted to reach students from socio-economically disadvantaged backgrounds. The second approach is the welfare principle, which provides public aid to a broader share of the student population. This model is more common in the Nordic countries, where financial support is generally designed to reach most students (Gwosć and van der Beek, 2022; OECD, 2024).

Recent research suggests that students in countries with welfare-based student aid systems

report fewer serious financial difficulties. These systems may also achieve slightly better representation of different social groups in higher education compared to more narrowly targeted models like BAföG. Gwosć and van der Beek (2022) even go so far as to propose a shift toward a more universal system, arguing it would substantially increase participation in student aid, though likely at the cost of greater loan reliance and with only modest improvements in social equity due to upstream structural inequalities.

To understand eligibility for BAföG and the amount of support awarded, it is essential to comprehend the means-testing process. The BAföG system calculates entitlements primarily based on the income and assets of the student and their parents, involving a detailed review of the applicant's financial situation. This includes the parents' income after accounting for taxes, social security contributions, and other standard allowances, with any income exceeding a predefined threshold deducted directly from the student's potential entitlement. The resulting support is structured so that roughly half comes as a non-repayable grant, while the other half is provided as an interest-free loan, part of which is typically canceled if certain repayment conditions are met after graduation (Herber et al., 2019).

A description of the process is visualized in Figure 1, which outlines a simplified version of the calculation of income and asset adjustments for both students and parents. For a more detailed simulation example of an individual in our dataset, see Appendix D.

The BAföG application process is often regarded as overly complicated and discouraging. Applicants must provide detailed information on fourteen types of income and sixteen categories of assets and debts. Parents are also required to complete a comprehensive four-page form about their income and any siblings. Before 2016, all applications had to be submitted in hardcopy. On average, students spend more than five hours completing the paperwork (Fidan and Manger, 2021).

These challenges, among other factors, may help explain the ongoing decline in the proportion of students receiving financial aid. Since the introduction of BAföG in 1971, the proportion of students receiving financial aid has fallen from around 50 percent to just 13 percent in 2021 (Kroher et al., 2023). Of those recipients, only about half received full funding (Meier et al., 2024b). The decline over time appears to be driven in part by stricter eligibility rules, such as income thresholds that have not always kept pace with

inflation or with the actual cost of living for students, which results in fewer students qualifying now than in earlier decades (Meier et al., 2024b).

This gap between support and student needs is illustrated by data from the German National Student Survey (Sozialerhebung), which show that from 2000 to 2017, the maximum BAföG support rate remained below average reported student expenses. It was only in 2022, with the 27th amendment to BAföG (Bundestag, 2022a), that the maximum support rate was increased to exceed average living costs for the first time (Meier et al., 2024a,b). This increase took place after the end of the period covered in this analysis and is therefore not reflected in the data used.

Both the size of the BAföG award and who ultimately receives support are determined by two core components of the system: the exemption thresholds and the standard support rate. Exemption thresholds exist for different sources of income and assets, applying separately to income of students, parents, and assets. These thresholds specify the portion of income or assets that is disregarded when calculating eligibility, so only amounts above these limits affect the aid a student can receive. The standard support rate specifies the basic amount of financial assistance that a student is eligible to receive, based on factors such as their living situation. These two mechanisms are interconnected, as raising the income exemption threshold both increases the number of students eligible for BAföG and raises the amounts granted to those who previously received only partial support.

Both the support rate and the exemption threshold must be reviewed every other year and adjusted as needed to reflect changes in living costs, economic conditions, and income trends.[1] When considering trends in BAföG uptake it is important to recognise that a declining share of students receiving funding does not necessarily indicate that fewer students are in need of support. Some of the decline might reflect general improvements in living standards. Income per capita in Germany has increased over the past two decades, and shifts in demographics and household income levels may mean that some students are no longer eligible under the current rules. This can be viewed as a general prosperity effect. Furthermore, the share of students receiving financial aid is also affected by various behavioural factors, including fluctuations in demand for education and the social composition of prospective students. This proportion does thus not accurately

[1] In accordance with §35 BAföG, see Bundesministerium der Justiz (2025).

reflect how many students are actually in need of financial aid nor how many of them receive such aid (Meier et al., 2024a,b).

While a drop in financial aid rates might suggest that fewer students are in need of support, this interpretation has its limits. Rising income levels and changing demographics may explain some of the reduced eligibility, but they don't account for why many students who are eligible choose not to apply. Things like uncertainty about eligibility, the complexity of the system, or whether the amount of support seems worth the effort, all influence take up rates. As previous studies have shown, it's not just about who qualifies on paper, it's also about how the system is experienced by students themselves (Meier et al., 2024a,b).

Survey data helps to illustrate why many students do not apply for BAföG in practice. According to the 22nd German student survey, around 80% of students did not apply for BAföG during the 2021 term. The most common reason given was thinking that parental income was too high, cited by about 74% of non-applicants. The second most common reason stated was the perception that own income or assets were too high, with just under 30% of non-applicants claiming that. Fear of debt was cited by just over 21% of non-applicants, making it the third most common reason. Additionally, around 8% indicated that the expected funding amount would be too low as a reason for not applying (Kroher et al., 2023).

These findings underscore the need to examine not only eligibility rules, but also the practical and perceived barriers that shape students' decisions to apply for financial aid. The following chapters take up these questions in more detail.

4 Data

To estimate non-take-up rates of welfare benefits, research typically relies on one or more of three data sources: administrative records, specially designed surveys, and general purpose household surveys. Each comes with its own trade-offs. Administrative data are accurate for tracking benefit receipt but usually lack information on those who do not apply. Special surveys can provide richer detail on eligibility and claiming behaviour, though they are costly and rarely implemented. General purpose surveys are more readily available and widely used in empirical research on non-take-up, even if they are not designed with this purpose in mind (Mechelen, 2017).

In line with much of the existing literature, this study relies on data from the German Socio-Economic Panel (SOEP), which falls into the third category of general-purpose household surveys. As one of the longest-standing multidisciplinary household surveys in the world, SOEP has been conducted annually since 1984 by the German Institute for Economic Research (Goebel et al., 2024). It is a nationally representative longitudinal study that collects data from around 30,000 individuals in 22,000 households each year. The survey includes respondents aged 17 and older and provides rich individual- and household-level information on income, education, labour market activity, household structure, and demographics. This study uses the SOEP-Core sample, the central and most comprehensive module of the dataset. While general purpose surveys like SOEP are not specifically designed to measure non-take-up, they have the advantage of covering both benefit receipt and the before mentioned characteristics needed to estimate eligibility (Mechelen, 2017).

4.1 Sample Description

We restrict our analysis to the period between 2007 and 2021, as this corresponds to the range for which we were able to consistently collect and harmonize the necessary statutory parameters from official BAföG regulations (Bundesministerium der Justiz, 2025). These parameters include annual updates to base need rates, income allowances, asset thresholds, and other legally defined components relevant to BAföG eligibility and award determination.[2]

[2]See Appendix D for an example illustrating how these rules are applied.

Our final dataset comprises 5,889 student-year observations, each representing a student in a given survey year, drawn from a harmonized sample based on SOEP-Core data spanning the above mentioned period. The panel is unbalanced, as students are observed for varying numbers of years depending on education duration, dropout behavior, and survey participation.

While some students appear only once, others are followed across multiple years of their educational trajectory. Each observation includes comprehensive information on sociodemographic background, enrolment status, income and assets, housing situation, and reported BAföG receipt. Variables used in the simulation are consistently available throughout the entire period. To ensure accurate simulation of BAföG eligibility and awards, we restrict the sample to students for whom we can identify income information for both parents. Although the SOEP survey is nationally representative, this analytic subsample is conditional on respondents enrolled in education and meeting the inclusion criteria of the simulation pipeline. Further description of our implementation of the data is provided in the next chapter. In addition, a descriptive overview of key variables is provided in Appendix C, Table C4.

A summary of the main variables for both the non-take-up (NTU) sample and the full eligible sample is presented in Table 2. The table provides an overview of key demographic, socioeconomic, informational, and behavioural variables for each group. These descriptive statistics help illustrate the composition of the samples and set the stage for the microsimulation and the regression analyses that follow.

Descriptive statistics: non-take-up (NTU) and full eligible sample

Variable	NTU Sample			Full Sample		
	Mean	Min	Max	Mean	Min	Max
Main explanatory variable						
Simulated BAföG Amount (EUR)	400	52	861	123	0	861
Demographics and Socioeconomic						
Age	23	18	34	23	18	41
Female (%)	52	n/a	n/a	51	n/a	n/a
Has partner (%)	2	n/a	n/a	2	n/a	n/a
Migration background (%)	31	n/a	n/a	20	n/a	n/a
Institutional and Informational						
Lives with parents (%)	43	n/a	n/a	48	n/a	n/a
Sibling claimed BAföG (%)	35	n/a	n/a	30	n/a	n/a
East background (%)	17	n/a	n/a	21	n/a	n/a
Parents highly educated (%)	25	n/a	n/a	43	n/a	n/a
Behavioural Predictors						
Patience (0–10)	6.2	0	10	6.0	0	10
Impulsiveness (0–10)	5.0	0	10	4.9	0	10
Risk appetite (0–10)	5.3	0	10	5.1	0	10

Table 2: Descriptive statistics for two groups: the non-take-up (NTU) subsample, consisting of students classified as eligible but not receiving BAföG support, and the full sample of all theoretically eligible students. Means for binary and categorical variables are expressed as percentages. Min/Max values are not applicable for binary variables.

Note: The mean simulated BAföG in the full sample is lower because it includes all observations with a simulated amount of zero.

5 Method

This study proceeds in two main steps. First, we perform a microsimulation to calculate theoretical BAföG eligibility and award amounts based on statutory rules applied to individual-level survey data. This simulation serves to identify who is entitled to student aid under the legal framework.

Second, we estimate two binary response models along with a linear probability model to analyze behavioural non-take-up. That is, the likelihood that students eligible for BAföG according to the simulation nonetheless do not receive it. These models incorporate relevant socioeconomic and demographic factors to explore determinants of non-take-up beyond eligibility alone.

5.1 Microsimulation of Theoretical BAföG Eligibility

Microsimulation is a modelling approach that uses detailed individual-level data to apply policy rules directly to each observation. Instead of relying on representative averages, this method captures how specific characteristics and circumstances influence outcomes across the population (Klevmarken, 2022).

Given the complexity of BAföG eligibility rules, the need to simulate tax rules when calculating individual incomes, and the importance of capturing individual backgrounds, microsimulation is well suited to this analysis. Our model reconstructs eligibility and award amounts by applying both the statutory BAföG criteria and relevant tax regulations to detailed SOEP survey data. This approach ensures that net incomes for students and their parents, which are central to means-testing under BAföG, are calculated in accordance with statutory rules.

We identify eligible students based on statutory criteria, regardless of whether they actually received aid. Figure 1 provides an overview of the steps in the microsimulation pipeline.

