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Poverty among migrant, mixed, and non-migrant households: the role of non-teleworkability and single-earnership in Germany

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ABSTRACT

Migrant and mixed households have higher poverty than non-migrant households. This is partly because single-earner two-adult households are more prevalent in migrant and mixed households and because such households have different job characteristics. One crucial job characteristic is teleworkability. Whether or not individuals can work from home has become a dividing factor in the labour market. While much research has focused on how teleworkability affects poverty in the majority population, less attention has been devoted to migrant and mixed two-adult households. Using the German Microcensus (2019), we construct work arrangements based on the number of earners in the household and their job's teleworkability to predict poverty for non-migrant (N = 49,507), mixed (N = 6,818), and migrant households (N = 8,922). Descriptive statistics show that, in Germany, migrant and mixed households have more single-earner and non-teleworkable work arrangements. Results from logistic regressions report higher poverty for non-teleworkable and single-earner work arrangements, putting mixed and migrant households at an increased disadvantage. Furthermore, we find that migrant (and mixed) households not only have a higher prevalence of high-poverty work arrangements but also higher poverty than non-migrant and mixed households within the same work arrangements.

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Teleworkability; labour market; poverty; mixed households; migration

Introduction

Migrants, defined here as individuals who leave their country of birth to live elsewhere, are an economically vulnerable group and face higher poverty than non-migrants in Europe (Giesecke et al. 2017; Kesler 2015). As poverty is an important obstacle to integration into society and the labour market (Barnes et al. 2002), high poverty levels are particularly problematic for migrants who lack the country-specific capital that would

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facilitate their participation in wider society. While employment is important in protecting individuals against poverty, migrants' poverty exceeds that of non-migrants, even when they are employed (Crettaz 2018; Lohmann 2009). In-work poverty has increased in recent decades, due to worsening labour-market conditions related to the increase of atypical forms of employment such as part-time, temporary, and self-employment (Filandri and Struffolino 2019). One of this study's key motivations is to find out how this plays out for migrants' poverty.

Furthermore, digitalisation and technological advances have made teleworkability a new potential source of inequality in the labour market. This has become more visible since the Covid-19 pandemic. Jobs can be considered teleworkable if they do not require the worker to primarily work on the employer's premises – examples include insurance agents or business analysts. In contrast, non-teleworkable jobs – like shop assistant or manufacturing worker positions – are mainly tied to a specific workplace. Differences in the degree of teleworkability have implications for skill requirements and employment demand (Bihagen et al. 2021). Previous research has shown that migrants are less likely to hold or obtain a teleworkable job than non-migrants (Fasani and Mazza 2020), suggesting that non-teleworkability is one driver of differences in poverty between migrants and non-migrants. Labour market inequalities stemming from digitalisation and technological advances often create a 'digital divide' (Messenger et al. 2017), and the question of how this divide affects migrants in terms of poverty outcomes is an open one.

Poverty is typically measured on the household level, on the assumption that members pool their incomes. Therefore, household composition, especially regarding the number of earners, is important in assessing a household's economic situation (Biegert and Ebbinghaus 2022; Brady, Finnigan, and Hübgen 2017). As the dual-earner model has become more common, single-earner two-adult households are increasingly exposed to higher poverty (Nieuwenhuis et al. 2020; Tamayo and Popova 2020). This study discusses having a non-teleworkable job and being in a single-earner two-adult household as poverty risks and considers their interaction in defining the different exposure to poverty for non-migrant, mixed, and migrant households. We examined the association between poverty and households' working arrangements, as defined by the number of earners in the households alongside the teleworkability of the earners' jobs jointly. If one of two earners held a teleworkable job, this may avert poverty at the household level. On the other hand, poverty risks accumulate if the sole earner holds a non-teleworkable job.

Migrants' poverty risks can accumulate in households for reasons that go beyond job status and job characteristics. Previous research reports that households with one migrant and a non-migrant (henceforth referred to as mixed households) are less exposed to poverty than households with two migrants (Giesecke et al. 2017; Kesler 2015). Mixed households' economic advantages may be linked to the non-migrant partner compensating for the migrant partner's poverty risk or to a positive selection of migrants into mixed households. Therefore, our differentiation of household types considers that, in couple households, migrants can be either partnered with another migrant or with a non-migrant. Investigating differences between migrant, mixed, and non-migrant households, we contribute to research on the economic consequences of teleworkable or non-teleworkable jobs, which rarely considers household context and migrant status beyond control variables.

The context of our study is Germany, which has one of the largest immigrant populations in Europe (Destatis 2023) and is the largest economy in the European Union (Eurostat 2024). This means we can provide insights into a significant share of the European workforce. In light of the historical low-skilled immigration patterns to Germany from Southern Europe, Turkey, and Northern Africa post-WWII and given the substantial presence of migrant workers in manufacturing, the German labour market is an excellent context to monitor persistent economic differences between migrants and non-migrants. This is because digitalisation and advances in information and communication technologies (ICT) have reduced the need for routine manual workers and negatively impacted low-skilled production and manufacturing workers' labour market opportunities (Hötte, Somers, and Theodorakopoulos 2023; Wiedner and Giesecke 2022). In 2019, Germany's degree of teleworkability, measured as the share of employees who usually or sometimes perform telework, was close to the EU average (Sostero et al. 2020). In this ranking, Sweden has the highest prevalence of teleworkability and Bulgaria the lowest.

