Unclaimed Aid in the German Student Aid System
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

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Abstract

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1   Introduction

Non-Take-Up of BAföG: Recent Developments and Increasing Awareness

In recent years, the issue of non-take-up (NTU) of student financial aid, specifically BAföG (Bundesausbildungsförderungsgesetz), has attracted significant attention in Germany. While BAföG remains the primary policy tool for ensuring fair access to higher education, there is increasing skepticism about whether it effectively achieves its core objectives of unlocking educational potential and ensuring equal opportunities. This skepticism stems primarily from the steady decline in the number of eligible students who actually make use of BAföG (Gwosć and van der Beek, 2022; Meier et al., 2024).

Several recent studies highlight significant structural shortcomings of the current BAföG system as central reasons behind the rising NTU rates. Among the main points that critics emphasize is that BAföG allowances have not kept up with the actual living costs, particularly amid rising housing prices and increasing inflation (Meier et al., 2024). As of recent, some policy amendments have been made (such as the 29th BAföG amendment in 2024) in an attempt to incrementally adjust the support rates, but these attempts have to some extent been met with criticism for being inadequate. For example, student expenditures for 2024 are projected to average around 969 EUR per month, significantly more than the maximum BAföG rate of 812 EUR, even after these adjustments (Meier et al., 2024).

Additionally, the complexity and lack of transparency in BAföG application procedures further discourage students from applying, which in turn increases NTU rates. Many students find the eligibility criteria unclear, which creates uncertainty about whether or not they qualify for financial support. But these barriers aren't just administrative, they're also psychological. Feelings of stigma, or discomfort with applying for what is perceived as a welfare type of benefit, play a role in that as well. So, while economic factors matter, the decision not to apply is often also shaped by information deficits and psychological factors (Gwosć and van der Beek, 2022; Keller, Staack and Tschaut, 2017).

This growing awareness of BAföG's limitations has resultet in demands for more thorough impact evaluations and deeper structural reforms. As Meier et al. (2024) point out, despite annual public expenditure of approximately 3 billion EUR, there is still a lack of solid empirical assessment of the effectiveness and efficiency of the system. This knowledge gap has a limiting effect on the ability to make evidence based policy decisions, leading instead to reforms shaped by political compromise instead of objective analysis. Some researchers, like Gwosć and van der Beek (2022), argue that changing this might even require a shift from the current needs-based model (Fürsorgeprinzip), which requires students to prove their financial hardship, to a more inclusive, universal support model (Versorgungsprinzip). International comparisons indicate that participation rates in countries with universal support systems are substantially higher, which suggests that systemic change could lead to improvements for Germany in this regard.

The urgency to address NTU is becoming ever more apparent, especially in the context of recent economic challenges, such as rising housing costs and inflation, factors that disproportionately impact students. Critics of BAföG argue that the issues extend beyond just low support rates. They point to structural

issues, particularly the mix of grants and loans. For many students, especially those from economically disadvantaged families, the prospect of going into debt is enough to deter them from applying at all (Keller et al., 2017; Gwosć and van der Beek, 2022). (Gwosć and van der Beek, 2022).

In summary, the increasing NTU of BAföG has become a central issue in the wider policy discussion on accessibility of education. Addressing these problems will require targeted policy reforms, clearer and more transparent application processes and greater reliance on evidence based analysis. Implementing changes like that is crucial to ensure that public funds for student aid are used in an equitable and effective manner, and thus helping to maximize educational opportunities for students from all backgrounds.

2 Theoretical and Empirical Context (Related literature)

Means-tested student aid in Germany (BAföG) can amount to around 38000 EUR over the course of a university degree. Roughly half of this support comes as a non-repayable grant, while the other half is provided as an interest-free loan, a portion of which is typically waived after graduation. Despite the generosity of the program, microsimulation studies using SOEP data show that nearly 40% of students who are formally eligible never submit an application. This level of non-take-up (NTU) poses serious challenges to both the equity goal of making higher education accessible to all and the efficiency goal of directing public support where it can have the greatest impact (Herber et al., 2019).

In the NTU literature, non-take-up refers to the case where individuals meet legal eligibility requirements but still do not receive the benefit. This is different from "non-enrolment," where someone never enters the pool of potential recipients in the first place. In the economic context, the decision to claim aid is generally understood as a cost–benefit trade-off: students weigh the expected monetary gain against the costs of claiming, which are typically grouped into three categories: informational, procedural, and psychological (including stigma). These costs tend to increase when the program is complex and not clearly explained (Booij et al., 2012). Estimating NTU reliably is not straightforward. It depends on having high-quality data and being able to simulate eligibility rules in detail. Studies on German social assistance, for example, show that even small mistakes in reported income can lead to NTU rates being overstated by up to ten percentage points (Frick and Groh-Samberg, 2007).

Standard economic theory predicts that students 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). However, in the case of BAföG, the fact that part of the support is structured as a loan introduces additional behavioural factors. Students may be discouraged from applying due to debt aversion, present bias, or uncertainty about future earnings. Evidence from SOEP data shows that students who score high on impulsivity or impatience are significantly more likely to not take up BAföG. Conversely, those with an older sibling who has already gone through the application process are much more likely to apply, suggesting that informal networks help lower informational barriers. Research from Belgium supports this picture, finding that information-related barriers are often more important than administrative complexity or stigma in explaining why people do not claim benefits they

are entitled to (Fidan and Manger, 2021; Herber et al., 2019; Bolland et al., 2024).

Across different German studies, the estimated NTU rate for BAföG is remarkably consistent at around 40% (Goedemé and Janssens, 2020; Mechelen, 2017). Herber and Kalinowski's microsimulation work shows that a 100 EUR increase in monthly BAföG payments reduces the likelihood of non-application by roughly one percentage point. Their findings also highlight the importance of family context: students who have a sibling who already claimed BAföG are significantly more likely to apply themselves (Frick and Groh-Samberg, 2007; Bruckmeier and Wiemers, 2012). They further find that students raised in former East Germany tend to claim more often, suggesting that local norms and social context also play a role.

Germany's experience is not unique. For example, Dutch administrative data reveal that about 24% of eligible first-year students do not take up the means-tested supplementary grant. Surprisingly, a third of these non-claimants simultaneously take out student loans, which strongly indicates a lack of awareness or understanding of the program (Konijn et al., 2023). Estimates of non-take-up vary widely across countries, programs and data sources, but for means-tested social assistance schemes in OECD countries, NTU levels are often found to be quite high, or between 30 and 70% (Goedemé and Janssens, 2020).

In getting accurate estimates of NTU, a few key factors need to be considered. Among those are access to detailed linked data, a clear and replicable eligibility simulation, and careful correction for measurement errors. In the German case, even moderate misreporting of household income can shift the results substantially (Goedemé and Janssens, 2020; Frick and Groh-Samberg, 2007). Recent Belgian research using the TAKE survey shows that directly measuring the types of barriers students face, such as information or application hurdles, can dramatically improve the predictive accuracy of NTU models compared to relying only on background characteristics (Bolland et al., 2024).

Although earlier German studies have produced careful microsimulations of BAföG take-up, they rely on SOEP waves that stop in 2013 and therefore cannot speak to developments in the past decade (Herber et al., 2019; Bruckmeier and Wiemers, 2012). No national update has been published since then, even though student demographics and labour-market conditions have shifted. Using the latest SOEP data available up to 2021, this thesis delivers an up-to-date NTU estimate and a concise breakdown by key background characteristics—parental income, region of upbringing and migration status—providing the first nationwide picture of BAföG non-take-up immediately before the 2024 reform and a clean benchmark for future policy evaluations.

2.1 Studies on non-take up of welfare

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Over the past several decades, a substantial body of research has examined the phenomenon of non-take-

up (NTU) of welfare benefits in Germany. As summarized in Table 1, previous studies have produced a wide range of NTU estimates, reflecting differences in target populations, program types, methodological approaches, and data sources.

Early studies using administrative data and household surveys typically reported NTU rates for social assistance between 40% and 67%. More recent analyses, including those based on the German Socio-Economic Panel (SOEP) and the German Income and Expenditure Survey (EVS), have investigated non-take-up across a broader range of programs, including basic social security, housing allowance, and supplementary child allowance. Despite some variation, a persistent pattern emerges: a significant proportion of eligible individuals and households do not claim benefits to which they are entitled. The selected studies listed in Table 1 illustrate both the magnitude of this issue and the diversity of empirical approaches used to estimate NTU rates in Germany.