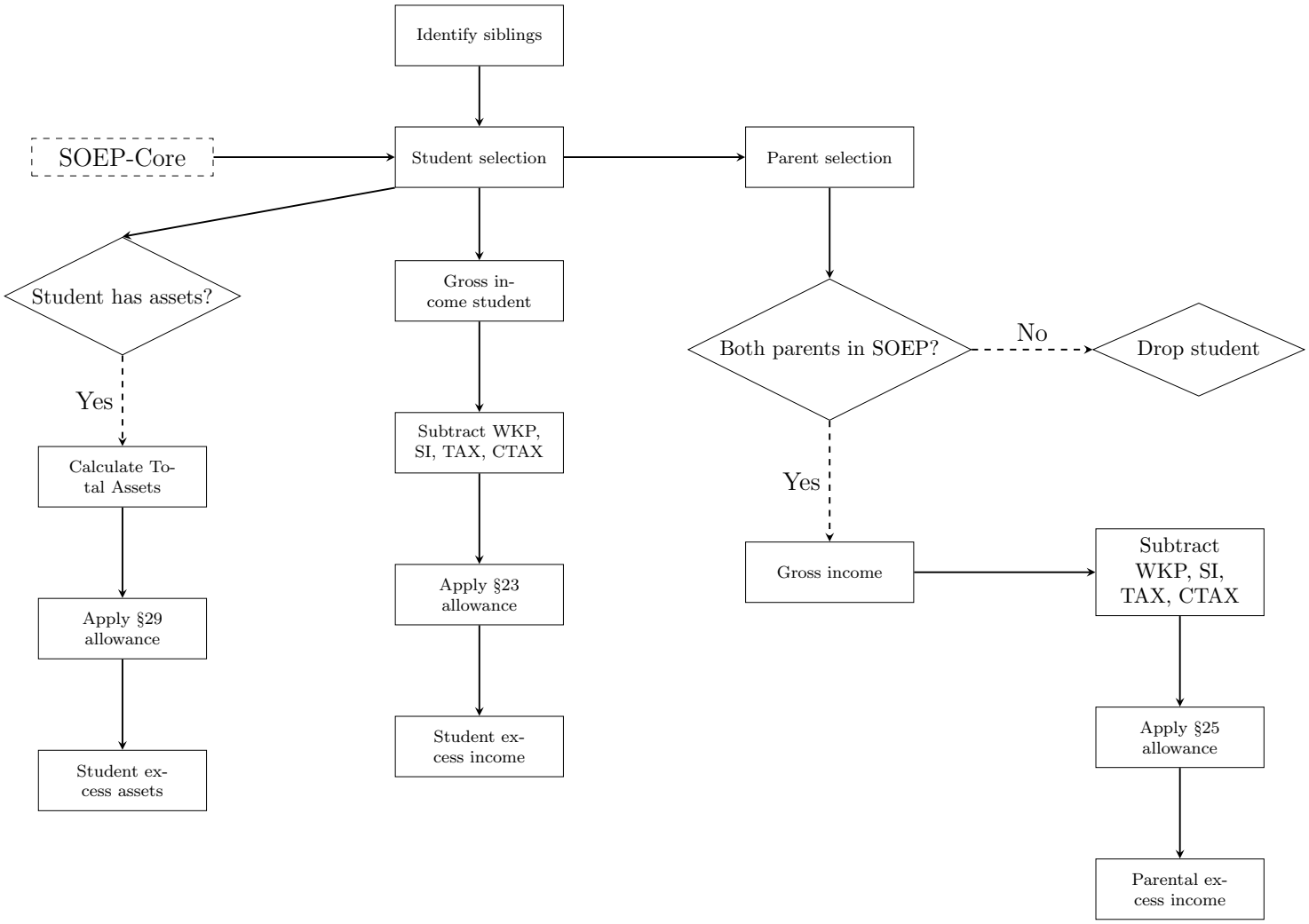

Figure 1: Flowchart for the calculation of student and parental income and asset adjustments. This process includes the identification of relevant income and asset sources, subtraction of allowable expenses, and the application of specific allowances under sections *§23*, *§25* and *§29* of BAföG. Abbreviations: *WKP*: Standard deduction for work-related expenses, *SI*: Social Security, *TAX*: Income tax, *CTAX*: Church Tax.

The microsimulation model implements the legal rules and means-testing procedures set out in BAföG (Bundesministerium der Justiz, 2025) for the years 2007 to 2021. For each student in the SOEP-Core sample, the model uses information on income, assets, and household structure for the student as well as for others who are expected to help support them, such as the parents and spouse, if any. The process involves calculating net incomes according to the relevant tax rules, applying asset limits and deductions, and then determining eligibility and award amounts using the statutory formulas. In this way, the model aims to reflect how eligibility decisions are made in practice. The result is a theoretical eligibility and award amount for each student, which can be directly compared to self-reported BAföG take-up. For a detailed example of how the full calculation logic applies in practice, see Appendix D.

5.1.1 Simulation Methodology

The pipeline begins by assembling a harmonized dataset of student-level observations from SOEP-Core and manually harmonizing variables that are not already harmonized. This is achieved by filtering for individuals who are enrolled in education, fall within the relevant survey years, and are at least 18 years old. To ensure a valid estimation of parental contributions, the dataset is further restricted to cases where income data from both legal parents are observable in the panel, thereby reducing bias and improving the accuracy of eligibility estimates. The most important statutory input parameters used throughout the simulation, such as needs rates, income disregards, and deduction formulas, are documented in Appendix E.

Calculating Own Income. This student-level dataset serves as the core of the simulation pipeline, providing the central structure to which all additional information is appended. It integrates sociodemographic variables, including sex, age, partnership status, number of siblings, number of children, household composition, and federal state of residence. Gross student income is also appended at this stage. Net student income is derived from gross values by applying year-specific rules for income tax, solidarity surcharge, and church tax where applicable, as well as standard deductions.[3] This net income will later be used to compute the student's excess income as part of the BAföG

[3]Standard deductions as defined in §§ 21–23 of the BAföG law; see Bundesministerium der Justiz (2025) for details.

need assessment.

Calculating Parental Contributions. Accurate parental income information is essential for constructing a credible BAföG means test. The simulation pipeline aggregates and evaluates parental income to estimate the expected contribution toward the student's BAföG entitlement. For each student, the incomes of both legal parents, identified within the household and linked through SOEP family structure data, are retrieved and converted into annual net income. The net income of parents is retrieved the same way as the student's own income (applying income tax, solidarity surcharge, standard deductions, and church tax).

Net incomes from both parents are combined into a joint parental income measure. From this, the model subtracts statutory allowances,[4] which vary depending on whether one or both parents are present, the number of dependent children, and year-specific legal thresholds. Additional deductions are applied if the student has siblings who might also be eligible for support. The result is a measure of excess parental income, which feeds directly into the theoretical award calculation.

Measuring Assets. SOEP collects asset data only every five years (2007, 2012, 2017, and 2022), leaving gaps in between. To address this, we used linear interpolation to estimate missing values. Although asset values may not always change linearly, this straightforward method allows us to create a continuous asset measure suitable for the microsimulation.

The simulation applies an asset test to evaluate whether students possess financial resources exceeding statutory exemption thresholds. For each student, net assets are calculated by aggregating financial assets, real estate, business holdings, private insurances, vehicles, and other tangible property, minus reported debts. These total net assets are then compared against the exemption limits,[5] which depend on age, partnership status, and number of dependent children. Any amount above the relevant threshold is considered excess and reduces the student's calculated need.

[4] As defined in §§ 24–25 BAföG; see Bundesministerium der Justiz (2025).
[5] Set out in § 29 BAföG; see Bundesministerium der Justiz (2025).

Modelling taxes. Full tax-return simulations, such as those in Herber et al. (2019), require detailed information (e.g., deductions, extraordinary expenses) that the SOEP does not always provide. Therefore, we approximate net parental income using the statutory tax bracket formulas,[6] updated annually since 2007.

Need calculation and theoretical entitlement. In the final stage, the simulation model determines the student's funding need by combining the statutory base need, housing allowance, and health insurance supplement.[7] From this total amount, any excess income of the student, their parents, and any excess assets are deducted. The remainder represents the student's theoretical monthly BAföG entitlement.

In its simplest form, this can be expressed as:

$$\text{Entitlement} = \text{Need} - \text{Excess Income} - \text{Excess Assets} \tag{5.1}$$

A positive entitlement does not automatically imply eligibility: the model also applies age-based eligibility criteria. Students are only considered theoretically eligible if they meet the age requirements defined in the law, typically under 30 at the beginning of studies for undergraduate studies and under 35 for graduate-level programs. The final output includes both the simulated monthly award and a binary eligibility flag, which are used for comparison against self-reported values in SOEP. Detailed examples of this calculation and relevant thresholds are provided in Appendix D.

5.1.2 Measuring Non-Take-Up and Eligibility Classification Errors

We define non-take-up of BAföG (NTU) in line with Nelson and Nieuwenhuis (2021) as the circumstance when a person is eligible for welfare but does not receive it. Conversely, take-up (TU) refers to eligible individuals who do receive BAföG. This terminology is commonly used in the literature on welfare take-up rates.

The non-take-up rate is thus the number of eligible individuals who do not receive BAföG divided by the total number of eligible individuals. Formally, this is expressed as

[6] As defined in § 32a EStG and updated annually since 2007; see Buzer (2006, 2007, 2011, 2013a,b, 2015a,b, 2016a,b, 2018a,b, 2020, 2022a,b, 2024a,b,c).

[7] Specified in § 13 BAföG; see Bundesministerium der Justiz (2025).

$$\Pr(\text{NTU} = 1 \mid M = 1) = \frac{\sum_{i=1}^{N} \mathbf{1}\{R_i = 0 \text{ and } M_i = 1\}}{\sum_{i=1}^{N} \mathbf{1}\{M_i = 1\}}, \tag{5.2}$$

where the indicator function is defined as

$$\mathbf{1}\{\cdot\} = \begin{cases} 1 & \text{if the condition inside the braces is true,} \\ 0 & \text{otherwise,} \end{cases} \tag{5.3}$$

and the binary variables R_i and M_i are defined as

$$\begin{aligned} R_i &= \begin{cases} 1 & \text{if individual } i \text{ reports receiving BAföG in SOEP,} \\ 0 & \text{otherwise} \end{cases} \\ M_i &= \begin{cases} 1 & \text{if individual } i \text{ is classified as eligible in our model,} \\ 0 & \text{otherwise} \end{cases} \end{aligned} \tag{5.4}$$

A key limitation in simulating benefit take-up is the potential for misclassification. Even when the legal framework is closely replicated, differences between simulated and actual BAföG decisions can occur. These differences can arise from factors that are unobserved or not accurately measured in the survey data, as well as from administrative exceptions or complexities that the model does not fully capture (Frick and Groh-Samberg, 2007; Janssens and Derboven, 2022). Because the analysis relies on self-reported survey data, both income and benefit receipt are subject to potential inaccuracies. Without access to administrative records, it is difficult to determine whether such cases reflect true model misclassification or reporting error.