Using large-scale representative data from the German Microcensus (2019), we construct household-level work arrangements by including the number of earners and the teleworkability of the earners' jobs. We measure teleworkability using a novel index of the teleworkability of occupations (Gädecke et al. 2021) based on a task-focused employee survey in Germany. The questions guiding this article are: a.) How are work arrangements distributed among migrant, mixed, and non-migrant households? and b.) How does poverty vary by work arrangement for migrant, mixed, and non-migrant households? The analysis consists of three parts. First, we map differences in work arrangements between migrant, mixed, and non-migrant households. Second, we estimate poverty for migrant, mixed, and non-migrant households. Finally, we investigate how poverty varies for migrant, mixed, and non-migrant households by work arrangements that account for teleworkability and the number of earners in the household.

Migrants' poverty risk

In European countries, migrants are exposed to higher poverty than non-migrants (Kesler 2015). Although poverty differentials between migrants and non-migrants are partially driven by higher unemployment rates, employed migrants also have higher poverty levels than non-migrants (Crettaz 2018; Lohmann 2009). Migrants' in-work poverty is driven by their weak position in the labour market, which is often ascribed to individual-level factors, such as human capital characteristics and discrimination, or to aspects of the labour market structure.

Individual-level factors

One often-mentioned factor is that, on average, migrants have lower educational attainment than non-migrants. Previous studies have found that migrants' allocation to low-wage employment can often be explained when controlling for educational attainment (Granato and Kalter 2001). More recent data, however, have shown an increase in the number of migrants with medium and high education levels throughout the last decades, which has altered the historical prevalence of low-skilled migrants in

Germany. Although this trend in educational attainment points to potential improvements in migrants' economic situation, human capital is not easily transferable across countries, and migrants face difficulties in getting their qualifications recognised (Sommer 2021). Migrants often lack country-specific human capital, such as language skills or cultural knowledge, which means that their educational and vocational attainment is less valued (Konietzka and Kreyenfeld 2002). This contributes to their placement in the lower strata of the labour market. In addition, migrants may employ different human capital investment strategies than non-migrants. As migrants may plan to return to their countries of origin and prefer prompt financial returns over long-term financial gains, they could select low-status or precarious employment and not invest in receiving country-specific human capital).

Second, employer discrimination is a barrier for migrants in accessing (strong) labour market positions. Field experiments that involve sending applications for real jobs have identified ethnic, religious, and racial discrimination dynamics. Individuals from countries with substantial Muslim populations (Di Stasio et al. 2021), veiled women (Weichselbaumer 2016), foreign-born minorities, and minorities from culturally very distant countries (Veit and Thijsen 2021) get lower call-back rates from employers than the majority population in Germany. However, discrimination varies between countries and groups. For example, people from Turkish migration backgrounds face less hiring discrimination in Germany than in the Netherlands (Thijssen et al. 2021).

Labour market structure

Labour market structures are a further factor explaining migrants' economically poor position. The German labour market has a dual structure, meaning it differentiates between labour market insiders and outsiders. Insider employment is stable, well-paid, and offers opportunities for professional development, while outsider employment is casual, temporary, poorly paid, and associated with higher poverty levels. These two labour markets are not permeable, and segregation can be observed across and within industries and firms. Previous studies report high occupational segregation for migrants in Germany. Migrants are: i) overrepresented among labour market outsiders (Constant and Massey 2005); ii) more likely to work in blue-collar occupations and in the hospitality and restaurant industries (Drever and Hoffmeister 2008); and iii) more likely to be employed in more volatile sectors with less secure seasonal and temporary employment (Bogoeski 2022).

As the labour market structure has changed due to deindustrialisation, tertiarisation, and decreasing labour market regulation, so-called atypical jobs have become more prevalent, and the low-wage sector has expanded. This development has further resulted in an increase in temporary contracts, part-time work, irregular working hours, and poorly protected employment. Since low work intensity and low pay are the main drivers of poverty, employment has partly lost its protective effect. In addition, the emergence of ICT has provoked new discussions on labour market segregation along a digital divide (Bihagen et al. 2021; Messenger et al. 2017). More emphasis is being put on skilled labour, meaning that low– and medium-skilled workers are being assigned less value (Acemoglu and Autor 2011). A study on Germany confirms that migrants from Turkey have been disadvantaged by Germany's educational expansion and structural

labour market changes and experienced worsening labour market positions due to their low skill sets and historically high employment in manufacturing positions (Wiedner and Giesecke 2022). And in the Covid-19 pandemic and the associated lockdowns, workers in a non-teleworkable job were at risk of poverty as non-teleworkable jobs had higher furlough rates (Adams-Prassl et al. 2020; Fasani and Mazza 2020).

Previous studies have suggested that teleworkability is not evenly distributed in the labour market; migrants less frequently work in teleworkable jobs (Alipour et al. 2021; Fasani and Mazza 2020). For Germany, research has shown that being a migrant is negatively associated with always or frequently working from home (Alipour et al. 2021). In the pandemic, a discussion emerged over whether working from home primarily reflects existing labour market inequalities or creates a new divide among workers (Sostero et al. 2020).

Teleworkability reflects previous labour market advantages, in that individuals who can work from home tend to be highly educated, to have more work experience, to work in higher-paid and higher-level occupations, to have permanent work contracts, to work full-time, and to be more autonomous (Alipour et al. 2021; Brussevich, Dabla-Norris, and Khalid 2020; Sostero et al. 2020). Further factors associated with teleworkability include factors related to the work organisation, firm size, the level of employer's trust, and the time spent commuting to work (Sostero et al. 2020). In the pandemic, heterogeneity in terms of various jobs teleworkability potential became especially visible (Fasang, Struffolino, and Zagel 2023; Fasani and Mazza 2020).