Author(s)	Year	NTU (%)	Year of Data	Data Source	Program Type
Frick and Groh-Samberg	2007	67	2002	SOEP	SA
Herber et al.	2016	36–40	2002–2013	SOEP	BAföG
Bruckmeier et al.	2013	41–49	2005–2007	SOEP	BSS
Bruckmeier and Wiemers	2018	43.1	2008	EVS	SA
Bruckmeier and Wiemers	2018	63	2008	EVS	HA/SA
Bruckmeier and Wiemers	2018	88	2008	EVS	SCA
Bruckmeier and Wiemers	2012	41–49	2005–2007	SOEP	SA

Table 1: Selected previous estimates of non-take-up (NTU) rates for social benefits in Germany. Program type abbreviations: SA = Social Assistance, BAföG = Federal Student Aid, MTG = Means-Tested General Benefits, BSS = Basic Social Security, HA = Housing Allowance, SCA = Supplementary Child Allowance.

Note: This table summarizes selected results on non-take-up rates from prior literature using SOEP and other German datasets. See cited references for full details.

To estimate non take up rates of welfare benefits, researchers typically rely on one or more of three data sources: administrative records, specially designed surveys and general purpose surveys. Each has its own strengths and weaknesses. Administrative data is generally precise for welfare receipt, but often it lacks information on those who do not claim benefits. Special purpose surveys can collect more detailed information on eligibility and take up behaviour but are costly and rarely used. On the other hand, general purpose surveys are more readily available and are widely used in empirical research (Mechelen, 2017).

In this study, data was collected from a general purpose survey, i.e. the German Socio-Economic Panel (SOEP), which is one of the longest standing multidisciplinary household surveys in the world, gathering data from around 30000 individuals across 22000 households annually (Berlin, 2025).

While such data is not specifically designed to measure non take up, it has the advantage of covering both benefit receipt and the characteristics needed to estimate eligibility, such as income, household composition and demographic variables (Mechelen, 2017).

However, it comes with some limitations. First of all, there are potential biases due to non response bias and undercoverage. Vulnerable groups, such as those without a permanent address or people living

in institutions, are often missing from survey samples. Non response may also be correlated with non take up, which can distort estimates. Second of all, measurement errors can be a concern, especially in regards income, asset reporting, and welfare receipt. Respondents may misreport their income or confuse the benefits they receive, leading to inaccurate estimates of eligibility and take up. Third of all, mismatches in the timing and definition of income used in surveys compared to what administrations use to assess eligibility can result in classification errors. For example, surveys often report annual income, but eligibility is commonly assessed monthly. Lastly, general purpose surveys often lack detailed information about reasons for non take up, making it difficult to distinguish between, for example, lack of awareness and administrative barriers (Mechelen, 2017).

3   Student Aid Systems: International and German Context

Schwarz and Rehburg (2004) highlight how, starting in the 1970s, higher education shifted from being reserved for a small group to something more broadly accessible to the general population. This expansion, seen across much of Europe, led to a growing need for public financial support for students. Each country responded differently, some designed broad, universally available aid schemes, while others introduced more narrowly targeted programs. These differences in scope, eligibility, and administration mean that there is no unified European approach to student financial aid.

These differences in how student aid systems are set up don't just come down to choices made within the education sector, they also reflect different ideas about the role of the state in providing financial support. In countries like Germany, where social policy tends to emphasise personal and family responsibility, financial aid is often tightly means-tested and more narrowly targeted. In contrast, countries in the Nordic region have a stronger tradition of providing universal benefits, and that carries over into how they design their student support systems as well (Gwosć and van der Beek, 2022; Schwarz and Rehburg, 2004).

3.1   International Student Aid Models

When comparing the proportion of students receiving public financial aid across OECD countries, Germany proves to be one of the nations with the lowest coverage. Other OECD nations with low coverage include Austria, Croatia and Switzerland. What these countries tend to have in common is that public financial aid is narrowly targeted, focusing on students from socio-economically disadvantaged backgrounds. At the other end of the spectrum are countries such as Sweden, Denmark, Australia, and the United States, where a much larger share of students benefit from public financial aid (OECD, 2024).

These differences capture the two main design principles when it comes to public student funding, i.e. the welfare principle and the provision principle. The latter one aligns with Germany's BAföG, which is narrowly targeted to specific groups. The welfare principle on the other hand applies to systems where public aid benefits a larger share of the student population (i.e. the Nordic countries) (Gwosć and van der Beek, 2022).

Gwoś and van der Beek (2022) conduct an empirical comparison between two groups of countries in Europe, where one group consists of countries that apply the welfare principle and the other of countries that follow the provision principle. The results indicate that countries that follow the latter have a significantly greater share of students that receive public aid on average, and that public aid accounts for a greater proportion of the receiver's overall earnings. Moreover, the probability of students in these countries reporting serious financial issues is lower. The authors also look into what can roughly be translated into participation equity - which refers to proportionate representation of different social groups in higher education. They find that, to a slight extent, the countries that follow the provision principle do worse than the countries that follow the welfare principle (Gwoś and van der Beek, 2022). This raises the question of whether narrowly targeted systems like BAföG are truly effective in reaching the students who need support most, or whether broader systems, even if less precisely targeted, might ultimately be more successful in improving access.

There is however a common trend in that the main form of student aid across Europe is in the form of grants, i.e. monetary public support that is not to be repaid. These grants can cover general cost of living or more particular needs like tuition fees or accommodation. Student loans are the alternative (or even complement), where public monetary support needs too be repaid, typically after ones studies have been completed. Typically, such loans come with low interest rates (although there are exemptions to this), often lower than interest rates on private loans in a given country (Schwarz and Rehburg, 2004).

4 The German Study Aid System

The **Federal Training Assistance Act** (g. Bundesausbildungsförderungsgesetz, BAföG) is a public student aid system supplied by the **Federal Ministry of Education and Research** (g. Bundesministerium für Bildung und Forschung). 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., 2024). 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.

BAföG replaced various federal state regulations pertaining to attendance at vocational and general education schools that had already been consolidated in the Education Support Act (AföG) in 1969. It also replaced other regulations that were centred around providing assistance to gifted students and were not associated with any legal entitlement. Thus, this was the first law to establish a "legally enforceable right to educational funding" (Staack, 2017).

Since the beginning, BAföG 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

do the mechanisms of the welfare state intervene through BAföG (Staack, 2017).

BAföG was introduced in 1971 in the form of a 100 percent non-repayable grant and was generally very successful with almost half (44.6%) receiving the subsidy—a level never reached again. The early success of BAföG came with significant financial burdens for both the federal states and the federal government, prompting a series of reforms—particularly in response to the energy crises of the 1970s. In 1974, a mandatory loan component was introduced, and by 1977, the loan share had increased even further. By the 1980s, BAföG underwent a complete overhaul, the so-called "BAföG Kahlschlag" or BAföG clear-cut, transforming it into a fully subsidised loan program. As a result, the grant portion was eliminated, significantly reducing BAföG's appeal. Due to the rapid decline of students applying for BAföG it was once again overhauled in the 1990s, making it so that half the funding was in form of a grant and half in form of an interest-free loan – the structure of which is still in force today. Since 2005, the share of the funding that is provided as a grant has been just over 50% and the share provided as a loan just under 50%. Further changes were made in 2001 when a repayment cap of 10.000 EUR was introduced (Lost, 2025; Staack, 2017; Meier et al., 2024).

BAföG continues to face low interest among students today, with one of its major issues being that students are not utilizing it, as it lacks appeal (see table A2 and figure B1).

4.1 Declining uptake and its reasons

Some sources claim that since the introduction of BAföG in 1971, the proportion of students receiving financial aid has fallen from around 50% to around 15% as of 2023. Thereof, around 50% received full funding (Meier et al., 2024). According to the German student survey (g. Die Studierendenbefragung in Deutschland), it even went as low as 12.9% in the summer semester of 2021[1] (Kroher et al., 2023). While these figures are based on different sources and survey years, they both point to the same overall trend, a significant and long term decline in the share of students receiving BAföG.

The survey supports the finding that BAföG uptake has declined over time, and furthermore found that uptake has consistently been lower among students with higher parental education levels, which likely reflects income based ineligibility. Furthermore, the study shows that as parental educational attainment increases, funding rates decrease. At the same time, a general decline in funding rates can be observed over time across all groups (Kroher et al., 2023).

