

Sallam, Hend; Christl, Michael

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Do Migrants Pay Their Way? A Net Fiscal Analysis for Germany

Hend Sallam* Michael Christl†

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Abstract

This study quantifies the direct average net fiscal impact (ANFI) of migration in Germany, taking into account both indirect taxes and in-kind benefits such as health and education spending. Using a status quo approach with data from the German Socio-Economic Panel (SOEP) for 2018 and microsimulation techniques to impute both indirect taxes and in-kind benefits, our results show that migrants, especially first-generation migrants, have a more favorable net fiscal impact on average compared to natives. However, we demonstrate that this result is mainly driven by the favourable age structure of migrants. When controlling for demographic differences between these groups, we show that second-generation migrants contribute very similarly to natives to the German welfare state. Nevertheless, both natives and second-generation migrants, respectively, contribute more than first-generation migrants. These differences persist even when we do not account for indirect taxes and benefits-in-kind.

Keywords: *immigration, net fiscal impact, public finances, tax-benefit system*

JEL-codes: *F22, H24, H50*

*Humboldt-Universität zu Berlin, School of Business & Economics hend.sallam@hu-berlin.de

†Joint Research Centre, European Commission; Global Labor Organization (GLO) and Universidad Loyola Andalucía mchristl@uloyola.es

1 Introduction

Immigration is frequently proposed as a mean of improving inter-temporal fiscal sustainability (Mayr, 2005). Meanwhile, some public debates held immigration accountable for hindering the restoration of the fiscal balance. Nevertheless, the current literature estimating the recent net fiscal impact of migration in Germany is scant. The demographics of the German population have widely shifted following recent refugee and immigration influxes, and this dynamic necessitates an updated evaluation in light of the recent changes. Several scholars previously inspected this topic for Germany (e.g., Bonin, 2002; Gerdes, 2007; Hinte and Zimmermann, 2014; Manthei, 2020, among others).

To assess the fiscal impact of immigrants, our analysis focuses on an advanced economy—Germany—a country that has experienced significant recent immigration waves. Estimates of the net fiscal impact of migration in Germany are relatively outdated. Moreover, our data allow us to distinguish between first-generation and second-generation migrants, a distinction still largely absent in the current literature, which predominantly differentiates between EU and non-EU migrants. Using various concepts, we evaluate their impact on public coffers in direct net terms.

We employ the Net Fiscal Impact (NFI) method, drawing on data from the German Socio-Economic Panel (SOEP) and utilizing a microsimulation approach for taxes and transfers tailored for Germany. The SOEP is a long-term survey that gathers detailed information from thousands of households in Germany, covering economic conditions, social behavior, well-being, and individual preferences.¹ Our calculations are based on the GETTSIM (German Taxes and Transfer Simulator) microsimulation model, specifically designed for Germany. In doing so, our approach allows for precise modeling of the German tax-transfer system, resulting in an accurate and context-specific assessment of migration’s fiscal impact.

To achieve a more accurate estimate of the Net Fiscal Impact (NFI), we additionally include indirect taxes, such as Value-added Taxes (VAT) and excise taxes, as well as in-kind benefits for health care in our micro-data set, following the approach of Fiorio et al. (2024). While the latter’s analysis focuses on VAT only, we extend the scope by incorporating excise taxes in our calculations. This addition allows for a more comprehensive understanding of how immigrants contribute to public finances through their consumption patterns. Neglecting excise taxes would risk underestimating the total fiscal contributions made by natives or immigrants. By including both of indirect taxes (VAT and excise taxes) and in-kind benefits, we provide a

¹Using the SOEP has substantial advantages compared to other surveys used in the literature (Hauser, 2008; Frick and Krell, 2010).

fuller picture of the fiscal contributions beyond direct income taxes and social security payments. However, one key observation is that the imputation of VAT in the German context has been outdated in previous fiscal estimations, which relied on data from as early as 2010 or 2009, as seen in studies like [Blömer and Peichl \(2020\)](#) and [Pestel and Sommer \(2013\)](#). In contrast, our study addresses this limitation by using updated data based on the ITT extension of EUROMOD, which significantly enhances the precision of fiscal impact assessments and provides a more accurate and comprehensive overview of immigrants’ contributions to public finances.

Moreover, while other studies, such as [Fiorio et al. \(2018\)](#) and [Christl et al. \(2022\)](#), use data that does not include migrants who arrived during the 2015 migration wave in Germany. Our 2018 data, however, accounts for the impact of the 2015 wave, since it includes most of the newly arrived migrants. In 2015, Germany experienced its highest level of immigration and largest positive migration balance since 1992. Immigration surged by 46% compared to the previous year, reaching 2.14 million arrivals. The number of asylum-seekers reached a historical record in 2015 ([Federal Office for Migration and Refugees \(BAMF\), 2016](#)). Additionally, those studies have been unable to explore the distinction between first- and second-generation migrants due to data limitations, our analysis overcomes this by incorporating detailed data that allows us to differentiate between these groups. This distinction is crucial, as first- and second-generation migrants often have significantly different fiscal impacts due to variations in education, integration, and labor market participation ([Dustmann and Frattini, 2014](#); [OECD, 2013](#)).

This analysis uses a static approach, known as cash-flow models, that shows a certain population group’s net impact at a specific time, thereby capturing a ”snapshot” of the fiscal impact over a defined period, without projecting future changes or feedback effects. We attempt to answer the question of whether migrants in the receiving country, Germany in our case, are net recipients or net contributors to public finances, based only on the dimension of direct net payments. Particularly, based on this selected approach, we shed light on the instantaneous net impact of native and migrant subpopulations on the public budget (see [Chojnicki, 2013](#)).

This article is organized as follows: Section [2](#) reviews some of the relevant literature. Section [3](#) discusses our methodology and the derivation of the fiscal accounts. Next, Section [4](#) presents our empirical results, breaking down taxes and transfers by age groups and by age and migration status, respectively, and also showing the results of different estimation concepts: standard and extended. Finally, Section [5](#) concludes the paper.

2 Literature review

The field of fiscal literature examines both the direction and magnitude of the fiscal impact of migration. The evidence on this topic remains inconclusive. The net fiscal contribution of immigration is typically estimated to be relatively modest, typically within the range of ± 1 percent of GDP. In general, caution is warranted when interpreting fiscal results (Mayr, 2005), particularly given the lack of uniformity in the construction of net fiscal accounts. As Gerdes (2007) observed, there is no consensus on how net fiscal accounts should be compiled, including which items should be considered. Empirical studies indicate that there is considerable variation in the methods employed. As evidenced by the majority of empirical studies in this field, the findings regarding the net fiscal contribution (impact) are contingent upon several factors, including the assumptions made, the year under analysis, and the items included when examining the fiscal effects of migration. These latter factors can be further subdivided into those related to revenues and those related to costs.

Recent studies have provided valuable insights into the net fiscal impact of migration. For example, Fiorio et al. (2024) found that, on average, migrants across EU-14 countries, were net contributors to public finances from 2014 to 2018, contributing approximately €1,500 more per capita each year than natives. Analyses of these impacts generally follow either a static-analytical or a dynamic approach. Generational Accounting (GA), which falls into the dynamic category, has seen notable applications by researchers such as Auerbach et al. (1994); Chojnicki (2013); Mayr (2005); Auerbach and Oreopoulos (1999). Another dynamic approach is based on the overlapping generations general equilibrium, as exemplified by Storesletten (2000). Furthermore, the scope of these analyses varies widely, from cross-country comparisons and multi-country studies to focused examinations of individual countries. For instance, while many studies address broader or multiple-country contexts, some narrow their focus to specific national settings. Regarding the former, recent research on the fiscal impact of migration for EU countries includes works such as those by Christl et al. (2022) and Fiorio et al. (2024). In contrast, Dustmann et al. (2010) conducted a focused analysis for the UK, using multiple cross-sections to compare the direct benefits of immigration, such as additional tax contributions, with the direct costs of migration, including the costs incurred by the government for providing services to immigrants and their families. Their analysis spans several fiscal years from 2005 to 2009, attempting to answer whether immigration after the 2004 EU accession was beneficial to the UK. Their findings suggested that A8 immigration has not burdened the welfare system but has instead strengthened the fiscal position, even under the most conservative scenario of their study. It is important

to note that migrants in each of the studies mentioned above are defined differently. This variation is a significant caveat that contributes to the differing fiscal impacts of migration based on the specific population in question.

Moreover, understanding the fiscal impact of migration requires carefully examining its various components, including pensions, which play a crucial role in government finances. Pensions influence government revenues through statutory contributions and affect government expenses via payments to retirees. However, the treatment of pensions in fiscal analyses has varied significantly. Some studies have included pensions in their calculations (e.g., [Hinte and Zimmermann, 2014](#)), while others have excluded them (e.g., [Storesletten, 2000](#)). As a balanced approach, [OECD \(2013\)](#) examined pensions; both as benefits received by households and as contributions made by household members. Their analysis either included both pension benefits and contributions or excluded them entirely. They found that omitting pension contributions and payments often painted a more favorable fiscal picture, particularly for countries with substantial immigrant populations and high public expenditure on pensions, such as Germany, France, and Austria. We expand on these discussions in [Section 4.1](#) where we show our results in this relevance.