In households with two adults, poverty declines considerably if both are employed (Tamayo and Popova 2020). Therefore, the rise in female employment in OECD countries in recent decades has attenuated increasing poverty levels by providing households with a second earner (Nieuwenhuis et al. 2020). Nevertheless, the second earner is typically employed in less secure, less typical, and lower-paid jobs, minimising the possible effects of poverty reduction. Furthermore, the growth in female employment is selective and mainly occurs in households which already engage in employment. Consequently, partners' homogamy in employment prevents substantial poverty reductions between households through women's labour force participation, which increases polarisation between employment-intense and jobless households (Gregg and Wadsworth 2008).

A theoretical explanation for employment intensity in migrant households is the family investment hypothesis, which assumes that newly arrived migrants must invest in receiving-country-specific human capital, financed by the family. Accordingly, one partner (in different-sex couples, this is mostly the man) invests in education or job training while the other partner works in dead-end jobs. For Germany, Basilio, Bauer, and Sinning (2009) have not found evidence supporting the family investment hypothesis, as partners' wages increased at similar rates with time spent in the destination country. However, other studies in Germany have reported gender differences in migrant employment as migrant women are, on average, less often employed than migrant men and non-migrant women (Fleischmann and Höhne 2013; Salikutluk, Giesecke, and Kroh 2020). Furthermore, migrant women are often underemployed or do not find adequate employment, especially when they have small children (Rubin et al. 2008). Taken together, these factors indicate that migrant households exhibit lower labour market attachment, partly driven by women's lower employment rates.

To summarise theoretical considerations and previous empirical findings, we could expect differences in poverty between migrant and non-migrant households to be driven by migrants' lower likelihood of having a teleworkable job and their higher prevalence of single-earner work arrangements.

Mixed households' poverty risk

Compared to migrant couples, mixed households where one person is a migrant and the other is a non-migrant have lower poverty rates (Giesecke et al. 2017; Kesler 2015); sometimes, they even have lower poverty rates than non-migrant households (Bostic and Hyde 2023). The influence of the non-migrant partner explains some of the economic advantages of migrants in mixed households. A non-migrant partner facilitates access to non-migrant social networks and enables faster economic integration into the receiving country. For Sweden, Dribe and Lundh (2008) have found that, for migrants, being married to a non-migrant is positively associated with higher employment rates and higher individual and household income. Using Danish longitudinal data and distributed fixed effects, Elwert and Tegunimataka (2016) showed that cohabiting with a native Dane positively affects migrants' incomes. Meng and Meurs (2009) and Meng and Gregory (2005) have found intermarriage premiums for migrants who intermarry in France and Australia.

To some extent, the better labour market outcomes of migrants in mixed unions have been attributed to selection (Kantarevic 2004), which means migrants with specific characteristics are particularly likely to partner with non-migrants. Furthermore, migrants in mixed unions may differ from migrants in migrant unions in terms of both their partnership status when migrating and the length of the relationship at the moment of the interview. In Germany, gender, country of birth, and religious affiliation explain selection patterns into mixed partnerships (Haug 2010; Schroedter 2013). Migrants in mixed unions have, on average, higher educational levels, better country-specific language skills, and longer residence in the receiving country (Haug 2010; Schroedter 2013). Some studies have found that the positive effect of intermarriage disappears when accounting for selection (Nottmeyer 2011), while others report a positive effect of intermarriage on labour market outcomes, even when considering selection (Elwert and Tegunimataka 2016).

From a household perspective, studies in Germany have shown a lower prevalence of dual-earners among mixed households compared to non-migrant ones (Braack, Milewski, and Trappe 2022; Nottmeyer 2011), but dual earners are still more common in mixed than in migrant households (Nottmeyer 2011). One explanation for this is human capital differences. For instance, in Germany, the migrant and the non-migrant partner in mixed households have more similar levels of education than migrant households (Nottmeyer 2011). As most studies take an individual approach when examining migrants in mixed unions, they disregard the role of the non-migrant partner in compensating for poverty. Nevertheless, non-migrants who intermarry seem to be selective. Evidence from Spain has shown that non-migrant men are more likely to intermarry if they are unemployed and low-skilled, suggesting a negative selection of non-migrant men into mixed households; this cannot be found for non-migrant women (González-Ferrer et al. 2018). However, non-migrants often are sole earners in mixed households (Braack, Milewski, and Trappe 2022). Therefore, we might expect

that, although non-migrants in mixed households (especially men) will be negatively selected, they will not face the same labour market barriers as their migrant partners.

Hypotheses

In the first step of the present study, we will identify the distribution of work arrangements, accounting for teleworkability and the number of earners for migrant, mixed, and non-migrant households. We expect the prevalence of dual-earner households to be the highest among non-migrant households, in the middle among mixed households, and lowest among migrant households (Hypothesis 1a). Further, we expect to find the lowest share of work arrangements with teleworkable jobs for migrant households, followed by mixed households (Hypothesis 1b). These hypotheses are based on two insights from the existing literature discussed above. First, migrants are more likely than non-migrants to have jobs in the lower strata of the labour market and, consequently, are less likely to hold a teleworkable job. Second, migrants in mixed households are positively selected and display higher educational homogamy than migrant households, suggesting higher labour force participation and higher levels of teleworkability.

In the second step, to examine differences in poverty, we will map predicted poverty probabilities for migrant, mixed, and non-migrant households. In line with previous studies, we expect migrant households to experience the highest poverty, followed by mixed households and non-migrant households (Hypothesis 2). We will investigate how differentials in poverty for migrant, mixed, and non-migrant households are associated with different work arrangements, net of observed human capital and household and job characteristics. As non-teleworkability and single-earnership have commonly been identified as poverty risks (Fasang, Struffolino, and Zagel 2023; Fasani and Mazza 2020), we expect household arrangements with single earners or workers in non-teleworkable jobs to have a higher poverty risk. Consequently, we expect the higher prevalence of migrant and mixed households in work arrangements with higher poverty risks to explain poverty differentials by household type (Hypothesis 3).