Structural and behavioural explanations

The decline in BAföG uptake seems to be the result of both structural and behavioural factors. Structurally, the eligibility rules have become relatively stricter over time. For instance, income thresholds have not always kept pace with inflation or with actual cost of living for sudents, which means that fewer students qualify now than in earlier decades (Meier et al., 2024). At the same time, the application process itself can discourage students from applying. The forms are long and complicated, and it is not

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[1]In Germany, the academic year is divided into a winter semester (October to March) and a summer semester (April to September). Most university programs begin in the winter semester.

always clear whether an application will be successful. For students who are already unsure about their eligibility, that uncertainty alone can be enough to put them off (Kroher et al., 2023). This is consistent with findings by (Fidan and Manger, 2021), who show that information gaps and behavioural factors, like students incorrectly assuming they're ineligible or being confused by the process, play a significant role in explaining non-take-up. Taken together, these elements likely explain both the lower eligibility rates and the growing number of students who could apply in theory, but choose not to.

These patterns also raise questions about how effectively BAföG is reaching the students it is meant to support. In particular, it is worth considering whether informational and structural barriers may be affecting some groups disproportionately, such as students whose parents didn't attend university or those with a migration background (Kroher et al., 2023).

Application rates and reported barriers

The 22nd German student survey estimated that just about 80% of students did not apply for BAföG during the term it was conducted. It also found that around 66% of students had never applied for BAföG and that a further 10% of students had also never received BAföG, but had submitted an (unsuccessful) application (Kroher et al., 2023). The survey doesn't go into detail about why these applications were unsuccessful, but common reasons are likely to include their income being just above the threshold, missing paperwork, or confusion about the eligibility criteria.

BAföG funded students can then be further divided into those who received BAföG dependent on parental support (9.3%) and those who received BAföG independently of parental support (3.4%) (Kroher et al., 2023). The difference comes down to whether a student's eligibility is based on their parents' income or assessed independently. Independent status usually applies to students who are older, have children of their own, or have been financially self-sufficient for some time.

These numbers suggest that quite a few students either don't realise they might be eligible for BAföG or feel discouraged from applying in the first place. The fact that so many have never submitted an application, along with a smaller group who applied but didn't receive support, points to a mix of both perceived and actual barriers in the system.

Data was also collected on reasons students had for not applying for BAföG. The most commonly stated reason was thinking that parental income was too high, but 73.7% of non-applicants claimed that as one of the reasons. The second most common reason stated was thinking that own income/assets were too high, with 29.7% of non-applicants claiming that. The third most common reason stated was fear of debt (21.4%). Also notable is that 7.8% of non-applicants stated that expected funding amount would be too low as one of the reasons (Kroher et al., 2023).

Funding expiration and completion patterns

The study also looked further into the group of former recepients. Out of the students who were not receiving BAföG because their funding had expired, just over 20% reported that they had exceeded the

maximum funding period or standard period of study. The study claims that this is not a surprising result since it is a well documented fact that most students in Germany exceed the standard period of study. Only just over a third of all students complete their studies within the standard period of study, with even almost a quarter exceeding the standard period of study by more than two semesters. Completing a degree within the allocated time is rather the exception than the norm (Kroher et al., 2023).

Other important reasons for the expiration of funding include that a student's own income or assets or those of relatives are too high (23.5% and 18.6%, respectively), that a student has changed their field of study (15.6%), or that the required credit scores could not be provided (12.2%). However, over 15% of students whose funding has expired also state that they do not want to incur further debt or that the expected funding amount is too low (14.3%). The current course of study not being eligible for funding or exceeding age limit play a minor role, accounting for around 7% and 4% respectively (Kroher et al., 2023).

Interpreting declining funding levels

It's also worth noting that for many years, the maximum BAföG support rate didn't keep up with average reported living expenses for students. Data from the Sozialerhebung shows that this gap persisted from at least 2000 to 2017. It wasn't until the 2022 reform (the 27th BAföG amendment) that the maximum support rate was increased to a level that finally exceeded average reported student expenses for the first time (Meier et al., 2024). This increase took place after the end of the period covered in this analysis and is therefore not reflected in the data used.

This raises a broader question about how to interpret declining funding rates. A lower share of students receiving BAföG doesn't necessarily mean 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 reflect how many students are actually in need of financial aid nor how many of them receive such aid (Meier et al., 2024).

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 seem to be 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., 2024).

4.2 How BAföG Entitlements Are Calculated

To understand who qualifies for BAföG and how much support they receive, it's helpful to briefly outline how the entitlement is calculated. The system is based on a means test that primarily considers the income of the applicant's parents. After deducting taxes, social security contributions, and standard allowances for parents and certain dependents, any income that remains after deductions is compared to a threshold. The amount above this threshold is subtracted directly from the student's potential BAföG entitlement. The basic structure of the calculation is shown in Appendix C.

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Alex, I need your take on this, should we just remove tthis subsction maybe? MAYBE DO A SEPARATE PIPELINE JUST FOR THE BAFÖG CALCULATIONS (IRRESPECTIVE OF HOW WE FOUND IT THROUGH THE SOEP DATA)

4.3 Institutional Design and Policy Instruments

4.3.1 The Income Exemption Threshold and the Support Rate

BAföG uses two main tools in order to achieve its central objectives, the so-called Freibetragsgrenzen, which is the income exemption threshold, and the so-called Bedarfssätze, which is the support rate (Meier et al., 2024).

Support Rates. In order to determine the support rates, three main reference points are used: 1) the development of basic social security benefits ("citizens allowance" or Bürgergeld), 2) the development of consumer prices, which reflects the increase in general costs of living, and 3) the specific living expenses of students, which are surveyed every four to five years in the Sozialerhebung ("the social survey"). Additionally, the financial situation of the federal government is taken into account in order to ensure that increases in support rates, income exemption thresholds and social allowances are fiscally feasible (Meier et al., 2024).

Income Exemption Threshold. In reviewing and determining the income exemption threshold, net income (g. arbeitnehmereinkommen) is primarily used as a reference indicator in BAföG reports. The income exemption threshold is also normatively determined by the legislature, i.e. the decision is not based on a fixed rule or an automatic formula, but on policy choices (Meier et al., 2024).

Interactions Between the Income Exemption Threshold and the Support Rate. These tools are interconnected, as raising the income exemption threshold increases the number of students eligible for BAföG. In addition to that, raising the income exemption threshold makes it so that those who previously received only partial support become eligible for more support, and thus raises the amounts granted to this group of students (Meier et al., 2024).

According to the law on BAföG the support rate and the income exemption threshold must be reviewed

every two years and, if necessary, re-determined accounting for the cost of living, general economic conditions, trends in income levels and wealth development (Meier et al., 2024).

4.3.2 Two Loan Repayment Models

ALEX: CONSIDER SHORTENING THIS SUBCHAPTER SINCE OUR FOCUS IS NOT ON THE REPAYMENT SYSTEM?

The two main ways of financing studies in higher education (HE) using a loan is to either use a traditional **time-based repayment loan** (TBRL) which is of the same style as standard "mortgage-loans" where the principal is amortized on a fixed reimbursement schedule.

The alternative to the TBRL plans are **income contingent loans** (ICL), where the principal you are allowed to borrow and the rate at which you amortize the principal is contingent on your financial status. The principal you are allowed to borrow and the rate at which you amortize the principal is contingent on your earned and capital income. In some systems, as in the German one, the household earnings and capital gains are also considered when applying for the income contingent BAföG loan.

An obvious benefit of the ICL loan structure is that it eliminates the likelihood of defaulting on your debt, as the reimbursement period (and rate of amortisation) is adapted to the individual (or household) income. Time based repayments are known to overburden the poorer part of the population which decides to educate themselves. For instance, among the 20% of the poorest graduates in South Korea and United States almost all students have a repayment burden exceeding 100% of their income (Chapman et al., 2022). Income contingent loans therefore provides an insurance against low income for the debtor and promotes social benefits such as mobility and human capital formation.

However, there are some important drawbacks to income-contingent loans that policymakers should consider when implementing them. One concern is that, as long as the borrower has an outstanding balance, the loan effectively acts as a marginal tax on income above the repayment threshold. This can potentially reduce the borrower's incentive to work more, as higher earnings lead to higher repayments. If borrowers respond by working less to avoid steeper repayment rates, the loan will be repaid more slowly, increasing the cost borne by the creditor — in this case, the state. Whether this is an actual problem is yet to be investigated further, but has been shown that for instance in the UK's income contingent repayment plan to not be an actual problem (Britton and Gruber, 2020).