Additionally, fiscal analyses can be conducted at different levels of granularity. Some studies, like those by [Gerdes \(2007\)](#), construct net cost accounts on an individual basis, distributing costs across persons. In contrast, based on a household approach, [OECD \(2013\)](#) estimated the net contribution of immigrant households by averaging data over the period from 2007 to 2009. Each method, whether based mainly on individual-level or household-level calculations follows different assumptions. Therefore, this additional aspect constitutes a different estimation technique that impacts the results and subsequently the ANFI interpretations.

3 Data and Methods

3.1 Data

This section describes our data and methods employed to estimate the net fiscal impact of migration in Germany, based on a status-quo estimation. We employ micro-level data from the German Socio-Economic Panel (SOEP) dataset and microsimulation approach to predict welfare entitlements and social security contributions. The German SOEP data is a nationally representative household panel study from Germany ([Goebel et al., 2019](#)). Specifically, our strategy follows estimating the average NFI (ANFI) of migration for the whole population, and the benefits or contributions related to the population aged 17 years or older are predicted by the

German Taxes and Transfers Microsimulation Model (GETTSIM).² In doing so, we apply the default GETTSIM policy parameters for 2018. Since this approach does not capture the effects on some markets due to the arrival of new migrant groups, it follows a partial equilibrium approach.

Our calculations are performed on an individual level. Our weighted sample consists of about 40.6 million households and about 80.3 million individuals. On the note of the level of the analysis, the results of static analyses largely depend on the demographic unit of analysis (i.e., individuals or households) as argued by Christl et al. (2022), and as addressed in our previous section. Welfare benefits are attributed to the household head, in case there is a benefit on household level (e.g., basic income support, housing or children benefits). In case of joint taxation, taxes are attributed according to the income share within the household.

The base year of 2018 was selected as it represents the most recent period before any significant economic shocks, which could affect the net fiscal balance. Different items on the state’s budget are accounted for through microsimulation predictions using micro-profiles from the SOEP (see Table C1). However, certain items, such as pension incomes for retirees, are directly derived from SOEP data rather than from microsimulation. This approach is necessary because pension payments are not directly available in GETTSIM’s simulation. Instead, the SOEP survey offers detailed data on pension payments, making it a reliable source for this component. In a former study, the OECD (2013) employed a different methodology when accounting for pensions, using data from the OECD Tax and Benefit database. Finally, our approach applies the sampling weights provided in the SOEP survey data to ensure that the estimations accurately reflect the population in 2018.

To ensure a comprehensive analysis of social security contributions, we incorporated payments made by both employers and employees, representing a more accurate approach. In contrast, studies such as Dustmann and Frattini (2014) that use LFS data face limitations, as this data source lacks information on the amount of social transfers and pensions received, although it does indicate whether individuals receive pension payments. Conveniently, the German SOEP survey provides detailed information on these aspects. Our results based on a one-sided approach (i.e., either captured by the employee side or the employer side only) in terms of the social security contributions reveal significant differences. Therefore, it is crucial to consider the pension contributions made to the system and the pension income as omitting the employer’s contribution could significantly alter the results.

Moreover, our native/migrant definition follows the SOEP definition.³ In the

²For more details, check, <https://gettsim.readthedocs.io/en/stable/>

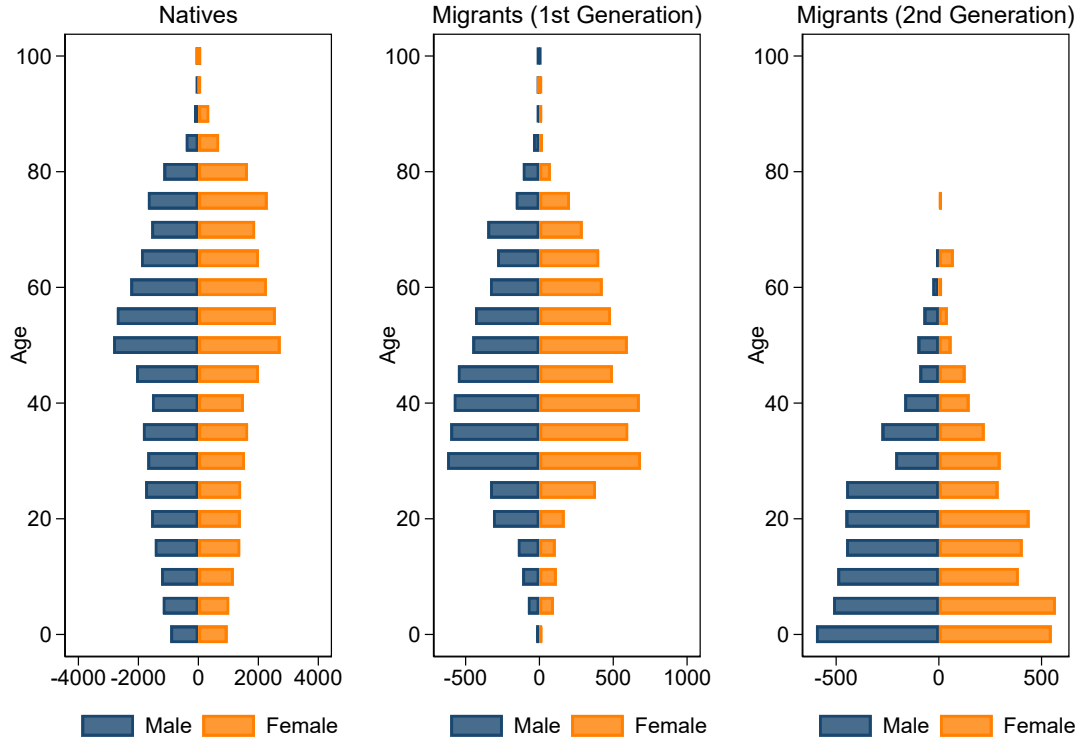
³See the SOEP’s migback definition in the PPFAD documentation SOEP (2015).

SOEP, respondents were assigned to the *MIGBACK* categories based on country of birth (see *GERMBORN*): To illustrate more, being born in another country than Germany indicates, by definition, a direct migration background (2), while respondents born in Germany may have either no (1) or an indirect (3) migration background. Moreover, naturalized respondents born in Germany are coded “3” (indirect migration background).

Finally, it is worth mentioning that these groups differ significantly in their demographic characteristics, particularly in their age structures. Given the substantial impact of age on economic activity, and thus on the overall net fiscal impact, it is important to be mindful of these differences. This relates to the discussions on the favourable age structures and how this can paint a positive picture of recent immigrants ([Dustmann and Frattini, 2014](#)).

As shown in [Figure 1](#), which illustrates the age composition of different population subgroups, the native population is substantially older than first-generation migrants. A larger proportion of natives are of pension age—typically individuals with a negative net fiscal impact. In contrast, second-generation migrants are predominantly very young, with a significant share still in compulsory education. This group is also expected to have a negative net fiscal impact at this stage, as they are not contributing to the state’s net fiscal balance while incurring high education-related costs. Overall, these demographic differences in age structure underscore the importance of considering population composition when analyzing the net fiscal impact.

Figure 1: Age pyramids of the different population groups (population in thousands)



3.2 Imputation of in-kind benefits and indirect taxes

To derive the various components to be included in the fiscal accounts, we address the in-kind benefits in addition to indirect taxes in more detail as next. Additionally, to gain insights into the relative importance of each budgetary component, we consider the relative share of these items for the German profile. For example, according to the OECD report, Germany is characterized by a lower proportion of revenues from taxes on corporate income and gains, while, on the other hand, the country's profile has substantially higher revenues from social security (SSC), and a rather low VATs. We also validate that our results are consistent with the macro-statistics of the respective year of our analysis ([Table C4](#)).

3.2.1 In-kind benefits for health

Health expenditures are considered tentatively by former research by [Zhang et al. \(2020\)](#), since it is the major direct personal non-transfer expenditure for adults. One significant aspect discussed by former studies is the necessity to consider the consumption of social goods such as education and health in addition to indirect taxes by immigrants (e.g. [OECD, 2013](#)).⁴ In practice, the in-kind benefits are not accounted for in an extension of the microsimulation model in GETTSIM which calls for an alternative estimation strategy. We follow [Fiorio et al. \(2024\)](#), accounting for them in a nearly similar fashion.

As for health-related expenditures, earlier research pointed to a lack of information on the utilization of healthcare services by migrants. Thereby, often assuming no distinction between migrants and the native population concerning public health insurance expenditure given that there is no reliable data regarding migrants utilizing health services ([Hinte and Zimmermann, 2014](#)). Other scholars have argued that immigrants have on average a more favorable age structure which results in a more favourable picture of health expenditures ([OECD, 2013](#)), which also relates to our discussion above in [subsection 3.1](#).