Finally, we expect to find higher poverty for migrant and mixed households than for non-migrant households within the same work arrangement (Hypothesis 4). This may be explained by unobserved heterogeneity in variables not contained in our data, such as salaries, differences within teleworkable and non-teleworkable jobs, or further disadvantages faced by migrants, such as employer discrimination (see discussion above).

Data and methods

Data and sample

We used data from the German Microcensus 2019 (RDC of the Federal Statistical Office and Statistical Offices of the Federal States of Germany 2022, DOI: 10.21242/12211.2019.00.00.3.1.0), an annually conducted representative household survey administered by the Federal Statistical Office. The Microcensus covers approximately 1% of the German population, and participation is mandatory for the selected households. The anonymised scientific use file for researchers comprises 70% of the data.[1] Following common German poverty measurements, households are selected at their main

residence, with communal accommodation being excluded (Boehle 2015). We restricted the sample to different-sex, two-adult couple households consisting of individuals of working age (19–65) and (if present) children below 18. Households with adult children are therefore excluded in our analyses. For the households to be further included in the sample, at least one person in the household had to be employed. Employment was defined as pursuing a professional activity for at least one hour per week. We excluded 1,747 non-migrant, 269 mixed, and 1,062 migrant households in which none of the two adult household members was employed.[2]

Variables and models

The dependent variable was a household's probability of being poor. A household was considered poor if the equalised net disposable household income was below 60% of the median household income in a given context. The Microcensus reports net monthly household income in the month preceding the survey before tax and social insurance payments. This income can come from various sources, such as unemployment benefits (*Arbeitslosengeld* I, *Arbeitslosengeld* II), child and accommodation allowance, investment income, and retirement benefits, although employment, on average, contributed the most (Hochgürtel 2019). We calculated the median monthly income at the country level of the total Microcensus scientific use file and not only our analytical sample. As the Microcensus uses income classes to measure household income, we used a procedure developed by Stauder and Hüning (2004) and edited by Boehle (2015) to impute the monthly household income within each income class. This procedure assumes that income is evenly distributed within each income class and ascribes each individual in the indicated income class a different possible income value that depends on the total number of individuals in the class and the width of the income class.

Household type was our core independent variable. We differentiated between three types of households: migrant households with two migrants, mixed households with one migrant, and non-migrant households with two non-migrants. A migrant was defined as a person who migrated themselves, i.e. a first-generation migrant. The second independent variable was work arrangement: it combines information on whether the households consist of one or two earner(s) and whether the earner(s)' job was teleworkable. This differentiation yielded eight different work arrangements for different-sex couple households (Table 1), ranging from work arrangements with low expected poverty risk (two earners with a teleworkable job) to work arrangements with high expected poverty risk (one earner with a non-teleworkable job).

Table 1. Typology of work arrangements in different-sex households.

	N of earners	Man	Woman
Highest risk ← Lowest risk	2	teleworkable	teleworkable
	2	teleworkable	non-teleworkable
	2	non-teleworkable	teleworkable
	2	non-teleworkable	non-teleworkable
	1	teleworkable	not employed
	1	not employed	teleworkable
	1	non-teleworkable	not employed
	1	not employed	non-teleworkable

We measured an occupation's teleworkability using an index (Gädecke et al. 2021) based on the German BIBB/BAuA Employment Survey 2018 (Rohrbach-Schmidt and Hall 2020). This survey asked employed individuals whether they frequently, sometimes, or never conducted certain job-related tasks, which we classified as teleworkable or non-teleworkable, following Arntz, Ben Yahmed, and Berlingieri (2020). Tasks considered teleworkable included 'advertising, marketing, public relations PR' or 'use of internet or email processing', while non-teleworkable tasks were 'manufacturing, providing goods and commodities' or 'repairing, renovating'. We divided all tasks considered teleworkable and done frequently in an occupation by the number of total tasks done frequently. This resulted in a teleworkability index between 0 and 1, indicating the share of teleworkable tasks by occupation.[3] Following the mean share of teleworkable tasks by occupation, we coded an occupation as teleworkable if the index was above 0.8 (Gädecke et al. 2021). Finally, we merged the information on the teleworkability of occupations with the Microcensus 2019 using the German classification of occupations (KldB2010).

We dropped cases with missing values on the variables used in the analysis: teleworkability (N = 80), main earner's educational attainment (N = 55), the main earner's region of birth (N = 223), main earners who were unemployed or inactive (N = 4,842; these are predominantly pensioners), and employed main earners with no information on shift work (N = 34) or the main earner's contract (N = 84). The final analytic sample consisted of 65,247 households, of which 49,507 were non-migrant households, 6,818 were mixed households, and 8,922 were migrant households.

The probability of being poor was estimated using stepwise logistic regression models. Model 1 accounted for raw differences between household types (non-migrant, mixed, or migrant). Model 2 adjusted for the number of children in the household (0, 1, 2 or 3+), residence in Eastern Germany (including Berlin) or Western Germany, and the main earner's socio-demographic characteristics: educational level (low, medium, high), age, gender and region of birth linked to historical and regional migration patterns (Germany, former labour recruitment countries (FLC), EU-15, EU-enlargement (since 2004), former Soviet Union countries (FSU), and other[4]). In Model 3, we included job-related variables for the main earner: employment status (full-time employment, part-time employment, atypical full-time employment, atypical part-time employment, self-employment), the type of contract (not applicable, fixed-term contract, or permanent contract), the frequency of shift work (every day, at least half of the days, less than half of the days, no); and leadership position (no leadership position, supervisor, manager). Model 4 adds the eight different work arrangements displayed in Table 1. Finally, in Model 5, we interacted the three household types with the eight work arrangements. The full results from the regression models are displayed in Table A4 in the Appendix.