In the case of BAföG, this issue is less pronounced, as the repayment system is only partially income-contingent. Repayments are capped at 130 EUR per month, and after a maximum of 77 installments (a total of 10,010 EUR), any remaining debt is forgiven (Studentenwerk Leipzig, n.d.).

5 Data

This study utilizes data from the German Socio-Economic Panel (SOEP), one of the longest-standing multidisciplinary household surveys in the world. Conducted annually since 1984 by the German Institute

for Economic Research (DIW Berlin) (Goebel et al., 2023), the SOEP is a nationally representative longitudinal survey that gathers data from approximately 30,000 individuals across 22,000 households each year. The survey includes respondents aged 17 and older and provides rich individual- and household-level information on income, education, labor market behavior, household composition, and demographics. This study relies exclusively on SOEP-Core, the central and most comprehensive module of the dataset (Berlin, 2025).

We restrict our analysis to the period between 2007 and 2022, as this is the range for which we were able to consistently collect and harmonize the necessary statutory parameters from official BAföG regulations Bundesministerium der Justiz (2025). This includes annual updates to base need rates, income allowances, asset thresholds, and other legally defined components relevant to BAföG eligibility and award determination.[2] Earlier years were excluded due to inconsistencies or incomplete availability of comparable legal documentation. By focusing on this window, we ensure that the simulation model is fully grounded in verifiable legal norms and reflects the actual policy environment faced by students during this time.

SOEP with its household structure allows us to link students to their parents, siblings and, in many cases, partners. Using this data, we construct a dataset that includes detailed student-level and household-level characteristics. For students, we observe age, gender, federal state (Bundesland), household type, and income (if any). Parental information includes gross and net income, employment status, household structure, tax burdens, and relationship status.

Using this data, we simulate the theoretical BAföG eligibility and award based on statutory rules in place during each year. This involves implementing a detailed microsimulation model that replicates the BAföG means test.

5.1 Sample Description

The final dataset contains 6,146 student-year observations, where each row represents a student in a given survey year. The sample spans the period from 2007 to 2022 and is derived from a harmonized student panel constructed using SOEP-Core data.

The panel is unbalanced due to individual variation in education length, dropout behavior, and survey response. While some students are observed for a single year, others are followed across multiple years of their educational trajectory.

Each observation contains detailed information on sociodemographic background, enrollment status, income and assets, housing situation, and reported BAföG receipt. Variables used in the simulation are consistently available for this period.

While the SOEP survey is nationally representative, this analytic subsample is conditional on survey respondents who were enrolled in education and met the inclusion criteria of the simulation pipeline. A descriptive overview of key variables is provided in Appendix C, Table C4.

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

5.2 Limitations

Although the SOEP provides comprehensive socioeconomic data, certain limitations persist.

Parental income coverage. Accurate parental income information is essential for constructing a credible BAföG means test. To ensure consistency in the simulation, the analysis is restricted to students for whom income data from both legal parents are available within the household files. This means that cases where one or both parents cannot be identified or linked within the dataset—such as due to absence, non-response, or household separation—are excluded from the simulation sample.

Because the SOEP dataset does not directly indicate BAföG eligibility, we construct theoretical eligibility through a microsimulation that mirrors the statutory rules of the Bundesausbildungsförderungsgesetz (BAföG) from 2002 to 2021 (Bundesministerium der Justiz, 2025; Bundestag, 1999, 2004, 2007, 2010, 2011, 2014, 2019, 2022a,b, 2024a). The model implements the need calculation under § 13 and the evolving allowance schedule under § 25, incorporating adjustments from each amendment. While undocumented exemptions or special cases cannot be captured, the simulation provides a consistent, rule-based approximation across survey waves.

Modelling taxes. Full tax-return simulations, as in Herber et al. (2019), require detailed information (e.g. deductions, extraordinary expenses) that the SOEP does not always provide. We therefore approximate net parental income with the statutory bracket formulas of § 32a EStG—updated for every year since 2002 (Bundestag, 2024b; Buzer, 2024b,a, 2022b,a, 2020, 2018b,a, 2016b,a, 2015b,a, 2013b,a, 2011, 2007, 2006; Liebig, 2012).

Deviation from official outcomes. Even when closely following the legal rules, the simulation can differ from actual BAföG decisions due to missing household details or unobserved individual circumstances. Still, it offers a consistent and transparent benchmark for analysing take-up over time.

While many SOEP variables approximate administrative data, its still the most suitable dataset for examining the BAföG non-take-up rate. The eligibility measure used here reflects the legal framework and is sufficiently accurate for a systematic analysis of non-take-up and its underlying factors.

Income misreporting. When studying benefit take-up using a probit model, there are two common sources of bias that are important to keep in mind: measurement error in income and incorrect reporting of benefit receipt. Income is a key factor in determining eligibility for means-tested programs like BAföG, but it is often self-reported and can be measured with error. If the income recorded in the data does not reflect individuals' true income, some people may be wrongly classified as eligible or ineligible. This can lead to biased estimates and misleading conclusions about the factors that influence take-up Pudney (2001).

Take-up misreporting. Another issue is that benefit receipt itself is sometimes misreported. For example, people might say they did not receive aid when they actually did, or the other way around.

This kind of misclassification makes it harder to accurately model the take-up decision. As shown in Pudney (2001), even relatively small errors in either income or benefit receipt can have a big impact on the results. This highlights the importance of being aware of potential measurement problems when interpreting the findings from probit models Pudney (2001).

6 Method

6.1 Microsimulation of Theoretical BAföG Eligibility

6.1.1 Purpose and Scope

The microsimulation pipeline is designed to calculate a theoretical BAföG eligibility status and award amount for students in the SOEP-Core sample. Its primary purpose is to compare these simulated entitlements with de facto BAföG take-up, as reported in SOEP.

To construct the theoretical values, the model replicates the legal rules and means-testing procedures defined in the Bundesausbildungsförderungsgesetz (BAföG) for the years 2007 to 2021. These rules are applied to individual-level SOEP data, including detailed information on income, assets, housing costs, and household structure.

This approach enables a systematic assessment of the alignment between statutory entitlements and actual BAföG participation. Deviations between the modeled and reported outcomes may arise from reporting errors, exceptional administrative decisions, or incomplete data. Full documentation of the simulation logic and input structure is provided in Appendix C and D.

Identifying the Non-Take-Up (NTU) Rate and Beta Error. We define non-take-up of BAföG in line with Nelson and Nieuwenhuis (2019), as the circumstance when a person is eligible for welfare, but does not receive it. This is in line with terminology commonly used in literature on welfare take up rates. Non take up rate is thus the number of people who are eligible, but do not receive it, divided by the total number of people eligible.

Formally, this is expressed as:

$$\Pr(\text{NTU} = 1 \mid M = 1) = \frac{\sum_{i=1}^{N} \mathbf{1}\{R_i = 0 \text{ and } M_i = 1\}}{\sum_{i=1}^{N} \mathbf{1}\{M_i = 1\}}, \quad \text{where} \tag{6.1}$$

$$\mathbf{1}\{\cdot\} = \begin{cases} 1 & \text{if individual } i \text{ is eligible but does not take up BAföG,} \\ 0 & \text{otherwise.} \end{cases} \tag{6.2}$$

Beta Error (Type II Error). It is worth noting, however, that these situations are often more complex. In some cases, individuals may receive BAföG even though they are not eligible. This can occur due to fraud or simply as a result of administrative errors. Such cases introduce the concept of

beta errors. A beta error refers to the probability that a student receives BAföG despite being classified as ineligible by our model. It captures false positives in the eligibility classification; cases where students who should not qualify according to the simulation nonetheless receive financial support.

Formally, it is expressed as:

$$\Pr(\text{TU} = 1 \mid M = 0) = \frac{\sum_{i=1}^{N} \mathbf{1}\{R_i = 1 \text{ and } M_i = 0\}}{\sum_{i=1}^{N} \mathbf{1}\{M_i = 0\}}, \tag{6.3}$$

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

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

6.1.2 Simulation Pipeline

Constructing the Student Dataset. The pipeline begins by assembling a harmonized dataset of student-level observations from SOEP-Core and manually harmonizing variables which are not harmonized already. 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 in order to reduce bias and ensure validity of estimated parental contributions.

The resulting student-level dataframe 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, church tax (where applicable), and standard deductions (e.g., Werbungskostenpauschale), in accordance with §§ 21–23 BAföG (Bundesministerium der Justiz, 2025). This net income will later be used to compute the student's excess income as part of the BAföG need assessment.