Some individuals may receive BAföG despite being classified as ineligible by the model. These cases, known as false positives, or sometimes as beta errors or type II errors, often reflect the same reporting errors, missing information or administrative exceptions described above. Formally, the beta error rate is given by:

$$\Pr(\text{TU} = 1 \mid M = 0) = \frac{\sum_{i=1}^{N} \mathbf{1}\{R_i = 1 \text{ and } M_i = 0\}}{\sum_{i=1}^{N} \mathbf{1}\{M_i = 0\}}, \tag{5.5}$$

where $\mathbf{1}\{\cdot\}$ is the indicator function defined as

$$\mathbf{1}\{\cdot\} = \begin{cases} 1 & \text{if individual } i \text{ is ineligible but receives BAföG,} \\ 0 & \text{otherwise.} \end{cases}$$

To assess the reliability of the simulation, we use two strategies. First, a sensitivity analysis is performed by adding normally distributed noise to the log-transformed income variables, to evaluate how income misreporting could affect non-take-up estimates.[8] Second, we interpret the share of false positives (beta errors) as an indicator of potential misclassification. Overall model accuracy is measured as:

$$\text{Accuracy} = \frac{\text{True Positives} + \text{True Negatives}}{\text{Total number of cases}} \tag{5.6}$$

While these measures cannot fully eliminate uncertainty, they provide a basis for assessing the robustness of the results and identifying areas where eligibility classification may be less reliable. The findings should be interpreted with caution, as prior research has shown that even modest levels of misreporting can substantially affect take-up analyses (Pudney, 2001).

Nonetheless, by systematically applying the legal framework to detailed individual data, the simulation offers a consistent and transparent benchmark for studying eligibility and take-up, helping to inform both academic research and policy discussions despite the inherent limitations of survey-based analysis.

5.2 Binary Choice Model

After having identified theoretically eligible students and measured non-take-up (NTU) of BAföG, the focus now shifts to exploring the factors that drive this outcome. To do so, we estimate a binary choice model of the form

$$\Pr(\text{NTU} = 1 \mid \mathbf{X}) = F(\mathbf{X}^\top \boldsymbol{\beta}), \tag{5.7}$$

[8] We apply the log transformation to the incomes to approximate a normal distribution, as the income data is right-skewed. See Appendix B, Figure B1.

where NTU is a binary indicator for non-take-up, $\mathbf{X}$ is the vector of covariates listed in Table 2, and $F(\cdot)$ is a link function that maps the linear index to a probability.[9]

We consider three specifications for $F(\cdot)$, corresponding to commonly used binary choice models. The Probit model uses the cumulative distribution function (CDF) of the standard normal distribution, the Logit model uses the CDF of the standard logistic distribution, and the Linear Probability Model (LPM) uses a linear functional form.

Model	**Link Function** $F(\mathbf{X}^\top \boldsymbol{\beta})$	**Estimation Method**
Probit (Standard Normal CDF)	$\Phi(\mathbf{X}^\top \boldsymbol{\beta})$	Maximum Likelihood
Logit (Standard Logistic CDF)	$\Lambda(\mathbf{X}^\top \boldsymbol{\beta})$	Maximum Likelihood
Linear Probability Model	$\mathbf{X}^\top \boldsymbol{\beta}$	Ordinary Least Squares (OLS)

Table 3: Specifications of the Binary Choice Models

While the SOEP is a panel dataset with information collected from individuals across multiple years, the sample size of eligible students is too small to support reliable longitudinal analysis. For this reason, all models are estimated on a pooled cross-section of theoretically eligible individuals ($n = 458$).

The logit and probit models are nonlinear estimators of the probability of non-take-up, based on an underlying latent index framework. Their coefficients represent changes in the unobserved latent variable and are not directly interpretable in terms of changes in the probability of the observed outcome. To facilitate interpretation, we report average marginal effects (AME), which approximate the average change in the probability of non-take-up associated with a one-unit increase in each covariate.[10]

In practice, logit and probit models typically yield similar qualitative results, with differences largely driven by the tails of the distribution. We report both for completeness. The LPM then serves as a linear benchmark. While it has some limitations in model-

[9] This formulation can be motivated by a latent variable model: $\text{NTU}^* = \mathbf{X}^\top \boldsymbol{\beta} + \varepsilon$, where NTU^* is an unobserved continuous variable and ε follows a standard normal distribution (probit) or a logistic distribution (logit). The observed binary outcome is $\text{NTU} = 1$ if $\text{NTU}^* > 0$, and $\text{NTU} = 0$ otherwise.

[10] The AME for covariate X_k is computed as the sample analogue of the population moment $\mathbb{E}[f(\mathbf{X}^\top \boldsymbol{\beta}) \cdot \beta_k]$, where $f(\cdot)$ is the derivative of the link function $F(\cdot)$. Specifically,

$$\widehat{\text{AME}}_k = \frac{1}{n} \sum_{i=1}^{n} f(\mathbf{X}_i^\top \hat{\boldsymbol{\beta}}) \cdot \hat{\beta}_k = \mathbb{E}_n \left[f(\mathbf{X}^\top \hat{\boldsymbol{\beta}}) \cdot \hat{\beta}_k \right],$$

where $\mathbb{E}_n[\cdot]$ denotes the empirical expectation over the sample.

ling binary outcomes, such as producing predicted probabilities outside the $[0, 1]$ range, it provides a simple and transparent interpretation, as coefficients directly represent the marginal effects.

5.2.1 Key Predictors of Non-Take-Up

Our model includes a set of explanatory variables informed by existing literature and the institutional context of BAföG. These variables capture a range of factors that may influence students' decisions about applying for financial aid, including demographic characteristics, socioeconomic background, and selected behavioural traits.

In particular, the model includes variables for risk preferences, migration background, prior family experience with BAföG, and regional socialization. These variables are selected to capture differences in access to information, institutional trust, familiarity with the application process, and attitudes toward public support. While our primary goal is to estimate the association between these factors and non-take-up among eligible students, the inclusion of conceptually relevant variables also helps to account for sources of heterogeneity that might otherwise bias the estimated effects of financial incentives.

The rationale for including several of these variables is further elaborated below, drawing on prior research and theoretical considerations.

Age, sex, and partnership status. First, we control for basic demographics that may influence financial aid decisions. Age is included as it can correlate with students' life circumstances or progression through higher education, potentially influencing their financial situation or familiarity with administrative procedures. Sex (female) is included to account for possible gender-related patterns in financial decision-making or access to information. Partnership status is also considered, as having a partner might affect household resources, support, or information exchange that could be relevant for BAföG take-up.

Migration background. Recent research has found that students from migrant households often have lower levels of financial literacy, which can create additional challenges in understanding eligibility requirements and navigating the BAföG application process (Tsegay, 2024). In the analysis, both direct and indirect migration backgrounds are taken into account to consider whether varying levels of familiarity with the German aid system

are related to take-up. Including migration background in this way helps to identify potential structural or informational barriers that could contribute to lower BAföG uptake.

Living with parents. Living with parents can lower students' living expenses and provide additional support, which may reduce both the need for financial aid and the likelihood of applying for BAföG. Including this variable helps account for differences in household circumstances that could influence non-take-up among eligible students.

Sibling prior experience with BAföG. Having a sibling who has previously received BAföG may provide students with practical knowledge and guidance during the application process. Herber et al. (2019) suggest that this type of family experience can help reduce informational and procedural barriers, potentially encouraging eligible students to apply. Including this variable allows us to examine whether informal support within families influences take-up decisions.

East German socialisation. A student's social and regional background may influence their attitudes toward government intervention due to historical and cultural context. Research by Alesina and Fuchs-Schündeln (2007) finds that individuals with an East German background tend to be more supportive of redistribution and more trusting of public assistance, even years after reunification. In our analysis, we include a regional indicator for current residence in East Germany as a proxy for these socialisation effects. Its significance in our model suggests that this proxy captures meaningful differences in how students perceive and respond to BAföG.

Parental education. Parental education often shapes students' educational and financial behaviours. We flag students whose parents hold at least a bachelor's degree as coming from higher-educated households to test whether this background affects BAföG application patterns.

Risk appetite, impulsiveness and patience. To understand why some eligible students do not apply for BAföG, we consider their willingness to take risks. Even though BAföG offers relatively safe and generous terms, risk-averse students might still avoid taking on any debt. Including this measure allows us to test whether risk preferences can help explain patterns of non-take-up. Herber et al. (2019) also include risk attitudes in

their analysis, primarily to assess whether risk aversion affects take-up or interacts with traits such as impatience. Although they do not find a strong effect, they suggest that risk attitudes remain relevant for understanding application behaviour. Based on this reasoning, risk attitudes are included as a control in our model as well.

In addition to risk appetite, we account for impulsiveness and patience using scales constructed by SOEP based on several survey questions. These behavioural traits might influence how students make financial decisions, so including them helps capture additional sources of variation in BAföG take-up.

6 Results

6.1 Microsimulation: Non-take-up rates

Our microsimulation results indicate that the non-take-up rate of BAföG, among theoretically eligible students, ranged from approximately 50–68% across the survey years 2007–2021, with an average of 60% (Table 4). These estimates are broadly in line with previous findings on non-take-up of social benefits in Germany, which generally fall between around 40–70%, depending on the program and time period (see Table 1 for example). While our estimates are broadly consistent with prior research, they are noticeably higher than the 36–40% non-take-up rate for BAföG reported by Herber et al. (2019), who also use SOEP survey data, but for the period 2002–2013.

Several factors may help explain the difference in estimated non-take-up rates. These factors include the specific SOEP variables used to capture income and reported BAföG receipt, as well as differences in the time periods covered (2007 to 2021 in our study versus 2002 to 2013 in Herber et al. (2019)). Other aspects of the microsimulation design and modelling approach may also contribute to the variation. Importantly, the overall accuracy of our model in classifying receipt status is 72%, as defined by the share of correctly predicted recipients and non-recipients (see equation 5.6). While not perfect, this level of accuracy is consistent with expectations given the complexity of the BAföG system and the limitations of self-reported survey data.

While there is some variation in non-take-up across years, it remains consistently quite high throughout the period. The rate fluctuates from a low of 50% in 2013 to a high of approximately 68% in 2019. This pattern is clearly illustrated in Figure 2, which shows a visible decline from 2008 up to 2013, followed by a gradual upward trend from 2016 until 2019.