Results

Prevalence of work arrangements among migrant, mixed and non-migrant households

Figure 1 maps the frequency of work arrangements for migrant, mixed and non-migrant households. The first graph in Figure 1 shows the relative distribution of work arrangements between migrant, mixed, and non-migrant two-adult households. Work

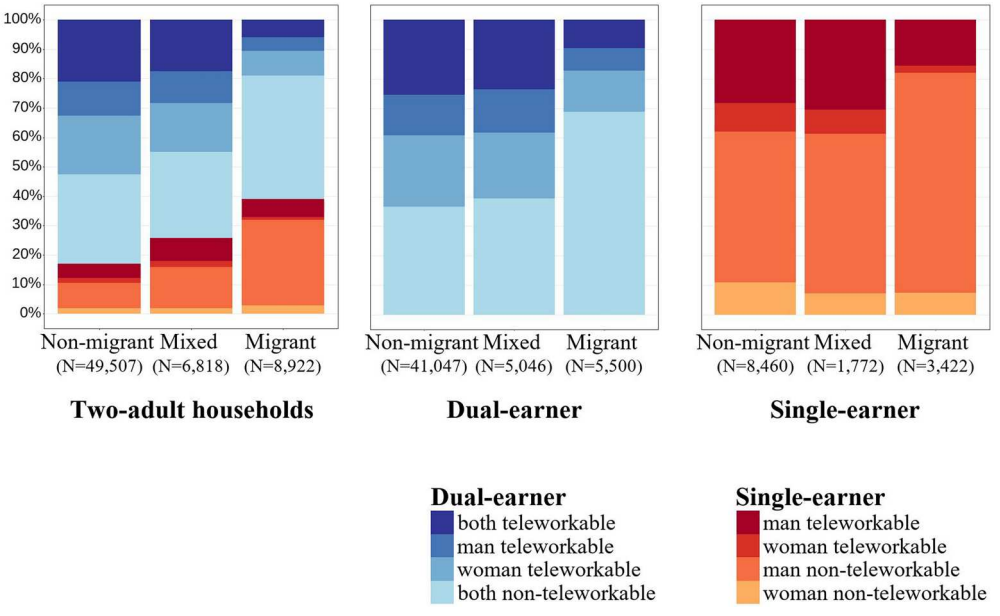

Figure 1. Distribution of work arrangements by household type.
Source: German Microcensus Scientific Use File 2019, own calculations. Percentages are calculated by household type, weighted. Total numbers are not weighted. Full results on first graph are shown in Table A1 in the Appendix.

arrangements are divided by dual-earner work arrangements (blue colour on top) and single-earner work arrangements (red/orange colour on the bottom). The arrangements are ordered from those with the lowest poverty risk on top, with men and women in teleworkable jobs, to the highest poverty risk, with men not in employment and women in non-teleworkable jobs. Within dual-earner and single-earner households, the brighter the colour, the higher the expected risk associated with each work arrangement. Given the higher percentages of unemployed and single-earner households among migrants, we expected to find the highest prevalence of dual-earners in non-migrant households, a moderate level among mixed households, and the lowest level in migrant households (H1a). While 11% of non-migrants were single-earners, 17% of mixed households and 27% of migrant households were single-earners, supporting H1a.

The second graph in Figure 1 presents the relative distribution of work arrangements in dual-earner households for non-migrant, mixed, and migrant households. Dual-earner non-migrant and mixed households had a similar distribution of teleworkable and non-teleworkable jobs: around 20% of dual-earner households had two teleworkable jobs, while around 40% had two earners with a non-teleworkable job. Among dual-earner migrant households, around 70% had a work arrangement where both partners worked in non-teleworkable jobs, and only 10% had two earners in a teleworkable job. Consequently, for dual-earner households, we can partly confirm H1b that migrant households have the lowest share of work arrangements with teleworkable jobs. This does not hold for mixed households.

The third graph shows single-earner households. The most frequent work arrangement in all three household types was a non-teleworkable man with a non-employed

female partner. However, among non-migrant and mixed single-earner households, work arrangements where the man had a teleworkable job and the woman was not employed were more common than among single-earner migrant households. Our hypothesis (H1b) was supported for single-earner migrant households, as they had the lowest share of work arrangements with teleworkable jobs, but mixed single-earner households were hardly distinguishable in their work arrangements from non-migrant households.

We will now examine the main earner's characteristics for each work arrangement in migrant, mixed, and non-migrant households (see Table A2 and A3 in the Appendix). In dual-earner work arrangements (Table A2), migrant households had a younger main earner than mixed and non-migrant households in nearly all arrangements. In work arrangements with two earners in teleworkable jobs, the main earner in migrant (and mixed) households tended to be more highly educated than the main earner in non-migrant households. In work arrangements where both earners had a non-teleworkable job, however, the main earner in migrant households tended to be less well educated than the main earner in mixed and non-migrant households. Furthermore, migrant main earners had permanent contracts less often and were less often in managerial positions. Especially in work arrangements with a man in a non-teleworkable job and a woman in a teleworkable job and with two non-teleworkable earners, shift work was more common among migrant main earners. In mixed dual-earner households, non-migrants were more often the main earners. The region of birth of the main earner in migrant households differed across work arrangements. In work arrangements where the man had a non-teleworkable job and the woman had a teleworkable job, the main earner in migrant households was often from a former Soviet Union country (FSU) while the main earner in migrant households with two non-teleworkable jobs was more likely to come from EU-enlargement countries.