In our research, health expenditures are apportioned only by the group’s age class (and not by age and gender) as in former studies (e.g., [Dustmann and Frattini, 2014](#)). To estimate and attribute health expenditures to each group, several limitations have been discussed in this relevance. For example, the [OECD \(2013\)](#) study highlighted that public health care expenditure per individual varies significantly by age and is challenging to obtain for many OECD countries. Furthermore, [Fiorio et al. \(2024\)](#) addressed another limitation pointing out how there is no reliable source estimating the distribution of healthcare costs by individual characteristics.

Due to current data limitations, we adopt the approach used in the study by [Fiorio et al. \(2024\)](#) to apportion health expenditures. Specifically, we assign each five-year age interval its corresponding share of health expenditures, labeled as ”current health spending by age,” with the last group representing those aged 80 and over. Consistent with their methodology, the distribution of health expenses is derived from OECD data for the Netherlands, as Germany is not included in this dataset ([OECD, 2017](#)). The most recent year covered by the OECD data is 2011, and we therefore employ the health accounts data for that year.

To align the age-expenditure profiles with the macro-aggregate of health expen-

⁴They also argued that the adjustments for indirect taxes, health and education expenditures will likely impact the differences in the net fiscal position between immigrants and the native-born. particularly, they will make the fiscal position of immigrant households less favourable compared to native-born households but the effect is generally small.

ditures—386 billion euros for Germany in 2018, according to EUROSTAT statistics—we apply an adjustment or augmentation rate of 1.8 (macro-validation), as discussed previously in Section 3.2. Notably, health expenditures per inhabitant in Germany were estimated at 4.8 thousand euros in 2018.⁵

The health costs per person in each age group are reported in Table 1. We can see that health costs are typically monotonically increasing with age, however, small children up to 4 years of age typically show a higher cost than children between 5 and 9 years. We can also see that health costs are increasing substantially at the age of 75, where long-term care costs play a crucial role.

Table 1: Health related annual costs per person, by age group in Euros

age category	annual costs
up to 4	1814
5 to 9	1440
10 to 14	2023
15 to 19	2146
20 to 24	2372
25 to 29	2677
30 to 34	2770
35 to 39	2738
40 to 45	2833
46 to 49	3236
50 to 54	3713
55 to 59	4259
60 to 64	4750
65 to 69	6026
70 to 74	7490
75 to 79	10201
above 80	20434

Source: Fiorio et al. (2018) based on OECD data and own calculations.

3.2.2 In-kind benefits for education

Educational expenses are a major part of government expenditures and in monetary terms one of the most important benefits-in-kind of households. Therefore accounting for such benefits might have a substantial distributional impact. We impute education expenditures for children and adults in education if the respondent falls

⁵Official figures estimate Germany’s education budget at 220 billion euros (Federal Ministry of Education and Research (BMBF), 2021) and the health budget at 386.1 billion euros in 2018 (Eurostat, 2024).

within the age group corresponding to the relevant ISCED classification, indicates in the SOEP that they are currently in education, and does not report receiving labor income. This approach excludes individuals in firm-specific education programs not covered by the basic education system.

As per Table 2, we distinguish between primary education (ISCED 1), lower-secondary education (ISCED 2), upper-secondary education (ISCED 3), post-secondary non-tertiary education (ISCED 4), as well as tertiary education (ISCED 5+6). To illustrate, regarding education expenditures, they are apportioned by educational attainment similar to Fiorio et al. (2018), who use information from Eurostat. The basis is the ISCED classification of the individual survey respondents.⁶ Moreover, similar to Chojnicki (2013), we assumed that the education costs by age were similar between native and immigrant students, which is common in the literature and also reasonable since public education costs are very similar across different regions and schools.

Table 2: Assigned annual costs per student by the ISCED group in Euros

ISCED classification	annual costs
Primary education or first stage of basic education	6662
Lower-secondary education or second stage of basic education	6412
Upper-secondary education	7898
Post-secondary non-tertiary education	8693
Tertiary education	14090

Source: Fiorio et al. (2018) based on Eurostat data.

3.2.3 Indirect taxation

Indirect taxes consist mainly of value-added and sales taxes. Indirect taxes are proportional and based on income (Ekberg, 2011). Germany has a standard tax rate currently set at 19%, applied to most goods and services which is close to the OECD average. However, several goods and services are either taxed at a reduced rate, or are exempted. According to German national accounts tax aggregates, revenues from VAT accounted for 7% of GDP, revenues from excises (on specific goods, such as tobacco or alcohol) for about 0.7%, while income taxes account for about 9.7% in 2018.⁷

⁶In particular, based on the “International Standard Classification of Education (ISCED)” of 1997.

⁷See, https://ec.europa.eu/eurostat/cache/metadata/en/gov_10a_taxag_esms.htm

The two revenue sources, VAT and income taxes together nowadays account for about two-thirds of total tax revenues (see e.g., [Bach et al., 2016](#); [Pestel and Sommer, 2013](#)). In 2018, VATs accounted for about 27% of total taxation in Germany, according to OECD statistics ([OECD, 2023](#)). This underscores the higher relative importance of this form of indirect taxation. And these indirect taxes are theoretically equivalent to a sales tax imposed on final goods, although each of them has distinct attractive features from the perspective of countering evasion, and it is the dominant form of indirect taxation in the European Union ([Decoster et al., 2010](#)). Earlier research highlighted the necessity to take indirect taxes such as VATs into account in order to achieve reasonable estimations ([Gerdes, 2007](#)).

Consumption tax payments are often imputed in the related literature, using average effective tax rates by decile of household disposable income (i.e., gross annual income less income tax and National Insurance payments) (see e.g., [Dustmann et al., 2010](#)).⁸ To account for this revenue item, expenditure data or surveys are typically used. The imputation strategy followed in the literature is based on estimating VAT profiles across the income distribution (for each household income decile) and impute these values in the used data set.

This approach has usually two shortcomings. First, when applied, there is a significant information loss across households, since the VAT not only differs across income groups, but also the type of household, the region as well as other socio-demographic characteristics of a household. This is a crucial aspect, since migrant households compared to native households not only differ substantially in terms of income, but especially in terms of household size. Second, this approach does typically not account for excise taxes, which play a crucial role when it comes to indirect taxation. Excises are imposed on specific goods or services, typically on the sale or production of items like alcohol, tobacco, fuel, and certain luxury goods.

The German SOEP household data does not include sufficient and detailed information on the consumption of households.⁹ Therefore, we use the ITT extension of EUROMOD. The ITT extension combines income and benefits data from the EU statistics on income and living conditions (EU-SILC) for Germany with expenditure profiles from the household budget survey (HBS) on micro-level via matching techniques,¹⁰ adjusting also for the underestimation in comparison with macro-statistics. Details on the matching method and the adjustments applied are elaborated in

⁸The disposable income for an individual equals income from work + income from capital + taxable public transfer payments + non-taxable transfer payments - income taxes ([Ekberg, 2011](#)).

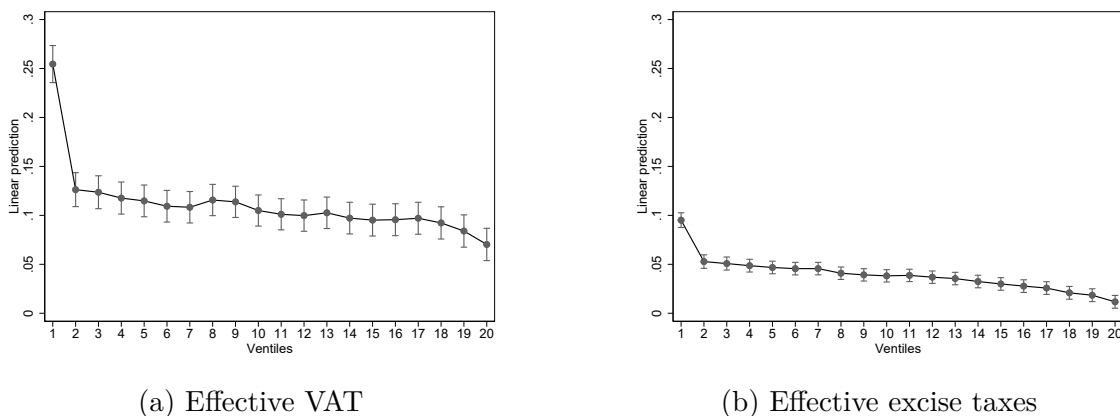
⁹See Footnote 8 in [Pestel and Sommer \(2013\)](#) for more explanation.

¹⁰The matched data set is based on EU-SILC 2018 and consumption shares based on HBS 2015. However, household expenditures are uprated accordingly to match the EU-SILC data.

Akoğuz et al. (2020). This allows us to calculate both, the VAT rates as well as the excise taxes paid by each household on a micro-level. To impute this information in the SOEP data set, we run a simple regression on both the effective VAT rate, in addition to the effective excise tax rate, respectively. Following the idea of Christl et al. (2022), we impute the indirect tax rates not only by income level (ventiles) but also by region, migration status, as well as by labor market status of the household. The results of the estimations can be found in Table B1 in the Appendix. This approach allows us to keep heterogeneity across households in the SOEP data.¹¹

Figure 6 illustrates the distributional effects of indirect taxes, such as the effective VAT rate and the effective excise taxes, across income groups. We can see that low income distribution have a higher effective tax burden on both types of indirect taxes.