The increase in non-take-up in the years preceding 2021 could potentially reflect behavioural or institutional factors such as changes in awareness, perceived complexity, or attitudes toward debt. It could also be partly driven by policy changes. Several BAföG reforms were introduced during this period, including increases in grant amounts and adjustments to income thresholds, which may have influenced both eligibility and the

Year	**Non-Take-Up** $\Pr(\text{NTU} = 1 \mid \text{M} = 1)$	**Take-Up Rate** $\Pr(\text{TU} = 1 \mid \text{M} = 1)$	**Beta Error** $\Pr(\text{TU} = 1 \mid \text{M} = 0)$
2007	60.6	39.4	13.6
2008	63.5	36.5	17.1
2009	61.0	39.0	18.6
2010	60.9	39.1	17.7
2011	53.8	46.2	16.1
2012	51.5	48.5	18.9
2013	50.0	50.0	15.9
2014	55.1	44.9	16.1
2015	64.0	36.0	12.6
2016	56.5	43.5	12.4
2017	62.6	37.4	10.1
2018	63.9	36.1	15.3
2019	67.5	32.5	11.7
2020	63.7	36.3	13.6
2021	66.7	33.3	12.3
Average	**59.7**	**40.3**	**15.0**

Table 4: Non-Take-Up, Take-Up, and Beta Error Rates by Survey Year (%). Non-take-up is the share of theoretically eligible students ($M = 1$) who do not receive BAföG. The take-up rate is simply the complement, i.e., the share of eligible students who do receive BAföG ($1 - \Pr(\text{NTU} = 1 \mid M = 1)$). Beta error is the share of ineligible students ($M = 0$) who nevertheless receive BAföG.

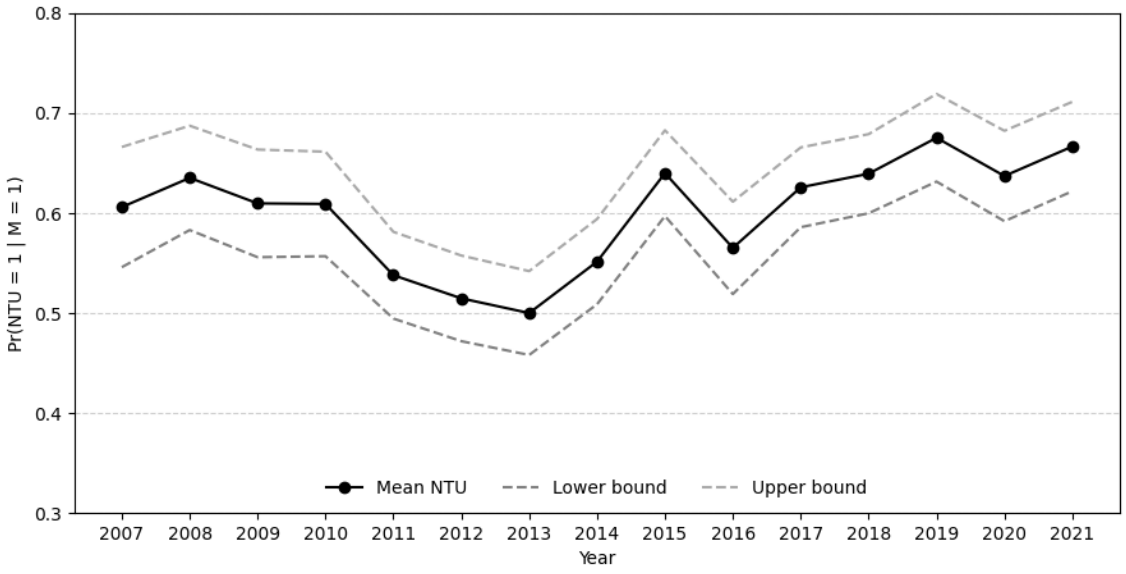

Figure 2: Development of the probability of non-take-up from 2007 to 2021. Error bands represent ±1 standard error.

perceived attractiveness of the program. Since the simulation accounts for these legal changes, the results capture not only behavioural responses, but also how reforms may have affected take-up incentives over time.

The fourth column in Table 4 shows the estimated beta error, which is the share of students who are classified as ineligible by the simulation but report receiving BAföG. On average, the beta error is approximately 15% across the full period. This degree of misclassification is similar to what has been observed in other studies of non-take-up, where issues such as income reporting errors and timing mismatches are common (Frick and Groh-Samberg, 2007). While this level of beta error is not negligible, the simulation seems to capture eligibility status fairly well overall, even if some noise is inevitable.

Taken together, the results suggest that a large share of eligible students do not take up BAföG, and that this has been the case fairly consistently over time. The high average non-take-up rate, of around 60%, points to persistent barriers such as lack of information or procedural hurdles. The financial attractiveness of BAföG may also be a factor. Although support amounts were increased at several points, the need-based allowances have consistently failed to keep pace with the actual cost of living for students (Staack, 2017). This could help explain why some students perceive the benefit as not worth the effort of applying.

6.1.1 Stability of Simulated Non-Take-Up under Income Noise

Table 5 reports conditional probabilities of take-up behaviour under varying levels of artificially introduced measurement errors in income. To evaluate the robustness of our non-take-up classification, we add normally distributed noise to the log-transformed income variables before recalculating theoretical BAföG entitlements and eligibility indicators. The standard deviation of this noise ranges from 0% (baseline) to 30%.

The findings reveal that simulated take-up probabilities remain highly stable despite income misreporting. Across all survey years, the probability of non-take-up changes only slightly, even at the highest noise level.

This robustness indicates that small to moderate errors in reported income do not significantly impact eligibility classification or population-level take-up estimates. It also reflects characteristics of the BAföG eligibility formula, where income thresholds, flat

Non-Take-Up and Beta Error Rates by Survey Year and Noise Level

Year	0%		10%		20%		30%	
	NTU	β	NTU	β	NTU	β	NTU	β
2007	60.6	13.6	55.74	13.13	57.38	13.43	57.81	13.25
2008	63.5	17.1	65.12	17.45	65.22	17.12	64.84	17.07
2009	61.0	18.6	60.49	18.57	63.86	19.08	61.73	18.63
2010	60.9	17.7	61.36	17.78	60.92	17.72	61.36	17.78
2011	53.8	16.1	55.07	16.12	55.88	16.73	55.72	17.14
2012	51.5	18.9	51.49	19.13	52.24	19.50	52.67	20.07
2013	50.0	15.9	50.69	16.04	52.78	16.98	53.06	16.83
2014	55.1	16.1	55.15	16.14	55.15	16.14	55.97	16.73
2015	64.0	12.6	64.80	13.01	63.20	12.20	63.03	12.75
2016	56.5	12.4	56.14	12.34	58.33	12.66	56.90	12.45
2017	62.6	10.1	62.42	9.76	63.09	10.16	64.05	10.33
2018	63.9	15.3	67.11	16.92	66.67	16.60	67.10	16.53
2019	67.5	11.7	67.24	11.41	66.67	11.07	66.39	10.77
2020	63.7	13.6	65.22	14.07	65.52	14.12	69.17	15.50
2021	66.7	12.3	66.07	11.87	66.96	12.39	65.46	11.82
Total	59.7	15.0	60.13	15.10	60.73	15.25	60.94	15.37

Table 5: Non-take-up (NTU) and beta error (β) rates by survey year and noise level (%)

regions, and buffers reduce the sensitivity to minor income fluctuations.

In summary, this analysis reinforces the reliability of our microsimulation approach, demonstrating that the classification of non-take-up is not overly sensitive to realistic levels of income measurement errors.

6.2 Determinants of Non-take-up: Binary Choice Models

Table 6 gives an overview of coefficients and average marginal effects (AME's)[11] of our Logit, Probit and Linear Probability Model.

As shown in Table 6, all three models consistently indicate that a 100 EUR increase in the simulated BAföG entitlement reduces the probability of non-take-up by approximately two to three percentage points. While the Logit and Probit models require average marginal effects for direct probability interpretation due to their nonlinear link functions, the Linear Probability Model coefficients represent approximate percentage point changes directly. Differences in magnitude between models are minor and expected given their distinct functional forms.

[11] Where applicable.

$\Pr(\text{NTU} = 1 \mid \mathbf{X})$

	Pooled Logit		Pooled Probit		Pooled LPM
	Coef.	AME	Coef.	AME	Coef.
Main predictor					
Simulated BAföG Amount$^{\circ}$	-0.160***	-0.029***	-0.095***	-0.030***	-0.021**
	(0.058)	(0.010)	(0.034)	(0.010)	(0.010)
Demographics and Socioeconomic Predictors					
Age	0.099***	0.018***	0.058***	0.018***	0.037***
	(0.019)	(0.003)	(0.011)	(0.003)	(0.003)
Female	-0.059	-0.011	-0.020	-0.006	0.004
	(0.256)	(0.047)	(0.149)	(0.046)	(0.046)
Has partner	1.429*	0.262*	0.874**	0.271**	0.157*
	(0.810)	(0.149)	(0.444)	(0.137)	(0.084)
Direct Migration background	-0.700*	-0.128*	-0.419*	-0.130*	-0.130*
	(0.378)	(0.068)	(0.219)	(0.067)	(0.068)
Indirect Migration background	-0.689**	-0.127**	-0.407**	-0.126**	-0.121**
	(0.299)	(0.053)	(0.179)	(0.054)	(0.058)
Institutional and Informational Predictors					
Living with parents	-0.019	-0.004	-0.008	-0.002	0.034
	(0.270)	(0.049)	(0.160)	(0.050)	(0.048)
Sibling claimed BAföG before	-0.554*	-0.102**	-0.321*	-0.100*	-0.107*
	(0.285)	(0.051)	(0.171)	(0.052)	(0.056)
East background	-1.253***	-0.230***	-0.749***	-0.232***	-0.252***
	(0.313)	(0.052)	(0.186)	(0.054)	(0.061)
Parents are highly educated	-0.015	-0.003	0.004	0.001	0.018
	(0.293)	(0.054)	(0.175)	(0.054)	(0.052)
Behavioural Predictors					
Patience	0.030	0.006	0.015	0.005	0.005
	(0.065)	(0.012)	(0.040)	(0.012)	(0.012)
Impulsiveness	-0.039	-0.007	-0.021	-0.006	-0.009
	(0.068)	(0.012)	(0.042)	(0.013)	(0.012)
Risk Apetite	-0.022	-0.004	-0.014	-0.004	-0.002
	(0.037)	(0.007)	(0.021)	(0.007)	(0.006)
McFadden Pseudo R^2	0.10		0.10		
Likelihood Ratio Test	53.33 (p = 0.00)		53.20 (p = 0.00)		
Adjusted R^2					0.74
F-statistic					103.8 (p = 0.00)
Observations	458		458		458

Table 6: Logit, Probit, and LPM (Linear Probability Model) coefficients. Logit and Probit also report average marginal effects. Standard errors are in parentheses. The LPM is estimated via OLS with MacKinnon and White (1985) robust (HC3) standard errors.

Notes: Significance levels: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Robust standard errors clustered at the student level. $\circ$ Indicates per 100 EUR.

The model suggests that age is also a strong predictor of non-take-up in our models: each additional year of age increases the probability of not claiming BAföG by approximately 1.8 percentage points (Logit/Probit AMEs), and 3.7 percentage points in the LPM. This positive relationship is consistent with Konijn et al. (2023), who find higher non-take-up with age in the Netherlands. In contrast, Herber et al. (2019) report no significant age effect for BAföG in Germany, and Fuchs (2007) find lower non-take-up among older individuals in Austria.[12]

Similarly, the presence of a registered partner corresponds to a substantially higher likelihood of non-take-up, with marginal effects indicating an increase of around 26 (16 in LPM) percentage points. These patterns may reflect lower BAföG entitlements among these groups, reducing the perceived benefit of applying.