The patterns were similar for single-earner households (Table A3): the main earner in migrant households was often younger and less often in permanent and managerial positions. In work arrangements with a teleworkable male earner, migrant earners had higher educational attainment, while migrant main earners were less educated than non-migrants in non-teleworkable work arrangements. In single-earner mixed households, the earner was often the non-migrant, especially in work arrangements with a teleworkable man and a non-employed woman. This is in line with previous studies reporting that non-migrants in mixed households were often sole earners (Braack, Milewski, and Trappe 2022). Among migrant households, the main earner in single-earner work arrangements is often from 'Other' countries. In the work arrangement where the man has a teleworkable job, and the woman was not employed, 43% of the main earners were from India, China, or the USA (not shown, available from the authors).

The poverty risk in migrant, mixed, and non-migrant households

Figure 2 shows predicted probabilities of poverty across different model specifications for non-migrant, mixed, and migrant households. Across all models, migrant households had the highest probability of being poor. Formal tests displayed in Panel B of Table A5 (in the Appendix) show that the pairwise comparisons of the coefficients relative to the three household types were significant across all models. This supported H2.

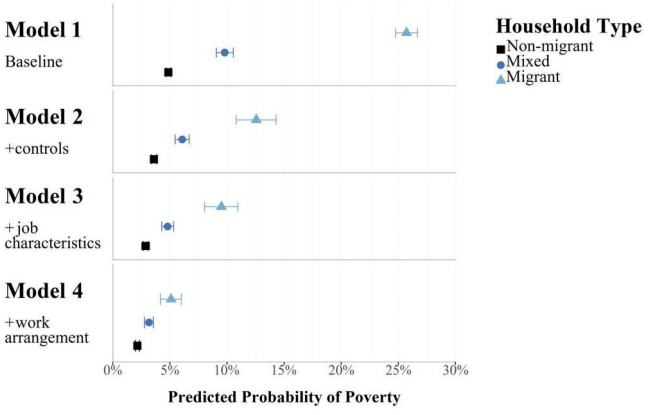

Figure 2. Predicted probability of poverty for different household types: stepwise models.
Source: German Microcensus Scientific Use File 2019, predicted probabilities, 95% confidence intervals, full results in Table A4 in the Appendix. Estimations at the means of covariates. The controls in Models 2, 3, and 4 are living in Eastern or Western Germany, the number of children in the household and main earner's sex, age, educational level and region of birth. In Model 3, job-related variables for the main earner are: employment status, the type of contract, the frequency of shift work; the leadership position. In Model 4, work arrangements are those displayed in Table 1 combining the employment status of the partner and job's teleworkability. Table A5 reports formal test for the significance of the comparison between predicted probabilities.

We tackled H3 via Models 2, 3 and 4, and found the following: First, adjusting for sociodemographic factors decreased poverty differentials between non-migrant, mixed, and migrant households (Model 2). For instance, the difference between migrant and non-migrant households declined from 20.8 (p-value < .001) to 8.9 percentage points (p-value < .001). Second, the differentials in poverty further diminished when models were adjusted for job characteristics (type of contract, employment type, leadership responsibility, shift work) (Model 3). For instance, the difference between migrant and non-migrant households further declined from 8.9–6.6 percentage points (p-value < .001). This finding held when we accounted for differences in the prevalence of work arrangements between household types (Model 4): The difference between migrant and non-migrant households was reduced from 6.6–3 percentage points (p-value < .001), while the difference between migrant and mixed households narrowed from 4.7 (p-value < .001, Model 3) to 1.9 percentage points (p-value < .001, Model 4). Although these adjustments reduced poverty differentials across the three household types, migrant and mixed households still had significantly higher predicted poverty than non-migrant households: the difference in predicted probabilities between migrant and non-migrant households remained significant (2.9 percentage points, p-value < .001), while the percentage point difference between mixed and non-migrant households was 1.01 (p-value < .001, Model 4).

A test of cross-model differences within the same household (Panel C of Table A5 in the Appendix) confirmed that, for all household types, the probability of poverty declined significantly when we adjusted the models for the household and main earner's characteristics (Model 2), the job characteristics (Model 3), and the work arrangement (Model 4). For migrant households, for instance, there is a significant reduction in the predicted

probability of poverty from 9.5% to 5.1% when adjusting for the work arrangement in the household (difference: 4.4 percentage points, p-value < .001). These results confirmed our hypothesis that the prevalence of work arrangements in the three household types explains their poverty differentials (H3). However, the greatest reduction in predicted poverty emerged when we adjusted for main earner and household characteristics.

In the next step, we added an interaction term between household type and work arrangement to Model 4 to test persistent differences across the three household types within the same work arrangement (H4). Figure 3 shows how predicted poverty varies by work arrangement for migrant, mixed, and non-migrant households (triangle, circle, square). The figure focuses explicitly on the number of earners in teleworkable jobs (shape filled: full (two earners in teleworkable jobs), half filled (one earner in a teleworkable job), empty (no earner in a teleworkable job)).

In general, poverty in dual-earner households was much lower than in single-earner households. In addition, households with teleworkable work arrangements are exposed to lower poverty than dual-earner households with one or two earners in non-teleworkable jobs. As for group differences in poverty within the same work arrangement (H4), several results can be noted. First, the differences in poverty between migrant and non-migrant households were only significant if the woman was in a teleworkable job or both were in non-teleworkable jobs. Second, if both earners were in non-teleworkable jobs, individuals in migrant households experienced a higher predicted poverty (5.3%) than those in non-migrant households (2.5%). With a predicted poverty of 3.8%, the poverty in mixed households lay between migrant and that of non-migrant households; differences in these predicted probabilities were significant.