Figure 2: Effective indirect taxes across the income distribution



As observed from the above figure, while the VAT rate exceeds 25% in the lowest part of the income distribution, the effective excise tax rate reaches more than 10% on average for poor households. On the other hand, looking at the upper part of the income distribution (highest income bracket), we estimate an effective VAT rate of about 8% and an effective excise tax rate of less than 2%. This highlights the strong regressive characteristics of indirect taxes. Native and migrant households pay on average significantly different indirect tax rates (11.2% vs. 10.7% VAT and 3.9% vs. 4.1% in excise taxes, respectively), however, when controlling for income and other household characteristics, we do not find a significant difference for native and migrant households in their effective tax burden. This is in line with previous

¹¹As shown in Table C2 and Table C3, the distribution of household income in EU-SILC and SOEP is very similar.

findings such as those by [Christl et al. \(2022\)](#) using data from 2010.

3.3 Methodology

In the following, we present the baseline of our estimations, following a similar approach to [Christl et al. \(2022\)](#).

$$NFI_i = \left(\overbrace{SSC_i + TIN_i}^{\text{Contributions}} \right) - \left(\underbrace{TRANS_i + BPEN_i}_{\text{Transfers}} \right) \quad (1)$$

[Equation 1](#) above reflects our standard estimation concept. We then include items often excluded from public transfer systems in fiscal estimations, namely indirect taxes and in-kind benefits.

$$NFI_i^{ext} = \left(\overbrace{SSC_i + TIN_i + VAT_i + TX_i}^{\text{Contributions}} \right) - \left(\underbrace{TRANS_i + BPEN_i + BINK_i}_{\text{Transfers}} \right) \quad (2)$$

Where:

NFI_i^{ext} is the extended net fiscal impact for individual i ,

SSC_i is the social security contributions per individual i ,

TIN_i is the income tax per individual i (including capital income tax and solidarity surcharge),

VAT_i is the value-added tax per individual i ,

TX_i is excise taxes paid by individual i ,

$TRANS_i$ denotes transfers (other cash benefits such as unemployment and family benefits) received by individual i ,

$BPEN_i$ is the pension benefits of individual i ,

$BINK_i$ is the in-kind benefits (health and education) received by individual i .

Furthermore, to analyze the re-distributional effect along the life-cycle, we also introduce the average net fiscal contribution in each age group decile, using both, the standard and the extended income concept. In more detail, we calculate the $ANFI^a$ by age group a , which we define as the average NFI_h^a of all individuals i in age group a :

$$ANFI^a = \frac{\sum_{i=1}^N NFI_i^a}{n} \quad (3)$$

To analyze the role that individual characteristics play in explaining the differences in the average net fiscal impacts, we estimate simple model to account for the

impact of demographic variables, as well as different exposure to the labor market. We tackle this question by estimating OLS regressions of the following specification:

$$NFI_i = \alpha + \beta_i gender_i + \gamma_i age_i + \delta_i edu_i + \theta_i mig_i + \zeta_i lm_i + \epsilon \quad (4)$$

where *gender* is a dummy variable that identifies males and females, *age* the age-groups, *edu* the education level (ISCED), *mig* the categorical migration status and *lm* the labor market status (employed, unemployed or inactive) of individual *i*.

Given the ongoing discussion on whether pensions should be treated as part of the net fiscal impact of an individual, we also report results without pensions (social security contributions for pensions, as well as pension benefits) in [Appendix A](#). Our results reveal substantial differences when comparing both approaches, as the net fiscal ranking of the three population groups has shifted.

[Table 3](#) highlights our methodological choices. We distinguish between six different models. The standard model includes the core parameters of the tax-benefit system, namely direct income taxes and all cash benefits received. The extended model additionally incorporates indirect taxes (VAT and excises) as well as in-kind benefits for health and education. In addition to the average net fiscal impact (ANFI), we use a model that controls for characteristics such as age, education, and labor market participation (with controls). To account for the impact of pensions, which redistribute income over the life cycle, we also estimate a model excluding pension benefits and contributions (no pension).

Table 3: Summary of different concepts used (methodological choices)

concept	Part of the tax-benefit system				characteristics	
	direct tax	indirect tax	transfers	in-kind ben	age	others
std. ANFI	x		x			
ext. ANFI	x	x	x	x		
std. NFI, (with controls)	x		x		x	x
ext. NFI, (with controls)	x	x	x	x	x	x
std. ANFI (no pensions)	x		x			
ext. ANFI (no pensions)	x	x	x	x		

4 Empirical results

4.1 Taxes and transfers by migration status

In the first step, we include the most straightforward items related to the direct transfers received and payments made by both migrants and natives respectively.

Table 4 shows the average net fiscal impact per month, disaggregated by migration status. On average, natives pay higher taxes and social insurance contributions (SIC), or social security contributions (SSC), compared to both first- and second-generation migrants. They also receive substantially lower transfers (74.0 Euros), especially compared to first-generation migrants (210.7 Euros).

Table 4: Average monthly net fiscal impact (ANFI) in Euros

status	taxes	SIC	pensions	transfers	ANFI
Natives	475.0	545.8	720.2	74.0	226.6
Migrants (1st generation)	422.9	461.9	340.1	210.7	334.0
Migrants (2nd generation)	334.4	308.2	108.1	94.01	440.6

However, when focusing on the average pension, we observe that, driven by the different age structures of natives and migrants, the average pension payment to natives is more than twice as high as that to first-generation migrants, and more than six times as high as that to second-generation migrants. Overall, using our standard concept, this results in a positive average net fiscal impact (ANFI) for all three population groups. However, it is the highest for second-generation migrants (440.6 euros), followed by first-generation migrants (334.0 euros) and natives (226.6 euros).

When adding indirect taxes (VAT and excises) and in-kind benefits for health and education to our calculations (Table 5), resulting in estimates based on the extended concept (see Equation 2), the average monthly net fiscal impact changes substantially. For instance, we observe a shift in the ANFI for natives. While natives pay slightly higher indirect taxes compared to first-generation migrants and substantially more than second-generation migrants, the in-kind healthcare benefits they receive are also substantially higher on average. However, in-kind benefits for education are higher for natives compared to first-generation migrants, but substantially lower than those received by second-generation migrants. First-generation migrants tend to have the lowest share of education expenditures in this setting. This results in an average net fiscal impact (ANFI) of -105.8 euros for natives, while first-generation migrants contribute 115.8 euros monthly. Second-generation migrants, due to the strong impact of in-kind education benefits, contribute less than first-generation migrants but more than natives, specifically about 93.5 euros monthly.

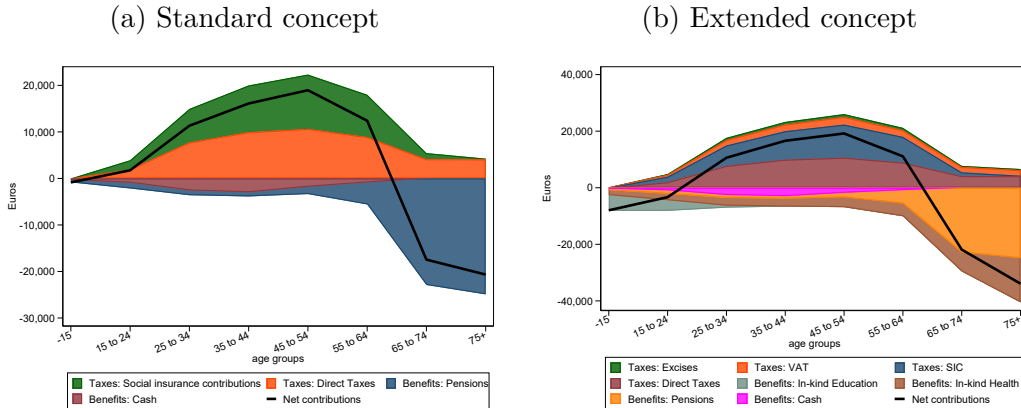
Table 5: Average monthly net fiscal impact (ANFI) in Euros, extended concept

status	taxes	SIC	pensions	transfers	VAT	excises	health	educ	ANFI
Natives	475.0	545.8	720.2	74.0	162.6	51.8	462.0	84.7	-105.8
Migrants (1st)	422.9	461.9	340.1	210.7	136.8	52.2	361.8	45.4	115.8
Migrants (2nd)	334.5	308.2	108.1	94.0	85.4	33.1	195.9	269.6	93.5

4.2 Taxes and transfers by age groups

In light of the previous discussion, we account next for age. In this subsection, we focus on the ANFI by age group to gain insights into each group's contribution to the public purse and the sustainability of the public transfer system. Over the life cycle, children typically benefit from the public system by receiving direct cash benefits as well as in-kind benefits (for health or education). Accordingly, we expect a negative ANFI for this age group. Once individuals enter the workforce, they begin contributing to the public purse through direct and indirect taxes, as well as social insurance contributions (SIC), turning the ANFI positive during the working years. Upon reaching retirement age, individuals receive public pensions, the largest benefit provided by the public transfer system, along with increasingly substantial in-kind health benefits. Therefore, we expect the ANFI to turn negative again for age groups typically associated with retirement.