Estimating Parental Contributions. In the next step, 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. These values account for deductions such as income tax, solidarity surcharge, and church tax, where applicable.

Net incomes from both parents are combined into a joint parental income measure. From this, the model subtracts statutory allowances as defined in §§ 24–25 BAföG (Bundesministerium der Justiz, 2025), which vary depending on the number of parents, 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 in the next stage.

A complete breakdown of the income transformation, applicable thresholds, and illustrative examples is provided in Appendix D.

Asset Test. The simulation includes an asset test to assess whether students hold financial resources above the statutory exemption thresholds. For each student, information on financial assets, real estate, business holdings, private insurances, vehicles, and other tangible property is combined, and reported debts are subtracted to derive total net assets.

Since asset data in SOEP are only collected every five years, missing observations for non-surveyed years are filled using linear interpolation. This approach allows for year-specific asset estimates that remain consistent with observed data and ensures full coverage across the entire simulation period.

Total assets are then compared against exemption thresholds defined in §29 BAföG (Bundesministerium der Justiz, 2025), which vary by age, partnership status, and number of dependent children. Any amount exceeding the applicable allowance is classified as excess assets and contributes to reducing the student's calculated need.

Need calculation and theoretical entitlement. In the final stage, the simulation model calculates the student's funding need by summing the statutory base need, housing allowance, and health insurance supplement, as defined in §13 BAföG (Bundesministerium der Justiz, 2025). From this total, the model subtracts any excess income attributable to the student, their parents, and their assets. The resulting amount determines the theoretical monthly BAföG entitlement.

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 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.

6.2 Binary Choice Model

After simulating statutory eligibility, we analyse behavioural non-take-up: the probability that a student refrains from taking up BAföG despite being theoretically eligible according to our microsimulation. We model both using a Logit and a Probit model.

6.2.1 Probit Model

Formally, we model

$$\Pr(\text{NTU}_i = 1 \mid \mathbf{X}_i) = \Phi(\mathbf{X}^\top \boldsymbol{\beta}), \qquad \text{for all } i \text{ with } T_i = 1, \tag{6.4}$$

where $\Phi(\cdot)$ denotes the cumulative distribution function of the standard normal distribution.

Here, $T_i = 1$ indicates the theoretical eligibility outcome of our microsimulation, and $\text{NTU}_i := \mathbf{1}\{R_i = 0\}$ is a binary indicator for non-take-up, based on the observed receipt in SOEP-Core (with $R_i = 1$ indicating receipt of BAföG and $R_i = 0$ otherwise).

6.2.2 Logit Model

In the same way as the Probit model, we fit a Logit model

$$\Pr(\text{NTU}_i = 1 \mid \mathbf{X}_i) = \Lambda(\mathbf{X}^\top \boldsymbol{\beta}), \qquad \text{for all } i \text{ with } T_i = 1, \tag{6.5}$$

where $\Lambda(\cdot)$ denotes the logistic cumulative distribution function

$$\Lambda(z) = \frac{1}{1 + e^{-z}}. \tag{6.6}$$

6.2.3 Interpretation.

Since raw logit and probit coefficients reflect changes in the latent index and are not directly interpretable in terms of outcome probabilities, we report average marginal effects (AMEs) for all covariates. These AMEs quantify the average change in the probability of non-take-up associated with a one-unit change in each covariate, holding other variables at their observed values.

Control Variables. Our models include a set of control variables to account for observed heterogeneity that may influence the probability of non-take-up. These controls include demographic factors (e.g., sex, migration background, partnership status, living situation), socioeconomic characteristics (e.g., parental income, own income, parental education), and family context (e.g., sibling previously claimed BAföG). We also control for regional differences using an East/West Germany background indicator, reflecting known structural and cultural variations. Finally, to capture behavioral differences that might affect take-up decisions, we include a measure of individual risk appetite. These covariates help isolate the association between key predictors and non-take-up by adjusting for potential confounders.

6.3 Model limitations

Addressing beta errors in eligibility simulations. In simulating benefit non-take-up, beta errors occur when individuals report receiving a benefit but are classified by the model as ineligible. These mismatches typically reflect limitations in the input data, particularly income and assets. Since the data in this study is self-reported, inaccuracies may occur in both income and benefit receipt. Without administrative records, it is not possible to confirm whether a student was truly eligible or actually received the benefit. Some studies suggest that beta errors are more often caused by issues in the income or asset data used for eligibility simulation, rather than incorrect reporting of benefit receipt (Frick and Groh-Samberg, 2007; Janssens and Derboven, 2022).

To address these limitations, several strategies are used in the literature. These include conducting sensi-

tivity checks by adjusting income levels and applying post-simulation corrections to reclassify borderline cases (Herber et al., 2019). Some studies also emphasize the value of combining different data sources where possible, such as using more detailed survey modules on assets or household composition to improve the accuracy of eligibility simulations (Janssens and Derboven, 2022).

Although beta errors cannot be completely avoided, it is important to recognise their potential impact on the results. In this thesis, particular attention is paid to identifying where beta errors may occur and considering how they might influence the findings. Sensitivity checks are applied where relevant to assess the robustness of the findings and to reduce the risk of misinterpretation.

OVERALL MAYBE SHORTEN THIS WHOLE BETA ERROR TEXT

7 Results

7.1 Microsimulation Non-take-up

Our microsimulation results indicate that the non-take-up-rate of BAföG, among theoretically eligible students ranged from approximately 50–70% across the survey years 2007–2021, with an average of 60% (Table 2).

These estimates are broadly in line with previous findings on non-take-up of social benefits in Germany, which generally falls between 40–67%, depending on the program and time period (see Table 1). 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.

This discrepancy may be attributable to several factors, including differences in the estimation of theoretical eligibility. These factors include the specific SOEP variables used to capture income and reported BAföG receipt, the time periods under study (with our analysis covering 2007–2021, compared to Herber et al. (2019), which covers 2002–2013), as well as other differences in the microsimulation design and modeling approach.

7.2 Determinants of Non-take-up

7.2.1 Binary Choice Model

Risk attitudes. In this analysis, a variable for students' self-assessed willingness to take risks is included. Even though BAföG offers relatively safe and generous conditions, some students might still be hesitant to take on any form of debt if they are generally risk-averse. By including this variable, we aim to capture whether differences in individual risk preferences help explain why some eligible students choose not to apply.

Herber and Kalinowski (2016) also include a risk preference variable in their study, mainly to control for the possibility that risk attitudes could affect take-up behavior or influence how other factors, like

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

Table 2: Non-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; beta error is the share of theoretically ineligible students ($M = 0$) who do receive BAföG.

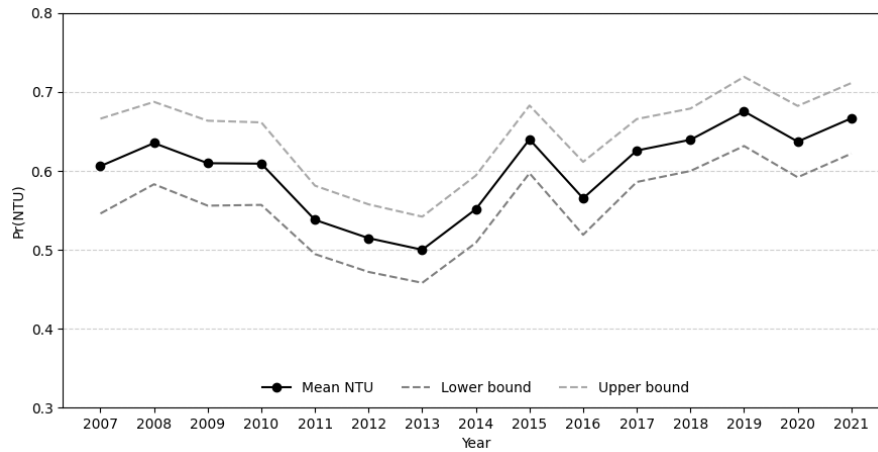Notes: SOEP v39, 2007–2021, weighted with individual weights

Figure 1: Development of the probability of non-take-up from 2007–2021.