Moreover, individuals with direct or indirect migration backgrounds are significantly less likely to refuse BAföG. This aligns with Herber et al. (2019) for Germany[13] and Konijn et al. (2023) for student aid in the Netherlands. By contrast, Fuchs (2007) find no significant effect of migration background for social assistance in Austria. Similarly, Frick and Groh-Samberg (2007) report mixed results for Germany, with a significant effect only in their Heckman selection model.

Furthermore, all three models suggests that whether an individual lives at home or has moved out from their parents does not, in itself, have a statistically significant effect on the likelihood of BAföG take-up. By contrast, informational factors appear to play a more substantial role: having a sibling who has previously received BAföG is associated with a significantly lower probability of non-take-up, by approximately 10 percentage points across all three models. This finding highlights the importance of informational spillovers within families in shaping take-up behaviour.

The models further indicate that individuals with an East German background are significantly more likely to take up BAföG, with non-take-up probabilities reduced by approximately 23 to 25 percentage points across all specifications. This finding is consistent with Herber et al. (2019) and Harnisch (2019), who also report higher take-up rates among individuals from East Germany.

[12] Fuchs (2007) find a significant negative age effect only in the selection stage of their Heckman model.
[13] Though not statistically significant.

By contrast, parental education appears to have no meaningful influence on take-up, as the estimated coefficients are statistically insignificant and the AMEs are close to zero across all models, suggesting no substantive effect.

Finally, we do not find any statistically significant effects of the behavioural predictors. Specifically, patience, impulsiveness, and self-assessed risk appetite do not have a significant impact on the probability of non-take-up. This is in line with Herber et al. (2019), who also report no significant main effects. However, they find statistical significance when interacting impatience and impulsiveness. We tested a similar interaction term but found no significant effect. Across all models, the estimated coefficients are small and not distinguishable from zero, suggesting that these behavioural traits do not systematically influence BAföG take-up decisions in our sample.

6.2.1 Restricting to Higher Entitlements

Our baseline analysis includes all students with any positive simulated BAföG entitlement. To check whether our results are driven by those with very small entitlements, who might not consider applying to be worth the effort, we rerun the models restricting the sample to students with simulated monthly entitlements of at least 200 EUR.

As shown in Appendix A, Table A3, the main findings hold. The negative link between entitlement size and non-take-up remains strong and significant. Similarly, age, partnership status, and East German background continue to show consistent effects. This indicates that the main findings are not just driven by students with minimal entitlements, but also reflect broader patterns in take-up behaviour among those eligible for more substantial benefits.

7 Discussion

In this paper, we have investigated the non-take-up of student aid in Germany (BAföG) by estimating theoretical eligibility using a detailed microsimulation model and linking the findings to reported benefit receipt in the SOEP panel survey. Across the years 2007 to 2021, our findings suggest that non-take-up among theoretically eligible students has remained high, averaging at approximately 60%. While there are fluctuations over time, ranging from a low of 50% to a high of approximately 68%, a slight upward trend in non-take-up can be observed in the years leading up to 2021.

In our econometric analysis, we use three model specifications, Logit, Probit, and a Linear Probability Model (LPM), to shed light on several important predictors of non-take-up. One of the most consistent findings across all models is the negative association between the simulated entitlement size and non-take-up. This result aligns with economic intuition, suggesting that when the expected subsidy is larger, the perceived benefits of applying are more likely to outweigh the associated costs.

Age and partnership status also appear to be important covariates. Older students are more likely to forgo BAföG support, which could reflect a lower perceived relevance of the program at later stages of study, or possibly greater financial independence. Similarly, students in a registered partnership are found to have higher non-take-up rates. This may be due to higher combined household income or a reduced perceived need for financial aid resulting from shared living expenses.

Although not entirely expected, the finding that students with direct or indirect migration backgrounds have lower non-take-up rates aligns with some earlier research (Herber et al., 2019; Konijn et al., 2023). One plausible explanation is tighter budget constraints: if migrant students can rely on fewer familial or social safety nets, the expected benefit of BAföG may outweigh the application's complexity. Cultural attitudes toward debt could also play a role, as personal borrowing remains comparatively uncommon in Germany (Seabrooke and Tsingou, 2017).

Our findings suggest that behavioural traits such as impulsiveness, patience, and risk appetite do not play a significant role in predicting non-take-up of BAföG. This is similar to the results reported by Herber et al. (2019), who also found no evidence for an effect

of impulsiveness or impatience when considered separately. However, they did find that students who were both highly impulsive and highly impatient, captured by an interaction term between the two traits, were more likely to forgo applying. We tested the same interaction in our data but did not find it to be significant. Overall, these patterns point to mixed evidence on the relevance of behavioural characteristics in understanding non-take-up decisions. In our study, structural and informational variables appear to play a clearer role in explaining non-take-up.

It is important to note that our results rely on self-reported survey data, which inherently suffers from measurement errors due to the use of proxy variables, missing data, and potential reporting biases. These data limitations may introduce estimation errors, including the possibility of beta errors, in identifying determinants of non-take-up. Nevertheless, the accuracy of our microsimulation, with a reasonably strong fit of 72%, provides confidence in the reliability of our estimates. The central finding remains that a substantial share of financially eligible students do not receive the support they are entitled to, highlighting a persistent gap between the intention and outcome of BAföG.

Although BAföG offers favourable terms compared to many student aid systems, its complex application and strict means-testing can discourage students less familiar with bureaucracy or expecting limited benefits. Students with a sibling who previously received BAföG and students from East German backgrounds, where attitudes toward public support differ, are more likely to apply. This suggests that social capital, through familiarity and trust in public programs, plays an important role in take-up.

From an economic perspective, the decision to apply for BAföG can be viewed as a weighing of costs and benefits. Policy makers therefore have two primary levers to encourage higher take-up: reducing the non-monetary costs associated with applying, such as informational and procedural hurdles, or increasing the benefits by raising the support rates.

Our analysis suggests there is considerable room for improvement on both fronts. The strict means-tested design of BAföG creates significant informational and procedural barriers that, according to our findings, unnecessarily hinder take-up. While greater administrative simplicity may entail some loss of precision in targeting, it could substantially reduce non-take-up. At the same time, support rates have for many years failed to keep pace with the actual cost of living for students, thereby diminishing the relative benefit

of applying. Although some steps have recently been taken to adjust benefit levels, these changes occurred after the period covered by our data. Further research that incorporates the recent reforms could not only provide a more complete picture of the program's effectiveness, but also estimate more precisely how such changes affect take-up rates.

Taken together, our results indicate that increasing take-up requires a dual approach: raising subsidy levels to ensure benefits are meaningful in real terms, and streamlining application procedures to lower the costs of accessing support. In line with the program's objective to promote equal access to higher education, it is especially important that BAföG reaches students with the greatest financial need, as reflected in higher entitlements. While simplifying administration would benefit all eligible students, ensuring that those entitled to the largest amounts are able to access support most directly advances the programme's goals. However, it is important to ensure that such reforms do not inadvertently add complexity or restrict eligibility, as these factors may themselves discourage take-up.

Ultimately, our findings reinforce the view that administrative complexity is a design flaw rather than a failure of intent. Addressing both procedural hurdles and lagging support rates is essential for making BAföG more effective in promoting equal access to higher education.

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Appendix A: Tables

Year	Consumer Price Index		Average Payout (EUR)		Financial Expenditure (EUR 1,000)	
	Index	Price Factor	Nominal	Real (2023)	Nominal	Real (2023)
1991	61	1.885	290	547	1,538,590	2,900,701
1992	65	1.795	290	521	1,539,929	2,764,764
1993	67	1.719	297	510	1,458,164	2,506,152
1994	69	1.674	295	494	1,257,002	2,104,621
1995	71	1.644	304	500	1,133,989	1,863,894
1996	72	1.621	322	522	1,059,270	1,716,900
1997	73	1.590	319	507	910,038	1,446,886
1998	74	1.577	316	498	861,688	1,358,905
1999	74	1.566	321	503	871,140	1,364,591
2000	75	1.546	326	504	906,857	1,401,724
2001	77	1.516	365	553	1,161,922	1,760,990
2002	78	1.494	371	554	1,350,543	2,018,032
2003	78	1.479	370	547	1,446,120	2,138,937
2004	80	1.455	371	540	1,513,641	2,202,517
2005	81	1.432	375	537	1,554,602	2,226,037
2006	82	1.409	375	529	1,538,770	2,168,773
2007	84	1.378	375	517	1,490,718	2,053,917
2008	86	1.343	398	534	1,590,638	2,136,104
2009	87	1.338	434	581	1,875,731	2,510,295
2010	88	1.325	436	578	2,019,078	2,674,533
2011	90	1.297	452	586	2,269,706	2,943,052
2012	91	1.273	448	570	2,364,963	3,009,718
2013	93	1.253	446	559	2,349,400	2,944,951
2014	94	1.241	448	556	2,280,748	2,831,524
2015	94	1.235	448	553	2,157,634	2,664,506
2016	95	1.228	464	570	2,099,110	2,578,590
2017	96	1.211	499	604	2,181,049	2,640,336
2018	98	1.190	493	586	2,001,732	2,381,265
2019	99	1.173	514	603	1,954,449	2,292,303
2020	100	1.167	574	670	2,210,920	2,580,143
2021	103	1.132	579	655	2,316,926	2,622,553
2022	110	1.059	611	647	2,454,392	2,599,161
2023	116	1.000	663	663	2,863,514	2,863,514

Table A1: Average nominal and inflation-adjusted BAföG payouts for student recipients (excluding pupils), based on official data from Statistisches Bundesamt (Destatis) (2023). The table includes the Consumer Price Index (CPI, variable `PREIS1`, base year 2020 = 100) and a derived price factor used to convert nominal amounts into 2023 euros. Inflation-adjusted averages and total expenditures were calculated with this deflator and are not directly reported in the original Destatis tables.