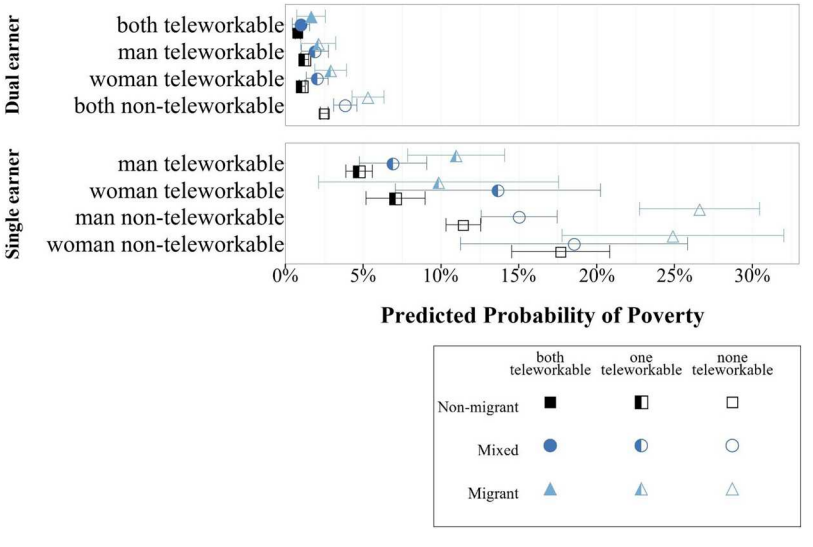

Figure 3. Predicted probability of poverty by household type and work arrangement.
Source: German Microcensus Scientific Use File 2019, predicted probabilities, 95% confidence intervals, estimates adjusted for the main earner's age, educational level, number of children in the household residing in East/West Germany and job characteristics. Estimations at the means of covariates. Full results of Model 5 in Table A4 in the Appendix.

Single earner households had much higher poverty overall than dual-earner households. The poverty risk was, on average, higher if the sole earner was in a non-teleworkable job. Addressing Hypothesis H4, Figure 3 indicates that differences between migrant and non-migrant households were significant if the man was the sole earner in the household, suggesting that men's unobserved (employment) characteristics drove differences in poverty between migrant and non-migrant households. The most pronounced differences among the three household types were observed when the man was the sole earner, and his job was not teleworkable. For this work arrangement, the predicted poverty was 26.6%, whereas for mixed households, it was 15%, and for non-migrant households, it was 11.4%. In sum, the interaction between household type and work arrangement shows that, even with the same work arrangement, household types differed in poverty. This difference was the largest for work arrangements where at least one adult had a non-teleworkable job, substantiating H4.[5] For most work arrangements where at least one partner had a teleworkable job, the differences between household types were not significant: this suggests that individuals in migrant and mixed households faced no economic disadvantage compared to non-migrant households when at least one of the partners could obtain a teleworkable job.

Discussion and conclusions

This paper contributes to the literature on the consequences of migrants' labour market disadvantages by adopting a novel analytical and substantive perspective. First, we focus on household types, defined based on the migration experience of the two adults, distinguishing between non-migrant, mixed, and migrant households. Second, we examine differences in poverty for these household types and household-level work arrangements, accounting for the number of earners and their respective jobs' teleworkability. Therefore, our results speak to the literature on poverty and the risk associated with single-earnership by conceptualising non-teleworkability as an additional poverty risk that interacts with single-earnership differently depending on the earners' migration experience.

Like Germany, many countries are seeing increases in first-generation migrants. It is thus crucial to understand how individual-level economic vulnerabilities play out on the household level and affect between-household inequalities. Our analyses of large-scale survey data show that, in Germany, migrant households have a higher prevalence of single-earner work arrangements with non-teleworkable jobs, while mixed households fall between migrant and non-migrant households. We have identified non-teleworkability and single-earnership as poverty risks, partly explaining higher poverty for migrant households. Furthermore, we find that migrant households more often have work arrangements with higher risks of poverty and also seem to experience higher poverty in these arrangements compared to non-migrant households.

While having a partner may compensate for poverty risk on the household level, single-earner work arrangements and work arrangements with non-teleworkable jobs do not allow for much risk compensation, meaning migrant and partly mixed households are less able to compensate for poverty on the household level. Inequalities between households are strongly linked to migrants' and non-migrants' partnership formation behaviour and the degree of assortative mating. The tendency for migrants to have

partners with migration experience (assortative mating) may increase economic inequalities between migrants and non-migrants. Our study shows that if, however, a migrant is partnered with a non-migrant, these mixed unions have a lower frequency of non-teleworkable work arrangements and somewhat lower poverty than migrant households. Therefore, it is vital to consider partnership formation behaviour and the number of migrants in a household when discussing the economic situation of households. Specifically, the role of non-migrant partners in averting poverty in mixed unions is an underexplored and important avenue for future research. Furthermore, research should explore to what extent mixed households impact processes of economic integration of migrants and polarisation between migrants concerning poverty in the long term. Observing the economic situation of non-migrant, mixed, and migrant households over time is also relevant, as children of mixed partnerships are more likely to partner with individuals with a migrant background than children with non-migrant parents (Irastorza and Elwert 2021).

Our findings further emphasise strong heterogeneity within non-teleworkable jobs, with migrants in non-teleworkable jobs being especially prone to high poverty. The high heterogeneity in non-teleworkable jobs alludes to labour market segregation beyond teleworkability. In our models, we controlled for type of contract, employment type, leadership responsibility, and shift work, but other job characteristics, like the industry or the level of unionisation, may be important mechanisms in explaining differences between migrant, mixed, and non-migrant households. Throughout the pandemic, employment in essential infrastructure jobs played a protective role. Research on such occupations in Germany indicates high variation within these jobs, with migrants being overrepresented in jobs with bad working conditions (Nivorozhkin and Poeschel 2022).