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

	Logit				Probit			
	Coef.	SE	AME	SE	Coef.	SE	AME	SE
Main explanatory variables								
Parental Income[†]	-0.226	0.242	-0.039	0.042	-0.136	0.145	-0.040	0.042
Student income[†]	0.643**	0.261	0.111**	0.044	0.383***	0.148	0.113***	0.042
Simulated BAföG amount	-0.002**	0.001	-0.000**	0.000	-0.001**	0.001	-0.000**	0.000
Demographics								
Age	-0.305	0.270	-0.053	0.046	-0.171	0.152	-0.050	0.044
Age^2	0.009	0.007	0.002	0.001	0.005	0.004	0.002	0.001
Female	0.679*	0.381	0.118*	0.066	0.391*	0.221	0.115*	0.066
Has partner	0.860	1.289	0.149	0.223	0.534	0.661	0.157	0.194
Migration background	0.244	0.378	0.042	0.065	0.131	0.231	0.039	0.067
Psychological traits								
Self-assessed risk tolerance	0.032	0.040	0.006	0.007	0.018	0.025	0.005	0.007
Personal patience	0.166*	0.092	0.029*	0.016	0.100*	0.055	0.029*	0.016
Personal impulsiveness	-0.224**	0.104	-0.039**	0.018	-0.135**	0.062	-0.040**	0.018
Controls								
Living at parents' home[¶]	0.383	0.401	0.066	0.069	0.222	0.235	0.065	0.069
Sibling claimed BAföG before	-0.380	0.343	-0.066	0.057	-0.208	0.199	-0.061	0.057
East background	-1.543***	0.453	-0.267***	0.070	-0.940***	0.268	-0.276***	0.071
Parents are highly educated	0.164	0.461	0.028	0.080	0.118	0.261	0.035	0.077
Pseudo R^2	0.1655				0.1645			
Observations	230							

Table 3: Logit and Probit Coefficients and Average Marginal Effects

Notes: Significance levels indicated by $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Robust standard errors clustered at the student level. Estimated using Python `statsmodels GLM()` with robust standard errors. [†] Log-transformed. [¶] Variable is indirectly used in the simulated BAföG calculation.

impatience, play a role. They do not find a strong effect of risk aversion on BAföG take-up, but they still argue it is useful to control for (Herber et al., 2019). In a similar way, we include this variable to improve our model and to see whether risk aversion plays any role in students' decisions to reject BAföG.

East German socialization. A variable indicating whether the student lives in East Germany is included to account for potential differences in attitudes toward state support rooted in historical and regional context. Alesina and Fuchs-Schündeln (2007) show that individuals from the former GDR tend to have stronger preferences for redistribution and a greater belief in the role of the state in providing social services, and that these differences in preferences can persist for one to two generations after reunification (Alesina and Fuchs-Schündeln, 2007). Current residence in East Germany may reflect continued exposure to these norms and institutions and can serve as a reasonable proxy for this form of socialization. Since the variable is statistically significant at the 5% level in our model, we interpret it as capturing persistent regional differences in how students view and respond to publicly provided financial support like BAföG.

Sibling prior experience with BAföG. An indicator for whether the student has an older sibling who previously received BAföG is included to capture potential differences in access to informal support and familiarity with the application process. Students with siblings who have already gone through the steps of applying may be more aware of eligibility rules and practical requirements. Herber and Kalinowski (2016) highlight that such sibling experience can help reduce informational and procedural barriers, making it more likely that students follow through with the application (Herber et al., 2019). This variable is intended to reflect how previous exposure to the system within the family can shape students' confidence and ability to navigate what is often perceived as a complex process.

Migration background. A variable for migration background is included to explore whether differences in familiarity with the BAföG system may influence take-up. Some students may come from households with less exposure to German administrative processes or financial aid structures, which could affect their understanding of eligibility or the application itself. In addition, studies show that individuals with a migration background in Germany often have lower financial literacy, which may make it harder to evaluate financial aid options like BAföG (Tsegay, 2024). Including this variable helps capture potential structural or informational factors that may contribute to lower take-up rates among eligible students. In the SOEP data, migration background is measured using the `MIGBACK` variable, which distinguishes between direct (first-generation, coded as 2) and indirect (second-generation, coded as 3) migration background. - Alex please review and make sure this is correct

...

ALEX: X many background variables on parental education are included. They are derived/ found from... blabla. Parental education background is shown to have an effect on the student's decision of take-up, although this is only true for the variable that is conditioned on at least one parent having a masters degree.

...

Interpretation of Average Marginal Effects from the Probit Model. All interpretations below are based on the average marginal effects (AMEs) from the Probit model presented in Table 3.

Student age is found to be significantly associated with NTU of BAföG. On average, each additional year of age increases the probability of NTU by 2.8 percentage points, holding all other variables constant. Similarly, student income has a significant effect, as a 100 EUR increase in gross monthly income is associated with a 1.2 percentage point increase in the probability of NTU, suggesting that higher-earning students may be less inclined to rely on BAföG support. Parental income matters as well. A 100 EUR increase in parental gross monthly income is associated with a 0.6 percentage point increase in the probability of NTU. NOTE ALEX: LOOK BETTER INTO THIS. AME POSITIVE FOR STUDENTS BUT NEGATIVE FOR PARENTS, DON'T THINK IT IS INTERPRETED CORRECTLY HERE ABOVE, ALSO WHY IS IT DIFFERENT? DOES THAT MAKE SENSE?

Other variables that have to do with family background were also found to have an effect. For example, having an older sibling who previously received BAföG reduces the probability of NTU by 9.6 percentage points on average, suggesting that familiarity with the system encourages take-up. Migration background is significant only for students with an indirect migration background (those born in Germany to foreign-born parents). For this group, the probability of NTU is 8 percentage points lower on average compared to those without a migration background. Gender, partnership status, and household size do not appear to significantly affect NTU.

Students from East Germany are much less likely to forgo BAföG than their West German counterparts. The results show that having an East German background decreases the probability of NTU by about 25.9 percentage points, on average. This substantial difference could reflect regional variation in attitudes towards public support or perceived entitlement.

Furthermore, parental education seems to matter, particularly at the highest levels. Having at least one parent with a level 7 ISCED education (equivalent to a master's degree IS THIS CORRECT ALEX?) increases the likelihood of NTU by 47.8 percentage points. The effects of lower education levels are not statistically significant in the model.

Lastly, the estimated theoretical BAföG amount is negatively associated with NTU. A 100 EUR increase in the theoretical amount corresponds to a 2.3 percentage point decrease in the probability of NTU, suggesting that higher expected benefits increase take-up. PLEASE CONFIRM THAT THIS MAKES SENSE ALEX

8 Discussion

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Appendix A: Tables

Year	Consumer Price Index		Average Payout (EUR)		Financial Expenditure (EUR 1,000)	
	Index (2020=100)	Price Factor (2023)	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 payout under the Federal Training Assistance Act (BAföG) for student recipients (excluding pupils), based on official data published by Destatis. The table includes the Consumer Price Index (CPI, variable **PREIS1**, base year 2020 = 100) and a derived price factor (column "Factor (2023)") calculated using these CPI values to express nominal amounts in 2023 euros. The inflation-adjusted average payouts and total financial expenditures were computed using this deflator and are not reported as such in the original Destatis tables.

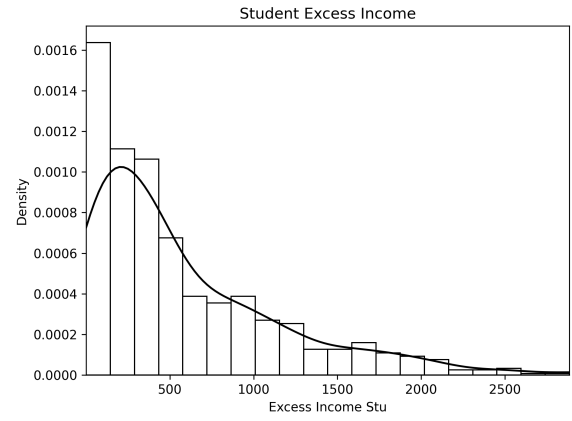| Year	Students	Number of Supported Students			Proportion Supported (%)		
		Total Supported	Fully Supported	Partially Supported	Total	Fully	Partially
2023	2,868,311	501,425	245,255	256,170	17.5	8.6	8.9
2022	2,920,263	489,347	244,559	244,788	16.8	8.4	8.4
2021	2,941,915	467,595	200,369	267,226	15.9	6.8	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. Columns: **BIL002** = total number of students; **PER010** = total supported students; **PER011** = fully supported students; **PER012** = partially supported students.