Figure 3: The ANFI by age groups



Graphically, [Figure 3](#) highlights both our standard concept and our extended concept of the ANFI across different age groups. In Figure (b), we observe that the positive impact of indirect taxes and the negative impact of in-kind benefits for health

largely cancel each other out. The ANFI for individuals aged 25 to 65 is similar in both the standard concept (left) and the extended concept (right). However, in-kind benefits have a significantly greater weight for older age groups (health) and for children (education), leading to a substantially more negative impact for the age groups below 25 years and those after retirement, compared to the effect observed in the standard concept.

4.3 Tax and transfers by age and migration status

In the third step, we account for both age and migration status. First, we briefly discuss the results based on the standard concept in [Figure 4](#), and then we comment on the results from the extended concept in [Figure 5](#).

Based on the standard concept, our calculations reveal significant differences in migration statistics across individual age groups. As highlighted in [Figure 4](#), we compare the yearly ANFI between natives, first-generation migrants, and second-generation migrants. Our calculations show that second-generation migrants have a substantially higher ANFI compared to natives, especially in the age group between 35 and 64. In contrast, in younger age groups, the ANFI is higher for natives. Additionally, we observe that first-generation migrants tend to contribute substantially less compared to both natives and second-generation migrants.

Moreover, unsurprisingly, [Figure 5](#) shows that the overall picture does not change much when adding in-kind benefits and indirect taxes in the extended concept. Indirect taxes do not vary much across different migration groups, however the peak is higher in the second-generation migrants group. In-kind benefits for health are dependent on age and, as we observe, do not differ between migrants and natives. Therefore, also when looking on our extended concept of the ANFI, we find that second-generation migrants are those who typically contribute most, especially during their working-age. First-generation migrants, however, show a substantially lower ANFI in almost all age-groups, indicating that the general positive impact of first-generation migrants as highlighted in [subsection 4.1](#) is mostly driven by a favorable age-structure.

Figure 4: ANFI by age group and migration background

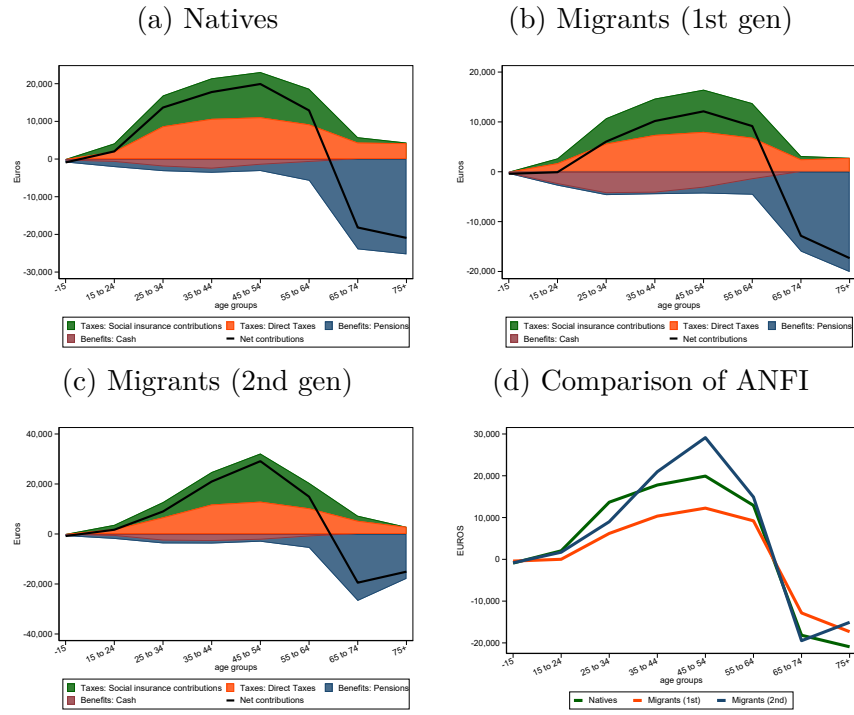
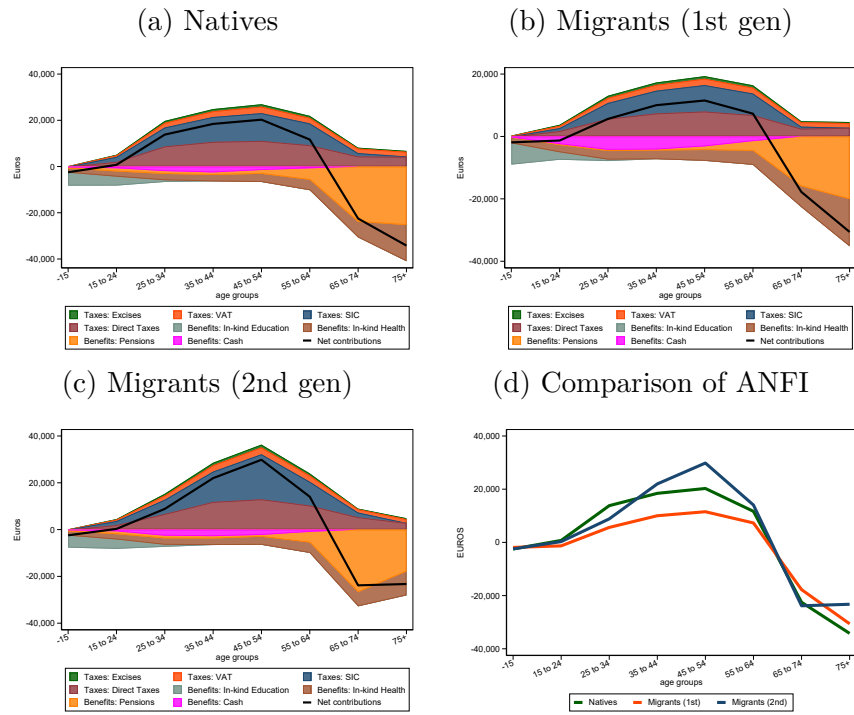


Figure 5: ANFI by age group and migration background, extended



4.4 Taxes and transfers - Accounting for age and other differences

In the previous sections of our analysis, we examined the average net fiscal impact of natives, as well as first- and second-generation migrants. By analyzing the results across different age cohorts, we observed substantial differences when accounting for age structure. In this section, we control for additional demographic factors and labor market status to provide a more accurate comparison between similar natives and migrants. This enables us to analyze the role that individual characteristics play in explaining the differences in the average net fiscal impacts.

Our regression results are presented in [Table 6](#). Specifications (1) to (4) are based on the standard concept of the NFI, while specifications (5) to (8) are based on the extended concept of the NFI. We observe substantial and significant differences across the age structure when using a single model controlling for migration status (specifications (1) and (5)) or when estimating them separately for natives, first-generation migrants, and second-generation migrants.

Other significant differences are visible across educational levels, with the NFI increasing significantly as education status rises. Significant differences between socio-demographic groups are observed only for natives and first-generation migrants, who contribute substantially less using the standard concept (6,091 Euros, specification (1)) and the extended concept (6,473 Euros, specification (5)). Second-generation migrants show a slightly lower NFI than natives in both concepts, but these differences are not statistically significant. As expected, both inactivity and unemployment substantially decrease the NFI in both concepts.

Table 6: Regression results of the effect of demographics on the Net Fiscal Impact