Year	Students	Number of Supported Students			Proportion Supported (%)		
		Total	Fully	Partially	Total	Fully	Partially
2023	2,868,311	501,425	245,255	256,170	17.5	8.6	8.9
2022	2,920,263	489,347	244,559	244,788	16.8	8.4	8.4
2021	2,941,915	467,595	200,369	267,226	15.9	6.8	9.1
2020	2,944,145	465,543	205,093	260,450	15.8	7.0	8.8
2019	2,891,049	489,313	212,217	277,096	16.9	7.3	9.6
2018	2,868,222	517,675	218,427	299,248	18.0	7.6	10.4
2017	2,844,978	556,573	229,053	327,520	19.6	8.1	11.5
2016	2,807,010	583,567	235,163	348,404	20.8	8.4	12.4
2015	2,757,799	611,377	231,477	379,900	22.2	8.4	13.8
2014	2,698,910	646,576	246,901	399,675	24.0	9.1	14.8
2013	2,616,881	665,928	253,371	412,557	25.4	9.7	15.8
2012	2,499,409	671,042	254,769	416,273	26.8	10.2	16.7
2011	2,380,974	643,578	246,895	396,683	27.0	10.4	16.7
2010	2,217,294	592,430	232,796	359,633	26.7	10.5	16.2
2009	2,121,178	550,369	211,881	338,488	25.9	10.0	16.0
2008	2,025,307	510,409	217,933	292,476	25.2	10.8	14.4
2007	1,941,405	494,480	191,268	303,212	25.5	9.9	15.6
2006	1,979,043	498,565	189,022	309,543	25.2	9.6	15.6
2005	1,985,765	506,880	193,285	313,595	25.5	9.7	15.8
2004	1,963,108	497,257	186,956	310,301	25.3	9.5	15.8
2003	2,019,465	481,594	179,755	301,839	23.8	8.9	14.9
2002	1,938,811	451,505	168,890	282,615	23.3	8.7	14.6
2001	1,868,331	406,776	134,933	271,843	21.8	7.2	14.6
2000	1,798,863	348,799	100,913	247,886	19.4	5.6	13.8
1999	1,770,489	338,427	103,239	235,188	19.1	5.8	13.3
1998	1,800,651	336,355	97,539	238,810	18.7	5.4	13.3

Table A2: Number and percentage of students receiving BAföG support using numbers from Statistisches Bundesamt (Destatis) (2023).

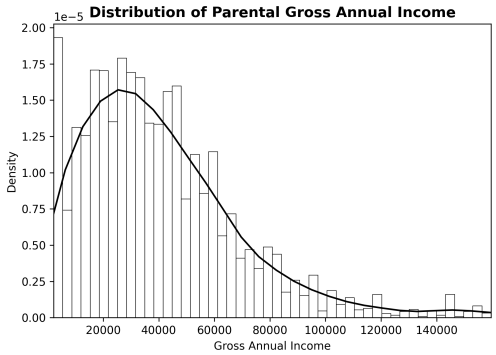
$\Pr(\text{NTU} = 1 \mid \mathbf{X})$

	Logit		Probit		LPM
	Coef.	AME	Coef.	AME	Coef.
Main explanatory variables					
Simulated BAföG amount°	-0.181**	-0.034**	-0.109**	-0.034**	-0.022
	(0.077)	(0.014)	(0.045)	(0.014)	(0.014)
Controls: Demographics					
Age	0.101***	0.019***	0.060***	0.019***	0.037***
	(0.024)	(0.004)	(0.014)	(0.004)	(0.004)
Female	0.007	0.001	0.020	0.006	0.016
	(0.290)	(0.054)	(0.169)	(0.053)	(0.053)
Has partner	1.480*	0.277*	0.906*	0.286*	0.190*
	(0.882)	(0.164)	(0.483)	(0.151)	(0.102)
Direct Migration background	-0.347	-0.065	-0.195	-0.061	-0.070
	(0.450)	(0.084)	(0.262)	(0.082)	(0.075)
Indirect Migration background	-0.740**	-0.138**	-0.439**	-0.138**	-0.133**
	(0.324)	(0.058)	(0.194)	(0.059)	(0.064)
Controls: Household and Socioeconomic Background					
Living at parents' home	0.070	0.013	0.050	0.016	0.054
	(0.311)	(0.058)	(0.183)	(0.058)	(0.056)
Sibling claimed BAföG before	-0.633*	-0.119**	-0.368*	-0.116*	-0.128*
	(0.331)	(0.060)	(0.198)	(0.061)	(0.066)
East background	-1.437***	-0.269***	-0.865***	-0.273***	-0.300***
	(0.369)	(0.061)	(0.218)	(0.062)	(0.072)
Parents are highly educated	0.002	0.000	0.009	0.003	0.015
	(0.360)	(0.067)	(0.213)	(0.067)	(0.066)
Controls: Behaviour					
Patience	0.042	0.008	0.021	0.007	0.006
	(0.072)	(0.013)	(0.044)	(0.014)	(0.013)
Impulsiveness	-0.047	-0.009	-0.024	-0.008	-0.008
	(0.075)	(0.014)	(0.046)	(0.015)	(0.013)
Risk Apetite	-0.014	-0.003	-0.008	-0.003	-0.000
	(0.042)	(0.008)	(0.025)	(0.008)	(0.007)
McFadden Pseudo R^2	0.11		0.11		
Cox and Snell Pseudo R^2	0.13		0.13		
Nagelkerke Pseudo R^2	0.18		0.18		
Likelihood Ratio Test	48.46 (p = 0.00)		48.39 (p = 0.00)		
Adjusted R^2					0.72
F-statistic					71.5 (p = 0.00)
Observations	352				

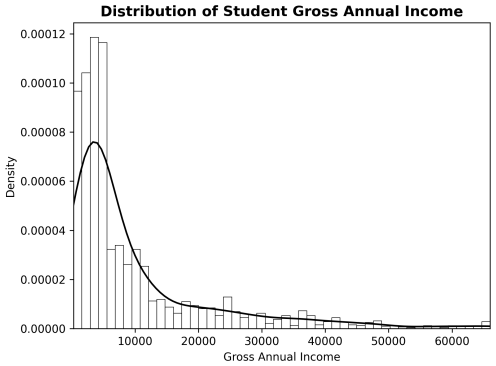
Table A3: Estimates corresponding to Table 6, using the same model specifications but classifying students as eligible if their theoretical entitlement exceeds 200 EUR.

Notes: Significance levels: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Robust standard errors clustered at the student level. ∘ Indicates per 100 EUR.

Appendix B: Figures

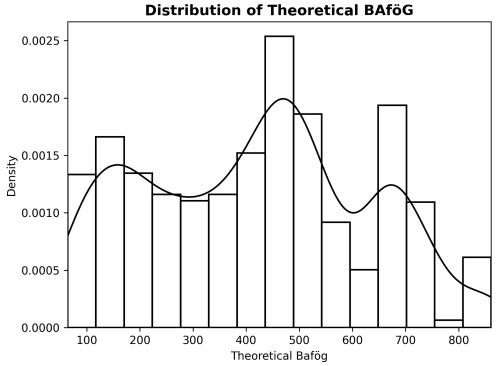


(a) Parental income

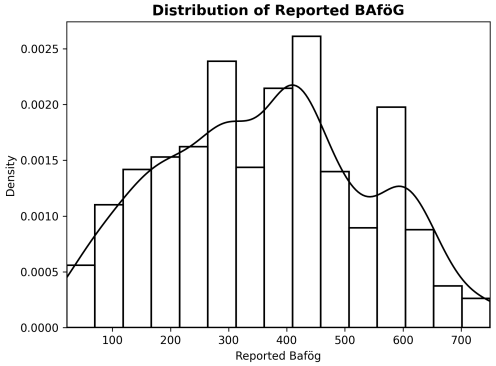


(b) Student income

Figure B1: Simulated mean excess income for parents and students.

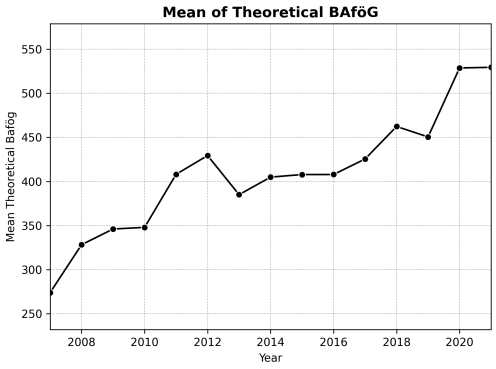


(a) Distribution of simulated BAföG entitlements based on microsimulation.

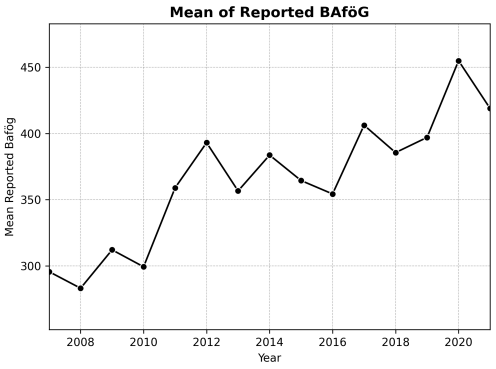


(b) Distribution of reported BAföG receipt in SOEP survey data.

Figure B2: Comparison of theoretical BAföG award simulation with actual reported take-up.



(a) Timeline of simulated BAföG entitlements based on microsimulation.



(b) Timeline of reported BAföG receipt in SOEP survey data.

Figure B3: Comparison of theoretical BAföG award simulation with actual reported take-up over time.

Appendix C: Dictionary of Variables in the Microsimulation Pipeline

Table C4: Variable Dictionary by Dataset.

Dataset	Variable	Description
IDENTIFIERS AND CORE DEMOGRAPHICS		
ppathl	pid	Person identifier
ppathl	hid	Household ID
ppathl	syear	Survey year
ppathl	gebjahr	Year of birth
ppathl	gebmonat	Month of birth
ppathl	sex	Sex
ppathl	partner	Partnership status
ppathl	migback	Migration background
regionl	hid	Household ID
regionl	syear	Survey year
regionl	bula	Federal state (Bundesland)
EDUCATION		
pl	pid	Person identifier
pl	syear	Survey year
pl	plg0012_h	Currently in education
pl	plg0014_v5	Education level, 1999–2008
pl	plg0014_v6	Education level, 2009–2012
pl	plg0014_v7	Education level, 2013–2021
RELIGION AND STUDENT AID		
pl	plh0258_h	Religion / church membership
pl	plc0167_h	BAföG eligibility
pl	plc0168_h	BAföG / scholarship (gross, monthly)
EMPLOYMENT AND INCOME		
pgen	pid	Person identifier
pgen	syear	Survey year
pgen	pgemplst	Employment status
pgen	pgpartnr	Partner indicator
biol	pid	Person identifier
biol	syear	Survey year
biol	lb0267_v1	Employment status
HOUSING AND RENT		

(continued on next page)

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Dataset	Variable	Description
pkal	pid	Person identifier
pkal	syear	Survey year
pkal	kal2a02	Monthly rent including utilities
pkal	kal2a03_h	Housing benefit
WEALTH AND ASSETS		
pwealth	pid	Person identifier
pwealth	syear	Survey year
pwealth	f0100a--f0100e	Financial assets
pwealth	e0111a--e0111e	Real estate (net value shares)
pwealth	b0100a--b0100e	Business assets
pwealth	i0100a--i0100e	Private insurances
pwealth	v0100a--v0100e	Vehicles
pwealth	t0100a--t0100e	Tangible assets
pwealth	w0011a--w0011e	Liabilities and debts
FAMILY RELATIONSHIPS		
biosib	pid	Person identifier
biosib	sibpnr1--sibpnr11	Sibling person numbers
bioparen	pid	Person identifier
bioparen	fnr	Father's person ID
bioparen	mnr	Mother's person ID
HOUSEHOLD COMPOSITION		
hgen	hid	Household ID
hgen	syear	Survey year
hgen	hgtyp1hh	Household type

Appendix D: Example Calculation of Theoretical BAföG Eligibility

This appendix documents the step-by-step calculation of theoretical BAföG eligibility for a selected individual from the SOEP-Core dataset. The example is based on data from the survey year 2018 and focuses on a university student identified by `pid = 20156903`.