Household Type	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1-Person Household	52.38	52.38	64.71	72.22	60.00	38.71	41.18	37.93	56.00	55.56	46.67	64.29	54.55	59.38	63.33
Couple Without Children	80.00	50.00	75.00	100.00	75.00	50.00	63.64	88.89	36.36	85.71	69.23	46.15	60.00	90.00	71.43
Couple With Children	66.67	70.83	56.86	56.86	51.90	56.96	51.69	59.49	71.43	53.13	66.67	66.67	73.24	67.27	77.27
Migration Background	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
No migration background	61.22	64.41	66.10	65.08	53.33	53.47	52.44	59.04	65.85	62.32	67.39	63.04	67.11	63.29	65.43
With migration background	58.82	61.54	47.83	50.00	54.76	45.71	46.67	49.06	60.47	47.83	54.55	65.46	68.42	64.71	70.00
Sex	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Male	68.97	69.44	58.54	69.23	50.00	53.73	47.89	53.52	61.91	64.00	70.31	64.79	64.29	58.33	68.00
Female	54.05	59.18	63.42	54.17	56.94	49.28	52.11	56.92	66.13	50.77	56.63	63.16	70.69	67.69	65.57
Region	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
West Germany	73.17	69.70	67.21	62.50	56.70	59.14	50.00	59.63	67.00	62.22	67.80	67.23	70.97	71.11	72.62
East Germany	40.00	42.11	42.86	56.52	45.71	34.88	50.00	37.04	52.00	36.00	41.38	50.00	52.38	34.78	48.15
Sibling BAföG history	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
No sibling received BAföG	65.52	63.33	53.85	60.87	64.87	61.29	56.76	73.17	58.97	72.41	70.27	52.50	75.68	66.67	63.33
Sibling received BAföG	61.54	64.71	46.15	53.33	48.48	32.14	37.50	56.00	68.18	44.44	44.74	63.64	60.00	43.75	55.56

Table A3: Non-take-up rates by household type, migration background, sex, region, number of siblings, and sibling BAföG history.
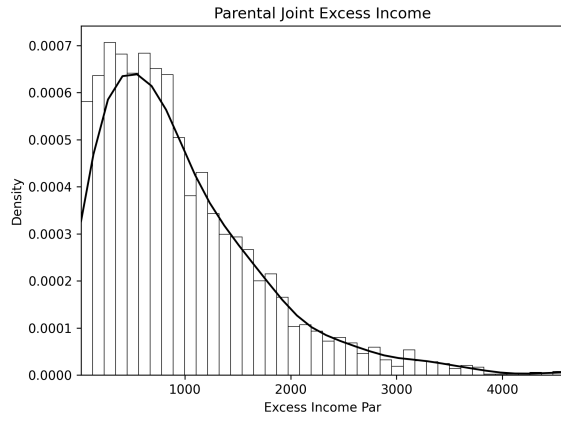
(a) Parental joint excess income   (b) Student excess income

Figure 2: Simulated mean excess income for parents (a) and students (b).
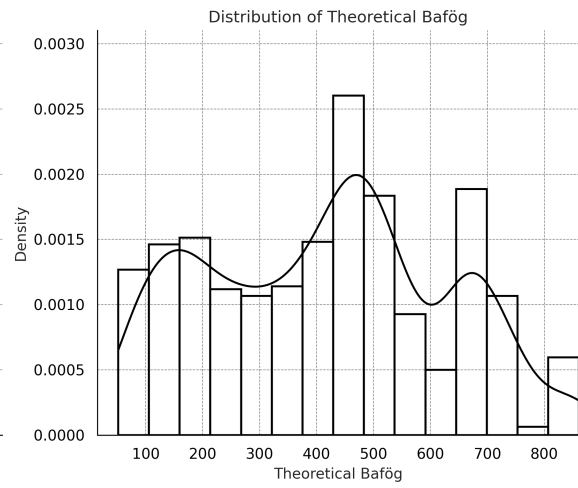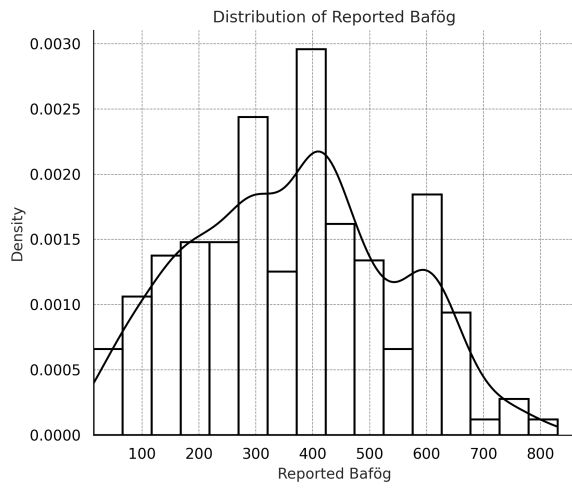

Figure 3: Comparison of the distribution of reported BAföG receipt in the SOEP-Core sample with the simulated (theoretical) distribution of simulated BAföG entitlements from our model.

Appendix B: Figures

Figure B1: Fraction of enrolled students in Germany receiving partial, full, or combined BAföG support (loans and grants). Based on official statistics from Destatis. *Own illustration.*

Figure B2: Average nominal and real monthly BAföG payout for students (excluding pupils), based on Destatis time series. *Own illustration.*

Appendix C: Microsimulation Pipeline[3]

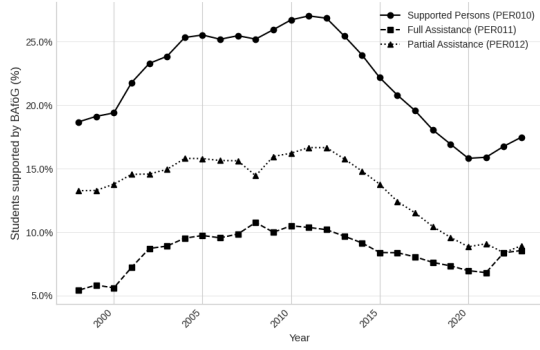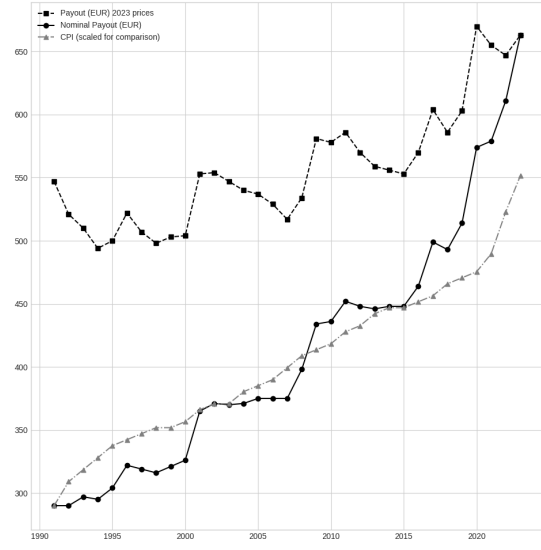This appendix documents the microsimulation pipeline used to construct the analysis dataset from raw SOEP extracts. The goal is to make each step in the process transparent, reproducible, and aligned with the legal and institutional rules governing student aid eligibility in Germany.

The pipeline is organized into five main components: a student module, a sociodemographic enrichment module, a student income module, an assets module, and a parental income module. These components interact as illustrated in Figure C3.
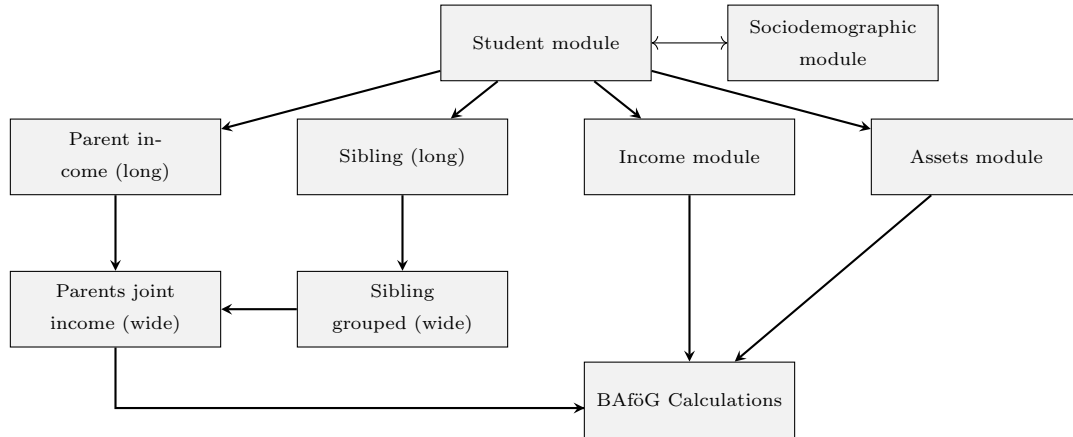
Figure C3: End-to-end pipeline overview with grouped raw SOEP sources

Figure C3 maps the complete microsimulation pipeline, from raw SOEP inputs through modular components to the final BAföG calculation. The remainder of this appendix explains each component in detail.