	<i>NFI</i>				<i>NFI^{ext}</i>			
	(1) total	(2) natives	(3) 1st gen	(4) 2nd gen	(5) total	(6) natives	(7) 1st gen	(8) 2nd gen
Sex (baseline: male)								
female	-5499.6*** (239.3)	-6276.4*** (301.4)	-2828.4*** (381.3)	-9952.6*** (1209.7)	-6558.7*** (277.5)	-7356.5*** (340.2)	-3385.1*** (461.8)	-11293.7*** (1469.1)
Age group (baseline: 15-24)								
25 to 34	1999.0*** (562.5)	4949.7*** (843.6)	-2078.8*** (739.7)	1540.8 (1840.1)	3616.7*** (690.7)	6772.6*** (994.3)	-1734.3* (944.8)	3436.7 (2285.0)
35 to 44	3943.4*** (542.0)	7648.3*** (797.0)	-1684.4** (728.7)	6265.1*** (1792.8)	6147.9*** (661.2)	10072.5*** (937.7)	-805.1 (922.3)	8149.0*** (2204.7)
45 to 54	8477.1*** (541.3)	12299.8*** (763.0)	576.0 (776.7)	10796.5*** (2116.1)	10601.7*** (657.9)	14501.6*** (900.4)	1432.6 (976.9)	13884.0*** (2559.5)
55 to 64	8098.7*** (570.2)	11514.2*** (778.9)	1187.1 (902.2)	8232.3*** (2843.2)	9088.3*** (684.8)	12724.7*** (914.0)	577.7 (1108.5)	9592.3*** (3442.7)
65 to 74	-10397.1*** (695.9)	-7706.9*** (890.2)	-8389.1*** (1368.9)	-17553.9*** (5045.8)	-10751.8*** (820.1)	-7930.6*** (1034.3)	-10979.8*** (1621.2)	-12258.6** (6135.0)
75+	-12690.5*** (727.3)	-9150.9*** (911.4)	-13342.6*** (1718.4)	-16519.0 (10679.1)	-21293.3*** (859.9)	-17749.3*** (1063.1)	-23506.7*** (2021.1)	-18523.7 (11725.5)
Education level (baseline: inadequately)								
general elementary	1388.6** (618.7)	5632.0*** (1695.0)	836.4 (618.1)	2650.1 (3633.1)	1091.2 (765.8)	5666.1*** (2002.2)	812.4 (769.3)	3824.8 (4498.7)
middle vocational	2624.7*** (576.0)	5495.5*** (1633.6)	3817.7*** (585.1)	6013.5* (3437.8)	2865.6*** (715.5)	6362.5*** (1935.0)	4315.6*** (726.1)	7533.4* (4241.3)
vocational + Abi	5451.6*** (682.8)	7835.8*** (1711.3)	6427.4*** (785.5)	8970.1** (3855.5)	5828.9*** (830.6)	8865.2*** (2019.7)	6817.3*** (947.9)	10869.1** (4681.7)
higher vocational	6817.1*** (763.4)	9006.6*** (1717.3)	9612.3*** (1894.5)	12569.8*** (4462.3)	7483.7*** (911.3)	10450.3*** (2022.2)	9541.8*** (2262.3)	12258.1** (5482.0)
higher education	10420.5*** (593.1)	13464.7*** (1651.1)	9096.6*** (605.5)	19850.9*** (3629.1)	11783.9*** (734.1)	15490.9*** (1953.1)	10242.2*** (747.5)	22541.8*** (4464.9)
Migration background (baseline: natives)								
1st generation	-6091.0*** (325.5)				-6472.9*** (383.8)			
2nd generation	-84.1 (570.7)				-399.4 (672.1)			
Labor market-status (baseline: employed)								
unemployed	-28224.2*** (422.8)	-31725.5*** (851.7)	-25575.6*** (432.6)	-24022.2*** (2120.7)	-29467.9*** (517.2)	-33336.0*** (979.2)	-26422.6*** (535.5)	-26182.3*** (2728.1)
inactive	-27803.7*** (437.8)	-29835.7*** (510.4)	-19172.0*** (947.0)	-18511.4*** (2074.3)	-31102.9*** (499.5)	-32891.8*** (573.4)	-21932.2*** (1114.3)	-23266.3*** (2543.0)
Constant	15877.0*** (729.1)	11012.6*** (1763.3)	11349.8*** (790.8)	11721.5*** (3704.6)	14915.1*** (899.6)	9208.4*** (2089.9)	10753.6*** (997.6)	9424.2** (4558.7)
Observations	25084	17139	6720	1225	21086	15043	5054	989
R2	0.54	0.57	0.46	0.34	0.59	0.62	0.48	0.35

Notes: NFI^{ext} stands for the net fiscal impact, using the extended income concept while NFI is the standard concept.

Standard errors in parentheses

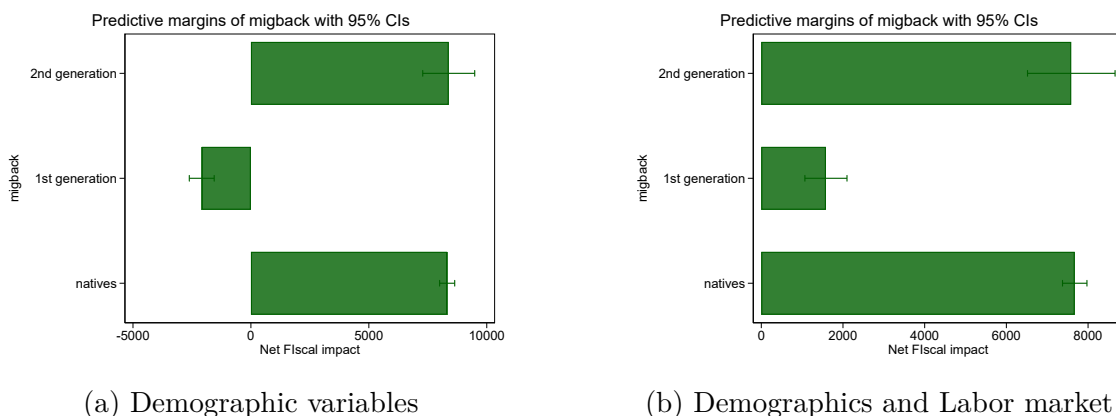
* p<0.10, ** p<0.05, *** p<0.010

We calculate the marginal effects for the net fiscal impact in [Figure 6](#), holding our control variables constant. This approach provides an estimate of the average net fiscal impact for each migration group, controlling for differences in gender, age, and

education, as shown in the left panel. The right panel further controls for the labor market status of the individual. In other words, the graphs highlight the differences in net fiscal contributions across migration groups, assuming all individuals have the same gender, age, education level, and labor market status.

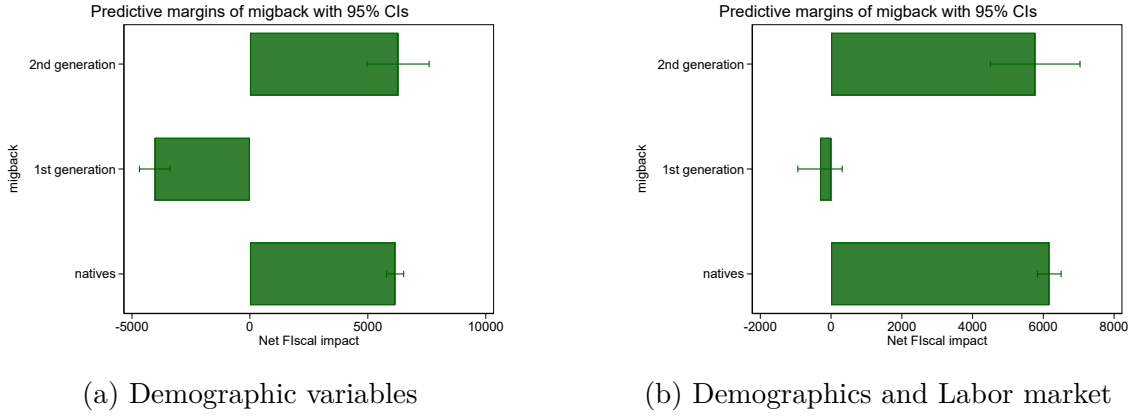
Note that [Figure 6](#) illustrates the net fiscal impact estimated by our regression model for different socio-demographic groups, based on the standard concept of net fiscal impact. As shown in [Figure 6a](#), there are no significant differences in net fiscal contributions between natives and second-generation migrants when controlling for demographics. However, first-generation migrants contribute substantially and significantly less compared to these two groups. This difference cannot be explained by demographics or by differences in labor market integration, as shown in [Figure 6b](#)).

Figure 6: ANFI controlling for additional socio-economic differences



Next, extending our net fiscal impact concept to include indirect taxes and in-kind benefits, as shown in [Figure 7](#), further emphasizes the observed differences. Overall, the net fiscal impact is lower compared to the standard concept, indicating that the inclusion of indirect taxes and in-kind benefits reduces the net fiscal impact. This suggests that the in-kind benefits a person receives outweigh the additional contributions made through indirect taxes.

Figure 7: Extended ANFI controlling for additional socio-economic differences



4.5 Summarizing the results

After discussing the effects across different estimation concepts, we summarize our findings on the fiscal impact of natives, first-generation migrants, and second-generation migrants. In the standard concept, second-generation migrants have the highest net fiscal impact, followed by natives and first-generation migrants. However, in the extended concept (which includes indirect taxes and in-kind benefits), second-generation migrants still rank highest but first-generation migrants move up to second place, with natives in third. When pensions are excluded (in both the standard and extended concepts), natives exhibit the highest average net fiscal impact, followed by first-generation migrants and second-generation migrants.

These results indicate that the inclusion of indirect taxes and benefits, as well as the treatment of pensions, can significantly alter the ranking of fiscal contributions among different population groups. In particular, excluding pensions shifts the fiscal advantage to natives, suggesting that pension contributions and distributions are crucial to the fiscal outcomes observed across these groups. Additionally, accounting for age and for other demographic and labor market characteristics (as in ANFI, with controls) highlights the importance of differences in the characteristics of the three socio-economic groups, that substantially influence the ANFI.