The purpose of this example is to illustrate how legal rules governing student financial aid, particularly those defined in the Federal Training Assistance Act (BAföG), are applied within the microsimulation pipeline. Each component of the calculation is presented transparently, including the determination of the student's assessed need, applicable supplements, and deductions based on income and assets.

The selected case is representative of a full-time student living independently, with modest student income, limited parental support, and non-negligible declared assets. The final theoretical BAföG award is computed by subtracting excess income and asset contributions from the total assessed need.

A summary of the key outcome variables is presented in Table D14. Subsequent sections decompose and document the logic and parameters behind each component in detail.

D.1 Total Base Need

D.1.1 Base Need

The base need (`base_need`) is a flat-rate amount representing the monthly minimum subsistence level for students in higher education. It is specified in § 13 (1) Nr. 1 of the Federal Training Assistance Act (BAföG) and does not vary by income, living arrangement, or demographic characteristics.

For all eligible university students during the relevant period, the base need was set at 399 EUR. Since the student in this case study meets the criteria for university-level BAföG support, this full amount is assigned without adjustment.

Component	Explanation	Value (EUR)
Base Need	Flat-rate monthly amount for university students	399

Table D5: Base need (`base_need`) for pid 20156903, in accordance with § 13(1) Nr. 1 BAföG.

D.1.2 Housing Allowance

The housing allowance (`housing_allowance`) compensates students for living expenses incurred while living outside the parental home. According to § 13 (1) Nr. 2 BAföG, students who do not reside with their parents are entitled to a fixed monthly supplement to cover rent and related costs.

In this example, the student was classified as living independently and the simulation applies a standardized flat amount of 250 EUR.

Component	**Explanation**	**Value (EUR)**
Housing Allowance	Standard flat rate applied for non-parental housing	250

Table D6: Housing allowance (`housing_allowance`) for `pid` 20156903, based on § 13 (1) Nr. 2 BAföG.

D.1.3 Insurance Supplement

Students with statutory health and long-term care insurance are entitled to receive flat-rate supplements as defined in § 13a (1) BAföG. These rates vary by time period and are adjusted periodically by legal amendments.

For survey year 2018, the applicable values, according to the 2020-08-01 rates still valid at the time, were:

- 61 EUR for health insurance (§ 13a (1) Nr. 1 BAföG)
- 25 EUR for long-term care insurance (§ 13a (1) Nr. 2 BAföG)

These two components sum to 86 EUR, which is assigned as the total insurance supplement for this individual.

Component	**Explanation**	**Value (EUR)**
Health insurance	§ 13a (1) Nr. 1 BAföG (statutory health insurance)	61
Care insurance	§ 13a (1) Nr. 2 BAföG (statutory long-term care insurance)	25
Insurance Supplement	Sum of flat-rate statutory insurance allowances	86

Table D7: Insurance supplement (`insurance_supplement`) for pid 20156903. Rates valid for the 2018 survey year.

D.2 Student Excess Income

The student's excess income (`excess_income_stu`) represents the amount by which their own annual income, after standard deductions, exceeds the personal allowance defined under § 23 (1) Nr. 1 BAföG. This component is subtracted from the total assessed need to determine theoretical eligibility.

Step 1: Estimating Gross Annual Income The student's income is derived from the SOEP variable `kal2a03_h`, which reports average gross monthly earnings. This value is multiplied by the number of working months in the previous calendar year (`kal2a02`) to estimate gross annual income. For `pid = 20156903`:

- Gross monthly income: 523 EUR
- Months worked: 12
- ⇒ Gross annual income: $523 \times 12 = 6{,}276$ EUR

Step 2: Standard Deductions Two statutory deductions are applied to estimate net taxable income:

- **Werbungskostenpauschale** (fixed deduction for work-related expenses): 290 EUR (2018).

$$6,276 - 290 = 5,986\,\text{EUR}$$

- **Sozialversicherungs-Pauschale** (fixed social insurance deduction): 17.2% of remaining income, capped at 17,200 EUR

$$5{,}986 \times 0.828 = 4{,}152.21$$

Step 3: Applying Income Tax The simulation applies German income tax tables to compute statutory income tax liabilities. In this case, the taxable income falls below the basic allowance threshold (9,000 EUR in 2018), so no income tax, church tax, or solidarity surcharge is applied. The net annual income is therefore $4,152.21$ EUR.

Step 4: Monthly Net Income and Allowance The student's net monthly income is calculated as:

$$\frac{4{,}152.21}{12} \approx 346.02 \text{ EUR}$$

The personal allowance specified in *§* 23 (1) Nr. 1 BAföG for the year 2018 was 290 EUR per month. Thus, the student's excess income is:

$$346.02 - 290 = 56.02 \text{ EUR}.$$

The BAföG relevant income for this individual can therefore be summarized as:

Component	**Explanation**	**Value (EUR)**
Gross monthly income	From SOEP variable `kal2a03_h`	523
Working months (previous year)	From SOEP variable `kal2a02`	12
Gross annual income	Estimated income before deductions	6,276
Werbungskostenpauschale	Work-related fixed deduction (§ 21(2) BAföG)	290
Sozialversicherungs-Pauschale	17.2% statutory deduction	1,133.79
Net annual income	Income after deductions	4,152.21
Net monthly income	Annual net income divided by 12	346.02
Personal allowance	§ 23(1) Nr. 1 BAföG (2018)	290
Student excess income	Amount exceeding allowance	**56.02**

Table D8: Calculation of student's excess income (`excess_income_stu`) for pid 20156903.

D.3 Parental Income Evaluation: Father (pid = 20156901)

This section documents the step-by-step derivation of net income for the student's father using variables from the SOEP-Core dataset and applying BAföG-compliant statutory deductions.

Step 1: Gross Income The parent reported a gross monthly income of 3,500 EUR and worked 12 months in the prior year, resulting in:

$$\text{Gross annual income} = 3{,}500 \times 12 = 42{,}000 \text{ EUR}$$

Step 2: Werbungskostenpauschale (§ 21 Abs. 2 BAföG) A fixed deduction of 1,000 EUR is applied to account for work-related expenses:

$$\texttt{inc\_w} = 42{,}000 - 1{,}000 = 41{,}000 \text{ EUR}$$

Step 3: Sozialversicherungs-Pauschale (§ 21 Abs. 2 BAföG) Next, a 21.3% deduction is applied to the income after Werbungskosten:

$$\texttt{inc\_si} = 41{,}000 \times (1 - 0.213) = 41{,}000 \times 0.787 = 32{,}267 \text{ EUR}$$

Step 4: Income Tax Calculation (§ 32a EStG) The parent is assessed as an individual (not jointly filed). Based on the 2018 tax table and a taxable income of 32,267 EUR, the following taxes are applied:

- **Income tax:** 6,062 EUR (per simulation based on § 32a EStG)
- **Church tax:** 0 EUR (not church-affiliated in SOEP)
- **Solidarity surcharge (Soli):** 333 EUR

The solidarity surcharge applies since taxable income exceeds the 2018 exemption threshold of 972 EUR (§ 32a Abs. 5 & 6 EStG, pre-2020 version). The surcharge is 5.5% of income tax, capped by taper rules.

Step 5: Net Annual and Monthly Income

$$\texttt{inc\_net} = 32267 - 6062 - 0 - 333 = 25872 \text{ EUR}$$

$$\texttt{net\_monthly\_income} = \frac{25872}{12} = 2156 \text{ EUR}$$

Component	Explanation	Value (EUR)
Gross monthly income	Reported by SOEP	3,500
Working months	From SOEP (previous year)	12
Gross annual income	$3{,}500 \times 12$	42,000
Werbungskostenpauschale	Fixed work-related deduction (§ 21(2))	1,000
Post-werbung income (`inc_w`)	After deduction	41,000
Sozialversicherungs-Pauschale	21.3% of `inc_w`	8,733
Income after SI (`inc_si`)	$41{,}000 \times 0.787$	32,267
Income tax	Based on § 32a EStG table	6,062
Church tax	SOEP indicates no affiliation	0
Solidarity surcharge	5.5% of income tax (capped)	333
Net annual income (`inc_net`)	After all taxes	25,872
Net monthly income	$25{,}872 \div 12$	2,156

Table D9: Income derivation for father (pid = 20156901) in 2018.

D.4 Parental Income Evaluation: Mother (pid = 20156902)

The same procedure is applied to evaluate the income of the student's mother. This parent reports a lower monthly income, but the same deductions are used to compute a BAföG-compliant net income value.

Step 1: Gross Income The mother reported a gross monthly income of 300 EUR and worked 12 months in the previous year:

$$\text{Gross annual income} = 300 \times 12 = 3{,}600 \text{ EUR}$$

Step 2: Werbungskostenpauschale (§ 21 Abs. 2 BAföG) A fixed work-related deduction of 1,000 EUR is applied:

$$\texttt{inc\_w} = 3{,}600 - 1{,}000 = 2{,}600 \text{ EUR}$$

Step 3: Sozialversicherungs-Pauschale (§ 21 Abs. 2 BAföG) A 21.3% deduction is then applied:

$$\texttt{inc\_si} = 2{,}600 \times 0.787 = 2{,}046.20 \text{ EUR}$$

Step 4: Income Tax and Surcharges Because the income falls well below the basic exemption threshold, no income tax or surcharges apply:

- Income tax: 0 EUR
- Church tax: 0 EUR
- Solidarity surcharge: 0 EUR

Step 5: Net Annual and Monthly Income

$$\texttt{inc\_net} = 2{,}046.20 \text{ EUR} \qquad \texttt{net\_monthly\_income} = \frac{2{,}046.20}{12} = 170.52 \text{ EUR}$$

Component	**Explanation**	**Value (EUR)**
Gross monthly income	Reported by SOEP	300
Working months	From SOEP (previous year)	12
Gross annual income	300×12	3,600
Werbungskostenpauschale	Fixed deduction (§ 21(2))	1,000
Post-werbung income (`inc_w`)	After deduction	2,600
Sozialversicherungs-Pauschale	21.3% of `inc_w`	553.80
Income after SI (`inc_si`)	$2{,}600 \times 0.787$	2,046.20
Income tax	Below exemption threshold	0
Church tax	SOEP indicates no affiliation	0
Solidarity surcharge	Below threshold	0
Net annual income (`inc_net`)	After all taxes	2,046.20
Net monthly income	$2{,}046.20 \div 12$	170.52

Table D10: Income derivation for mother (pid = 20156902) in 2018.

D.5 Joint Parental Income and Deductions

After calculating net income for each parent individually, their incomes are combined and assessed jointly, following the rules laid out in § 25 and § 21 of the BAföG Act. This section outlines how the parental income is evaluated as a unit, and how the applicable

deductions reduce the contribution relevant for BAföG eligibility.