C.1   Sociodemographic Module

This module constructs basic demographic characteristics needed throughout the pipeline. It provides sex, age, federal state, and household type variables. The federal state is used to derive an East/West classification, relevant for BAföG eligibility rules.

Key data sources include:

- `ppathl`: sex, birth year and month

- `hgen`: household type

- `regionl`: federal state of residence

These variables are merged into the student module and used in eligibility filtering, modeling allowances, and regional policy differences.

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[3]Byström, A. E., & Antonsdottir, M. S. (2025). `msc-thesis-code-v4`. GitHub. https://github.com/Alexerby/msc-thesis-code-v4.

C.2 Student Module

The student module is the core unit of the microsimulation. It filters and prepares individuals from SOEP who qualify as students, and populates them with relevant characteristics for BAföG simulation. This includes education status, household composition, parental identifiers, employment, and relationship status.

It integrates inputs from multiple datasets:

- Education and religion: from `pl` (`plg0012_h`, `plh0258_h`)

- Living with parents: based on household and parent ID matches in `ppathl`

- Employment status: from `pgen` (`pgemplst`)

- Number of children: counted from `bioparen` where the student appears as parent

- Partnership status: inferred from household records

The resulting dataset includes all eligible students, ready for downstream processing.

C.3 Student-Income Module

This module computes the student's BAföG-relevant income. It begins with gross labour income and applies the following processing steps:

- Merges reported income from the relevant assessment year (typically the previous calendar year)

- Deduction of Werbungskosten (§ 9a EStG)

- Social insurance allowance of (§ 21 BAföG)

- Calculation and subtraction of income tax, church tax, and solidarity surcharge

- Comparison with personal exemption thresholds (§ 23 BAföG)

The output is net income above allowances, which may reduce BAföG entitlements.

C.4 Assets Module

The assets module compiles student-owned assets from the `pwealth` dataset. This includes:

- **Financial assets:** bank accounts, savings, stocks, and bonds (`f0100a`–`f0100e`)

- **Real estate:** other property ownership and shares in real estate (`e0111a`–`e0111e`)

- **Business assets:** stakes in private businesses or self-employment (`b0100a`–`b0100e`)

- **Private insurances:** building loan contracts, life and pension insurance (`i0100a`–`i0100e`)

- **Vehicles:** cars, motorcycles, and other personal transport (`v0100a`–`v0100e`)

- **Tangible assets:** valuables such as jewelry, art, or furniture (`t0100a`–`t0100e`)

- **Liabilities and debts:** total outstanding debt, excluding student loans (`w0011a`–`w0011e`)

All components are aggregated into a student-level asset profile. This value is compared against the legally defined asset allowance to determine whether the individual exceeds the threshold and may be excluded from eligibility.

The legal basis for this assessment is § 29 of the Bundesausbildungsförderungsgesetz (BAföG), which specifies the applicable asset allowances (*Freibeträge vom Vermögen*).

C.5 Parental-Income Module

This module estimates the amount that parents are expected to contribute to a student's support. It proceeds as follows:

- Match student with parents using `bioparen`

- Extract gross income from `pgen`

- Deduct Werbungskosten and social insurance contributions

- Apply parental tax model and § 25 BAföG allowances (base, sibling, relationship)

If both parents are observed, their contributions are aggregated. The final value is the BAföG-relevant parental contribution.

C.6 BAföG Calculation

The final module brings together all student and parental variables to compute a theoretical BAföG entitlement. The following logic is applied:

- Deduct student income from allowances

- Subtract parental contribution

- Exclude students who exceed asset thresholds

This results in an estimated monthly benefit, which can be compared to reported values to analyze take-up behavior and simulate reforms.

C.7 Variable Dictionary

Table C4: Variable Dictionary by Dataset

Dataset	Variable	Description	Data Type (semantic)
ppathl	pid	Person identifier	int
ppathl	hid	Household ID	int
ppathl	syear	Survey year	date

(continued on next page)

Dataset	Variable	Description	Data Type (semantic)
ppathl	gebjahr	Year of birth	int
ppathl	sex	Sex	Categorical
ppathl	gebmonat	Month of birth	int
ppathl	partner	Partnership status	Categorical
ppathl	migback	Migration background	Categorical
biosib	pid	Person identifier	int
biosib	sibpnr1--sibpnr11	Sibling person numbers	int
pl	pid	Person identifier	int
pl	syear	Survey year	date
pl	plg0012_h	Currently in education	Ordinal
pl	plh0258_h	Religion / church membership	Categorical
pl	plc0167_h	BAföG eligibility	Binary
pl	plc0168_h	BAföG / scholarship (gross, monthly)	int
pl	plg0014_v5	Education level, 1999–2008	Ordinal
pl	plg0014_v6	Education level, 2009-2012	Ordinal
pl	plg0014_v7	Education level, 2013–2021	Ordinal
pgen	pid	Person identifier	int
pgen	syear	Survey year	date
pgen	pglabgro	Labour income (gross)	int
pgen	pgemplst	Employment status	Categorical
pgen	pgpartnr	Partner indicator	int
pkal	pid	Person identifier	int
pkal	syear	Survey year	date
pkal	kal2a02	Monthly rent including utilities	int
pkal	kal2a03_h	Housing benefit	int
pwealth	pid	Person identifier	int
pwealth	syear	Survey year	date
pwealth	f0100a--f0100e	Financial assets	int
pwealth	e0111a--e0111e	Real estate (net value shares)	int
pwealth	b0100a--b0100e	Business assets	int
pwealth	i0100a--i0100e	Private insurances	int
pwealth	v0100a--v0100e	Vehicles	int
pwealth	t0100a--t0100e	Tangible assets	int
pwealth	w0011a--w0011e	Liabilities and debts	int
bioparen	pid	Person identifier	int
bioparen	fnr	Father's person ID	int

(continued from previous page)

Dataset	Variable	Description	Data Type (semantic)
bioparen	mnr	Mother's person ID	int
regionl	hid	Household ID	int
regionl	bula	Federal state (Bundesland)	Categorical
regionl	syear	Survey year	date
hgen	hid	Household ID	int
hgen	hgtyp1hh	Household type	Categorical
hgen	syear	Survey year	date
pequiv	pid	Person identifier	int
pequiv	istuy	Student grants received	int
pequiv	syear	Survey year	date
biol	pid	Person identifier	int
biol	pid	Person identifier	int
biol	syear	Survey year	date
biol	lb0267_v1	Employment Status	Categorical
biol	syear	Survey year	date
biol	lb0285	Number of Children	int

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 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 operationalized within the microsimulation pipeline. Each component of the calculation is made transparent, including the determination of the student's assessed need, applicable supplements, and deductions based on income and assets.

The case selected 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. While the statutory maximum at the time was 399 EUR, the simulation applies a standardized flat amount of 250 EUR to align with data quality and institutional thresholds reflected in the SOEP housing variables.

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[4]Based on calculations using the microsimulation pipeline introduced in Appendix C.

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 amendment.

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

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

- $\Rightarrow$ 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)

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

- Step 1: $6,276 - 290 = 5,986$ EUR

- Step 2: $5,986 \times 0.828 = 4,152.21$ EUR (after 17.2% deduction)

Step 3: Applying Income Tax   The BAföG calculator 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:

- Income tax: 0 EUR

- Church tax: 0 EUR

- Solidarity surcharge: 0 EUR

- $\Rightarrow$ Net annual income: 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:

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

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

$$\texttt{inc\_net} = 32{,}267 - 6{,}062 - 0 - 333 = 25{,}872 \text{ EUR}$$

$$\texttt{net\_monthly\_income} = \frac{25{,}872}{12} = 2{,}156 \text{ EUR}$$

Component	Explanation	Value (EUR)
Gross monthly income	Reported by SOEP	3,500
Working months	From SOEP (previous year)	12
Gross annual income	3,500 × 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 × 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 ÷ 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:

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

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:

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

The remaining income after allowance is:

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

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

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

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.

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

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

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:

- $\texttt{received\_bafög} = 0$ EUR

- $\texttt{reported\_bafög} = 0$ EUR

- $\texttt{theoretical\_eligibility} = 1$ (eligible)