Table 7: Summary of Net Fiscal Impact Rankings by Approach and Migration Status

Approach	Concept	1st Rank	2nd Rank	3rd Rank
Average Net Fiscal Impact (ANFI) (Subsection 4.1)	Standard	Migrants (2nd gen)	Migrants (1st gen)	Natives
	Extended	Migrants (1st gen)	Migrants (2nd gen)	Natives
ANFI, with controls (Subsection 4.4)	Standard	Natives and Migrants (2nd gen)		Migrants (1st gen)
	Extended	Natives and Migrants (2nd gen)		Migrants (1st gen)
ANFI, without pensions (Subsection 4.2)	Standard	Natives	Migrants (1st gen)	Migrants (2nd gen)
	Extended	Natives	Migrants (1st gen)	Migrants (2nd gen)

Note: The "1st rank" indicates the group with the highest value.

5 Conclusion

This article investigates the net fiscal contribution of migrants in Germany using data from the German Socio-Economic Panel (SOEP) for 2018. We employ a microsimulation approach to quantify the direct fiscal impact of migrants versus natives (first and second-generation) in terms of taxes paid and government transfers received. We aim to determine whether migrants in Germany are net contributors or recipients of the welfare state, considering both direct and indirect fiscal impacts, including pensions, social security contributions, VAT and in-kind benefits for health and education. Our analysis follows a static cash-flow approach and distinguishes between different migrant groups (first-generation and second-generation migrants) to compare their fiscal impact to that of the native population.

Overall, our results highlight that migrants in 2018 on average exhibited a more favorable net fiscal impact than natives. This result is mainly driven by the lower receipt of pension payments by both first-generation and second-generation migrants, which impacts their net fiscal position. Additionally, natives pay more indirect taxes (VAT and excises) and receive higher in-kind health benefits compared to migrants. When all these factors (direct and indirect transfers as well as direct and indirect taxes) are accounted for, the average monthly net fiscal impact turns out to be negative for natives (-106 Euros). By contrast, first-generation migrants show a positive net fiscal impact of 116 Euros per month, similar to second-generation migrants who exhibit a positive ANFI of 94 Euros per month.

However, we show that the currently better average net fiscal impact (ANFI) is partially driven by migrants' favorable demographic characteristics. When accounting for age and other demographic factors, our results highlight that both natives and second-generation migrants have a very similar net fiscal impact, however, first-generation migrants contribute substantially less. When accounting for demographic characteristics and employment probability, the results remain largely unchanged.

Both natives and second-generation migrants show very similar net fiscal impacts. This is an indication of a good integration of second-generation migrants in Germany. However, accounting for all these factors reveals a strong divergence in the net fiscal impact of natives and first-generation migrants, also between second-generation and first-generation migrants. This also highlights the strong potential in fiscal terms for better integration of migrants from recent migration flows.

Overall, our findings highlight the positive and substantially higher fiscal impact of second-generation migrants compared to first generation migrants. This underscores the importance of long-term integration policies, including education and vocational training. But the disparities in net fiscal contributions between first- and second-generation migrants also reveal barriers like limited labor market access, suggesting targeted reforms for better integration. The favorable age structure of migrants presents an opportunity to address Germany’s demographic challenges at least in the short-run, but strong integration efforts are needed for success in the longer-run.

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Appendix

A Estimated results without pensions

Given the ongoing discussion on whether pensions should be included in the calculation of net fiscal impact, we also present results without pensions, meaning that we exclude not only social security contributions related to pensions, but also pension payments. This can also be seen as a way of accounting for differences in the age structure. Results for the average net fiscal impact (ANFI) are presented in [Table A1](#) and [Table A2](#) which can be compared to our previous estimations per [Table 4](#) and [Table 5](#).

Table A1: Average monthly net fiscal impact (ANFI) in Euros, without pensions

status	taxes	SIC	transfers	ANFI
Natives	475.0	343.7	74.0	744.7
Migrants (1st generation)	422.9	269.4	210.7	481.6
Migrants (2nd generation)	334.5	169.3	94.0	409.8

Interestingly, we observe that the best ANFI is now attributed to natives, followed by first-generation migrants and second-generation migrants subsequently, in both the standard concept and the extended concept (the latter accounting for indirect taxes and in-kind benefits).

Table A2: Average monthly net fiscal impact (ANFI) in Euros, extended concept without pensions

status	taxes	SIC	transfers	VAT	excises	health	educ	ANFI
Native	475.0	343.7	74.0	162.6	51.8	462.0	84.7	412.3
Migrants (1st generation)	422.9	269.4	210.7	136.8	52.2	361.8	45.4	263.4
Migrants (2nd generation)	334.5	169.3	94.0	85.4	33.1	195.9	269.6	62.7

B Regression results - VAT and Excise taxes

Table B1: Estimating effective VAT and Excise tax rates

	VAT rate	Excise rate
hh type (Ref: Three or more adults with children)		
One adult <65, no children	-0.0277** (0.0117)	-0.0173*** (0.00465)
One adult ≥ 65, no children	-0.0174 (0.0137)	-0.0179*** (0.00545)
One adult with children	-0.0200 (0.0138)	-0.0178*** (0.00546)
Two adults <65, no children	-0.0118 (0.0106)	-0.00481 (0.00422)
Two adults, at least one ≥65, no children	0.00158 (0.0120)	-0.00601 (0.00476)
Two adults with children	-0.0159 (0.0103)	-0.00713* (0.00410)
Main income source		
unemployment	-0.0433*** (0.0123)	-0.0121** (0.00489)
employment	-0.0220*** (0.00785)	-0.00346 (0.00311)
pensions	-0.0283*** (0.00840)	-0.0187*** (0.00333)
Migration background (Ref: Native)		
Migrant	-0.00545 (0.00635)	-0.000528 (0.00252)
Income distribution (Ref: Ventile 1)		
Ventile 2	-0.128*** (0.0117)	-0.0423*** (0.00464)
Ventile 3	-0.131*** (0.0119)	-0.0443*** (0.00472)
Ventile 4	-0.137*** (0.0121)	-0.0465*** (0.00479)
Ventile 5	-0.140*** (0.0123)	-0.0483*** (0.00488)
Ventile 6	-0.145*** (0.0124)	-0.0495*** (0.00491)
Ventile 7	-0.146*** (0.0125)	-0.0495*** (0.00498)
Ventile 8	-0.139*** (0.0127)	-0.0542*** (0.00502)
Ventile 9	-0.141*** (0.0127)	-0.0559*** (0.00504)
Ventile 10	-0.150*** (0.0128)	-0.0569*** (0.00506)
Ventile 11	-0.153*** (0.0129)	-0.0564*** (0.00511)
Ventile 12	-0.155*** (0.0131)	-0.0582*** (0.00518)
Ventile 13	-0.152*** (0.0132)	-0.0597*** (0.00522)
Ventile 14	-0.157*** (0.0133)	-0.0627*** (0.00527)
Ventile 15	-0.159*** (0.0133)	-0.0652*** (0.00529)
Ventile 16	-0.159*** (0.0133)	-0.0673*** (0.00530)
Ventile 17	-0.157*** (0.0134)	-0.0693*** (0.00531)
Ventile 18	-0.162*** (0.0134)	-0.0742*** (0.00533)
Ventile 19	-0.170*** (0.0135)	-0.0767*** (0.00535)
Ventile 20	-0.184*** (0.0134)	-0.0834*** (0.00533)
[1em] Constant	0.293*** (0.0155)	0.112*** (0.00613)
Observations	23595	23595

Standard errors in parentheses

* p≤0.10, ** p≤0.05, *** p≤0.010

C Supplemental data

From SOEP, 1 transfer item which corresponds to pension payments. From Gettsim¹² out of (16) items, we select (16-2=14 budgetary items) in the following way:

- 7 items for contributions
 - 4 items on the individual level:
 - * `ges_krankenv_beitr_m`
 - * `arbeitsl_v_beitr_m`
 - * `pflegev_beitr_m`
 - * `rentenv_beitr_m`
 - 3 items at the Tax Unit level:
 - * `abgelt_st_tu`
 - * `solli_st_tu`
 - * `eink_st_tu`
- 7 items for transfers
 - 4 items at the household level:
 - * `arbeitsl_geld_2_m_hh`
 - * `wohngeld_m_hh`
 - * `kinderzuschlag_m_hh`
 - * `kindergeld_m_hh`
 - 3 items at the individual level:
 - * `unterhaltsvors_m`
 - * `arbeitsl_geld_m`
 - * `elterngeld_m`

¹²For description, see, https://gettsim.readthedocs.io/en/stable/gettsim_objects/