Step 1: Joint Income The net monthly incomes of both parents are summed to form the joint income base:

$$\texttt{joint\_income} = 2{,}156 + 170.52 = 2{,}326.52 \text{ EUR}$$

Step 2: Parental Allowance (§ 25 (1) Nr. 1 BAföG) Because both parents are financially active, the applicable allowance is the joint parental allowance. According to the BAföG schedule valid from 2015-01-01 (25. BAföGÄndG), the relevant allowance value is:

$$\texttt{total\_allowance} = 1{,}715 \text{ EUR}$$

The remaining income after basic allowance is:

$$\texttt{joint\_income\_less\_ba} = 2{,}326.52 - 1{,}715 = 611.52 \text{ EUR}$$

Step 3: Sibling Deduction (§ 25 (3) BAföG) The student has two siblings who are eligible for sibling-related deductions. According to the 2015 allowance table:

- The sibling deduction per eligible sibling is 260 EUR
- Total deduction: $2 \times 260 = 520$ EUR

$$\texttt{joint\_income\_less\_ba\_and\_sib} = 611.52 - 520 = 91.52 \text{ EUR}$$

Step 4: Additional Allowance (§ 25 (4) BAföG) In addition, § 25(4) BAföG entitles parents to a percentage-based deduction on the remaining income. According to the allowance rules:

- A base allowance of 50% of the remainder applies
- Plus 5% per sibling with a positive deduction

Thus, the applied rate is:

$$50\% + (2 \times 5\%) = 60\%$$

$$\texttt{additional\_allowance} = 91.52 \times 0.60 = 54.91 \text{ EUR}$$

Step 5: Final Excess Parental Income The final contribution from parental income is the remaining amount after all deductions:

$$\texttt{excess\_income} = 91.52 - 54.91 = 36.61 \text{ EUR}$$

Component	**Explanation**	**Value (EUR)**
Joint income	Sum of both parents' net monthly incomes	2,326.52
Parental allowance	§ 25(1) Nr. 1 BAföG (joint allowance)	1,715
Remaining after allowance	2,326.52 − 1,715	611.52
Sibling deduction	2 × 260 (§ 25(3) BAföG)	520
Remaining after siblings	611.52 − 520	91.52
Additional allowance	60% of remaining income (§ 25(4))	54.91
Excess parental income	Final contribution to be deducted	**36.61**

Table D11: Calculation of joint parental excess income for pid 20156903 (2018).

D.6 Asset-Based Contribution

Students whose personal assets exceed a legally defined exemption threshold are required to contribute the excess toward their BAföG need (§ 29 BAföG). The following table lists all relevant asset categories reported in the SOEP and their treatment in the eligibility assessment for this individual.

Step 1: Declared Asset Categories The student's asset-related information for the 2018 survey year is as follows:

Asset Category	Value (EUR)
Financial assets (e.g., savings, stocks)	0
Real estate (e.g., land, housing property)	0
Business assets	0
Private insurance assets	0
Vehicles (e.g., car ownership)	7,940
Tangible assets (furniture, equipment)	0
Eligible debts (offsetting)	0
Total assets	7,940
Debts	0
Net assets	7,940

Table D12: Declared asset categories for pid 20156903 in 2018.

Note: These assets are linearly interpolated from 2017 and 2022 survey waves.

Step 2: Asset Allowance (§ 29 BAföG) Since the student was 25 years old in 2018 (i.e., under 30), the asset allowance for students under age 30 applied. According to the table valid from 2016-08-01 (25. BAföGÄndG), this exemption was:

$$\texttt{asset\_allowance} = 7{,}500 \text{ EUR}$$

Step 3: Excess Asset Contribution The contribution from assets is computed as the difference between net assets and the legal allowance:

$$\texttt{excess\_assets} = \max(7{,}940 - 7{,}500, 0) = 440 \text{ EUR}$$

Component	Explanation	Value (EUR)
Net assets	Total assets minus eligible debts	7,940
Asset allowance	§ 29 BAföG (U30 threshold in 2018)	7,500
Excess asset contribution	Final deduction from BAföG entitlement	**440**

Table D13: Excess asset calculation for pid 20156903 in 2018.

D.7 Final Theoretical BAföG Award

After accounting for all relevant supplements and income-based deductions, the theoretical BAföG award is computed by subtracting the student's and parents' contributions—as well as any asset-based contributions—from the total assessed need.

Step 1: Total Assessed Need The total monthly need is composed of:

- Base need (`base_need`): 399 EUR
- Housing allowance (`housing_allowance`): 250 EUR
- Insurance supplement (`insurance_supplement`): 86 EUR

$$\texttt{total\_base\_need} = 399 + 250 + 86 = 735 \text{ EUR}$$

Step 2: Total Deductions The following deductions apply:

- Student excess income: 56.02 EUR
- Parental excess income: 36.61 EUR
- Excess asset contribution: 440.00 EUR

$$\texttt{total\_deductions} = 56.02 + 36.61 + 440 = 532.63 \text{ EUR}$$

Step 3: Theoretical Award Calculation

$$\texttt{theoretical\_bafög} = \max(735 - 532.63,\ 0) = \mathbf{202.38\ EUR}$$

Component	Explanation	Value (EUR)
Base need	§ 13(1) Nr. 1 BAföG	399
Housing allowance	§ 13(1) Nr. 2 BAföG	250
Insurance supplement	§ 13a(1) BAföG	86
Total base need	Monthly assessed need	**735**
Student excess income	§ 23(1) Nr. 1 BAföG	56.02
Parental excess income	§ 25 BAföG + sibling adjustment	36.61
Excess asset contribution	§ 29 BAföG	440.00
Total deductions	Income and asset-based contributions	**532.63**
Theoretical BAföG award	**Maximum eligible amount**	**202.38**

Table D14: Final theoretical BAföG award for pid 20156903 in 2018.

Note on Eligibility Status This student qualifies for BAföG under the legal eligibility criteria defined by income, asset, and need thresholds. While their theoretical eligibility status is coded as `1` (eligible), they did not receive or report any BAföG support in the SOEP dataset:

- `received_bafög` = 0 EUR
- `reported_bafög` = False
- `theoretical_eligibility` = 1 (eligible)

therefore classifying this student as a "non-take up" observation.

Appendix E: Main Input Parameters for BAföG Entitlement Calculations

This appendix presents the key legal parameter tables used in the theoretical BAföG entitlement calculations. The data has been compiled from various legal sources and amendments Bundesministerium der Justiz (2025); Bundestag (1999, 2004, 2007, 2010, 2011, 2014, 2019, 2022a,b, 2024). Unless stated otherwise, values are given in euros.

The process of compiling these parameters served as an essential foundation for our analysis and, more broadly, enabled our entry into researching non-take-up of BAföG. Given the fragmented nature of BAföG legislation over time, assembling a clean, structured dataset was a prerequisite for this thesis. We hope that this documentation can serve as a resource for future researchers interested in modelling the German student aid system or conducting policy evaluation in this domain.

For the application of these input parameters, we refer to the codebase (Byström and Antonsdóttir, 2025, version `v1.0`) and the example given in Appendix D.

Valid from	§ 13 (1) 1	§ 13 (1) 2	§ 13 (2) 1	§ 13 (2) 2
2024-07-25	442	475	59	380
2022-07-22	421	452	59	360
2020-08-01	398	427	56	325
2019-07-16	391	419	55	325
2016-08-01	372	399	52	250
2010-10-01	348	373	49	224
2008-10-01	341	366	48	146
2002-01-01	310	333	44	133

Table E15: Monthly standard needs rates under § 13 BAföG for students, by validity date. Amounts vary by accommodation type and insurance status.

Valid from	§ 13a (1) 1	§ 13a (1) 2	§ 13a (2) 1	§ 13a (2) 2	§ 13a (3) 1	§ 13a (3) 2
2024-08-01	102	35	185	48	102	35
2022-08-01	94	28	168	38	94	28
2022-07-15	84	25	155	34	84	25
2020-08-01	84	25	155	34	84	25
2016-08-01	71	15	155	34	84	25
2010-10-01	62	11	155	34	84	25
2008-10-01	50	9	155	34	84	25
2002-01-01	47	8	155	34	84	25

Table E16: Monthly allowances under § 13a BAföG for health and long-term care insurance contributions, by validity date. Amounts vary by insurance type and student status.

Valid from	§ 21 (2) 1
2022	0.223
2021	0.213
2012	0.213
2001	0.210

Table E17: Deduction rates under § 21 (2) 1 BAföG for income from employment subject to pension insurance, used to approximate social security contributions in the means test, by year.

Note: Table only shows years in which the rate changed. Intermediate years are forward filled.

Valid from	§ 23 (1) 1	§ 23 (1) 2	§ 23 (1) 3
2024-07-19	353	850	770
2022-07-16	330	805	730
2021-08-01	330	665	605
2020-08-01	330	630	570
2019-07-09	330	610	555
2015-01-01	290	570	520
2010-10-24	290	535	485
2008-08-01	290	520	470
2007-12-24	255	520	470
2002-01-01	255	480	435

Table E18: Monthly income disregards (Freibeträge) under § 23 (1) BAföG for the student, by validity date. Columns refer to students living alone, with a child, or with a spouse/partner.

Valid from	§ 25 (1) 1	§ 25 (1) 2	§ 25 (3) 1	§ 25 (3) 2	§ 25 (4) 1	§ 25 (4) 2
2024-07-19	2540	1690	850	770	50%	5%
2022-07-16	2415	1605	805	730	50%	5%
2021-08-01	2000	1330	665	605	50%	5%
2020-08-01	1890	1260	630	570	50%	5%
2019-07-09	1835	1225	610	555	50%	5%
2015-01-01	1715	1145	570	520	50%	5%
2010-10-24	1605	1070	535	485	50%	5%
2007-12-24	1555	1040	520	470	50%	5%
2002-01-01	1440	520	480	435	50%	5%

Table E19: Income exemptions under § 25 BAföG for parents and spouses or partners, by validity date. Columns show fixed allowances and percentage deductions used in the means test.

E.1 Other Relevant Input Parameters

Valid from	§ 32a Abs. 5 & 6 (joint)	Otherwise (single)
2026	40700	20350
2023	36260	18130
2021	33912	16956
2020	1944	972

Table E20: Solidarity surcharge (Soli) exemption thresholds under § 32a Abs. 5 & 6 EStG, by year of entry into force. Joint refers to married couples filing jointly; single to individual taxpayers.

Year	Werbungskostenpauschale
2024	1230
2022	1200
2021	1000
2010	920
2003	1044

Table E21: Annual employee deduction for work-related expenses (Werbungskostenpauschale) under § 9a Satz 1 Nr. 1a EStG, by year of change. Intermediate years are forward filled in the microsimulation.

AI Statement

ChatGPT 3.5–4.5 was employed for language and grammar checks in the paper. The authors reviewed, edited and revised any content generated by ChatGPT to their preferences, therefore having ultimate responsibility for the entire paper.