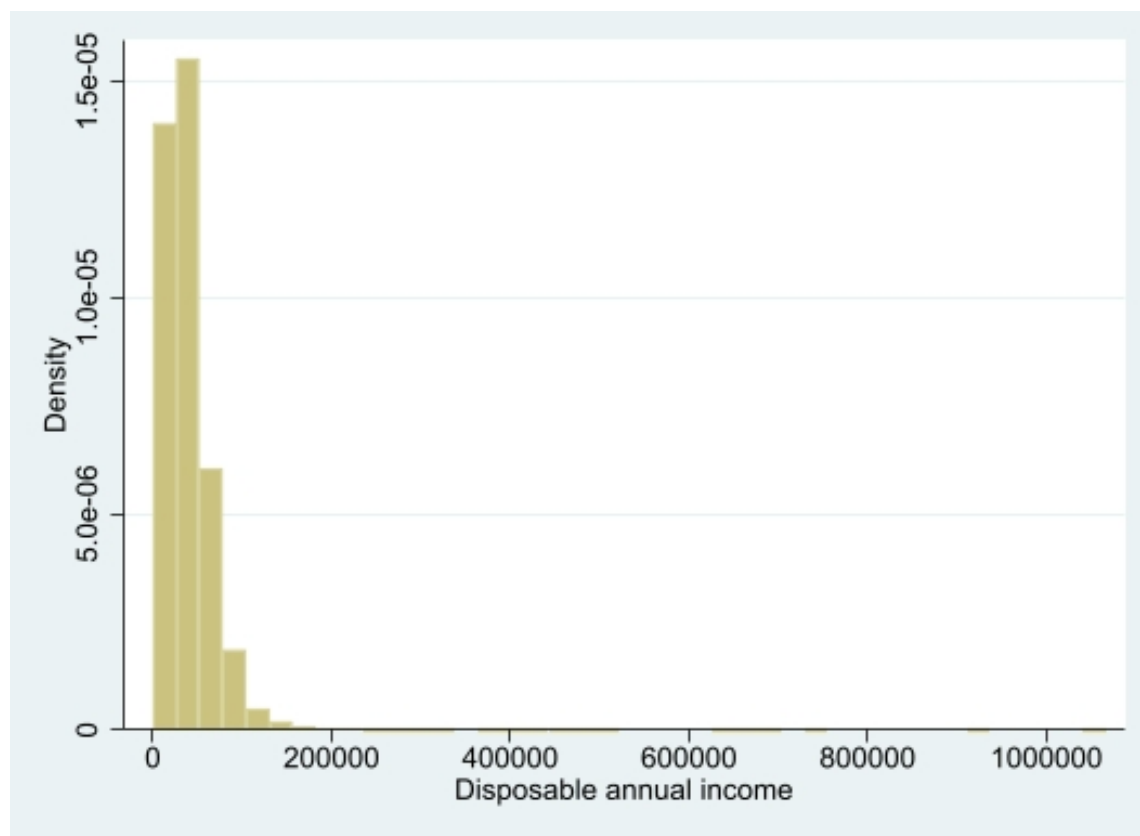


Figure C1: Histogram of HH disposable annual income in the 2018 sample. Authors' calculations based on the SOEP.

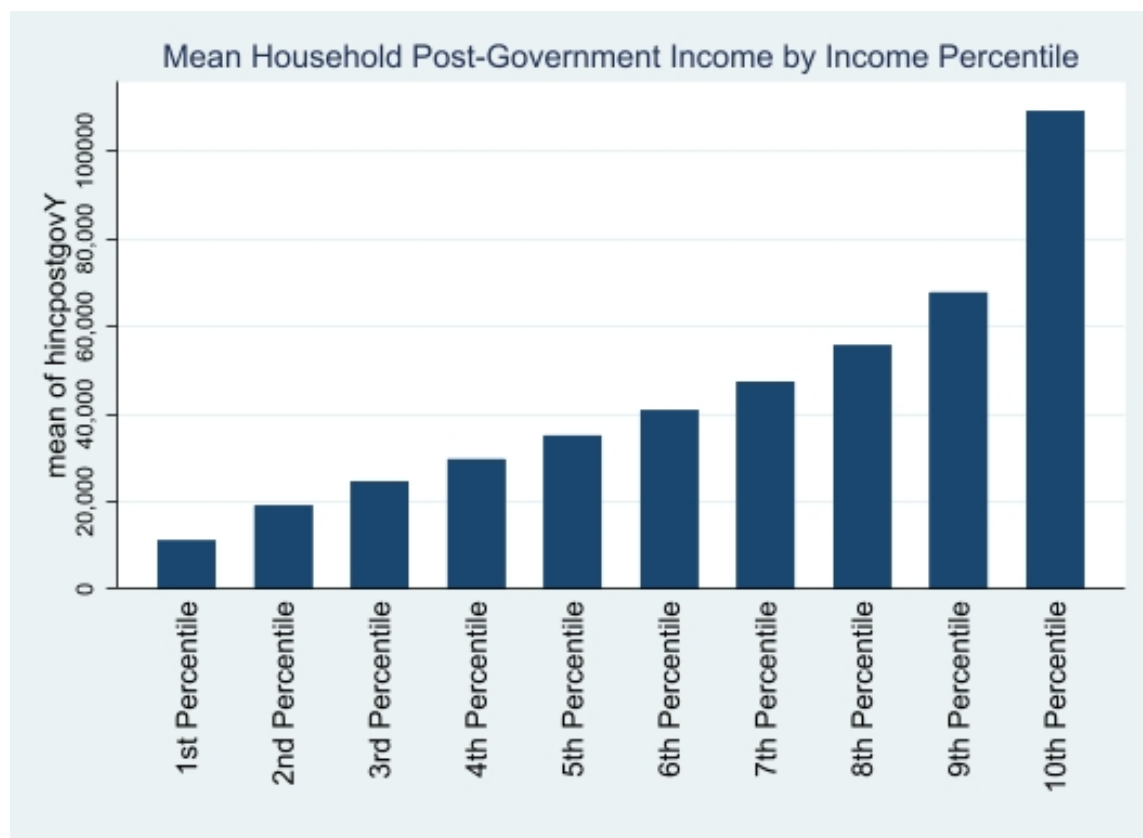


Figure C2: Mean disposable household income by income decile in the underlying 2018 sample. Authors' calculations based on the SOEP.

Table C1: Classification of the different fiscal items employed from the German GETTSIM microsimulation model

Variable	Description	Which side (Transfers 'T' / Cont. 'C')
rentenv_beitr_m	Monthly amount employee old-age pensions contributions	C
arbeitsl_v_beitr_m	Monthly amount employee unempl. insurance contributions	C
ges_krankenv_beitr_m	Monthly amount employee health insurance contributions	C
pflegev_beitr_m	Monthly amount of long-term care insurance	C
arbeitsl_geld_m	Monthly amount of unemployment assistance	T1
rente_anspr_m	Monthly amount of old-age pension claim (Similar to pension income, T, based on the reported pension_Y from the SOEP)	-
entgeltpunkte_update	Updated earning points for pension claim	-
abgelt_st_tu	Capital income tax per tax unit	C
sol_i_st_tu	Solidarity surcharge per tax unit	C
kindergeld_m_hh	Monthly child benefit	T2
eink_st_tu	Income Tax per tax unit	C
unterhaltsvors_m	Alimony advance payment	T3
arbeitsl_geld_2_m_hh	Monthly subsistence payment per household	T4
kinderzuschlag_m_hh	Monthly additional child benefit, household sum	T5
elterngeld_m	Monthly parental leave benefit	T6
wohngeld_m_hh	Monthly housing benefit per household	T7

Table C2: Summary of Disposable Annual Income by Income Decile (SOEP)

Income Decile	Mean	Std. Dev.	Frequency
1	11050.105	3559.9954	3,858
2	19117.429	1750.9611	3,861
3	24635.6	1485.6324	3,854
4	29746.77	1507.6914	3,859
5	35135.599	1537.9777	3,854
6	40870.985	1791.6027	3,860
7	47420.043	1999.4913	3,856
8	55662.205	2822.2558	3,859
9	67813.68	4480.9323	3,855
10	109169.06	64317.403	3,856
Total	44057.515	33947.859	38,572

Note: Own calculations, based on the underlying SOEP sample of 2018.

Table C3: Summary of Disposable Annual Income by Income Decile (EU-SILC)

Income Decile	Mean	Std. Dev.	Frequency
1	12182.03	3780.77	2,361
2	21112.50	1989.71	2,360
3	27347.04	1678.14	2,360
4	32612.26	1430.64	2,360
5	37812.81	1575.40	2,361
6	43866.56	1953.39	2,361
7	51308.97	2430.82	2,360
8	60199.10	2853.76	2,361
9	71783.29	4101.50	2,360
10	110133.41	51545.64	2,358
Total	46829.02	31738.19	23,602

Note: Own calculations, based on the underlying EU-SILC 2018 data.

Table C4: Model simulations vs. External statistics , 2018 (in Mio. Euros)

yearly	estimation	external	validation	source
employment income	1,257,200	1,374,900	91%	DESTATIS
other incomes	219,480	202,794	108%	DESTATIS
self-employment income	145,200	136,452	106%	EU-SILC
income tax	280,800	315,000	89%	DESTATIS
SIC	578,000	563,220	103%	DESTATIS
in-kind benefits health	387,580	386,100	100%	Eurostat
in-kind benefits education				Fiorio et al. (2018)
indirect taxes	155,000	163,000	95%	EUROMOD (adjusted to NA data)
excises	51,100	56,500	90%	EUROMOD (adjusted to NA data)

Note: NA stands for National Accounts.