Given that the impact of technological change on households differs by institutional context (Minardi et al. 2023), our findings for Germany have to be considered in light of the country's particular setting. However, we argue that Germany is an exemplary case for the study of poverty gaps between migrant, mixed, and non-migrant households depending on the access to teleworkable jobs, because the country has the largest EU economy and has a long history of immigration, enabling us to define labour market integration strategies over time. Therefore, our results may differ substantially in countries with less powerful economies, less occupational segregation, more recent immigration histories and differences in the selection of migrants.

By using data from 2019, the present study sets the baseline for future analyses on how the new economic scenario during the Covid-19 pandemic might have altered the patterns we identified. Recent studies suggest an expansion in teleworkability above what was available during the pandemic (Sostero et al. 2020). Therefore, our measure of teleworkability is conservative. It may be particularly worthwhile to examine whether the expansion of teleworkable tasks increased inequalities between migrants and non-migrants, since migrants face higher risks of unemployment in economic recessions (Kogan 2004). With mobile information and communication technology (ICT) becoming more important in the working environment, teleworkability is presumably not only a safer occupational feature in a pandemic like the Covid-19 one; indeed, literacy in ICT will become more important in the future labour market. Monitoring workers' skill sets and offering

further ICT literacy training to migrants may be important to decrease labour market inequalities and poverty.

This study does not come without limitations. Our data do not enable us to disentangle the internal-household mechanisms used to decide the number of earners. Whether having more single-earner households is due to cultural norms or structural difficulties in accessing employment is an avenue for future research. Although research in Germany has refuted the theory of family investment among migrants (Basilio, Bauer, and Sinning 2009), households' decisions to opt for a single-earner model could be linked to labour market disadvantages. The fact that single-earner work arrangements with a man in a teleworkable job are very common among third-country nationals may allude to specific migration patterns and work arrangements of migrant main earners from these regions. Further, the observation that in mixed households, the non-migrant partner is more likely to be the single earner (Braack, Milewski, and Trappe 2022) may hint at migrants' labour market disadvantages and a decision to prevent economic risks with the non-migrant partner taking over (sole) employment. We cannot rule out selection into different household types. For example, studies show that single-earner couples are more likely to migrate than dual-earner couples (Vidal et al. 2017).

Furthermore, certain migrant groups seem to be overrepresented in certain work arrangements, raising questions about economic differences between migrants. These selection effects may be visible within mixed households as well. For instance, the number of earners in mixed households may differ by region of birth and other migration-specific characteristics (Schroedter 2013). This study defines non-migrants as individuals without migration experience to Germany. The definition of a non-migrant includes individuals who have at least one parent who migrated, that is, migrants' descendants. Although research shows that second-generation migrants differ in their labour market outcomes (Granato and Kalter 2001) and have different mating behaviour than first-generation migrants and the majority population (Schroedter 2013), we have not distinguished between migrants and their descendants because this would have added too much complexity to the analysis.

Finally, we have focused on two-adult households and households with individuals of working age (19–65). Consequently, our conclusions are confined to this specific group. Economic disadvantages that older migrants (Steinbach 2018) or single households may face due to low pension entitlements and less risk-sharing by a partner are not considered in this study. Given the ageing migrant population in Germany and the increasing prevalence of single households, studies that look at these households will provide a more comprehensive understanding of the specific economic challenges. We further excluded households with adult children. In Germany, multigenerational households are more common among migrants (Flake 2012), and, for instance, children of migrants from Turkey leave the parental home later than children with non-migrant parents (Windzio and Aybek 2015). Therefore, investigating households with adult children is an important avenue for future research, particularly because forming multigenerational households can help mitigate economic disadvantages.

Despite these limitations, this study underlines the importance of taking a household perspective to gauge poverty for migrant, mixed, and non-migrant households. By focusing on two-adult households where one adult is employed, we have conceptualised and empirically substantiated non-teleworkability and single-earner work arrangements as

poverty risks, especially for migrant households. As the higher prevalence of single-earner households among migrant and mixed households is one driver of their poverty, incentivising dual-earnership among these households may decrease poverty in the long term. Regarding teleworkability, improving migrants' skill levels, especially in ICT, is an important policy recommendation. If the aim is to reduce differences between migrant and non-migrant households, merely targeting households by teleworkability/non-teleworkability might not suffice. Particularly because migrant households generally seem to benefit less from social policies (Bostic and Hyde 2023), such policies should be more attuned to migration experience as a labour-market disadvantage. The results showed that migrant households in non-teleworkable (single-earner) work arrangements displayed higher poverty in 2019. The pandemic might have exacerbated these economic vulnerabilities. By looking at households where at least one individual was employed, we have likely underreported the severity of the poverty differential between migrant and non-migrant households. Our results can therefore be considered conservative regarding the actual economic disadvantage of mixed and migrant households in Germany. Promoting employment, especially among these households, is the first important step towards improving migrants' economic well-being. However, especially since the Covid-19 pandemic accelerated the use of ICT, it is important to monitor to what extent different skill sets and less adaptation to a (more) digitalised labour market might further fuel differences between migrants and non-migrants in poverty over time.

Notes

1. The Microcensus scientific use file (SUF) includes a 70% sample of the complete Microcensus. Due to anonymisation requirements, the German Statistical Offices provide only a 70% sample for use outside their premises. The selection process of the 70% subsample follows the sampling design of the Microcensus closely. The subsample is solely altered for reasons of enlarging feature groups to maintain factual anonymisation (Statistisches Bundesamt 2022). The Federal Statistical Office further provides weights to preserve representativeness.
2. Our main focus is on differences in job characteristics between household types and not the selection into employment. However, we acknowledge that by excluding households with no earners from our analysis, we underestimate the overall poverty of migrant households in Germany. We present the substantive poverty gap of migrant households with no earners in Table S1 of the Supplementary Materials.
3. For detailed information on the distribution of the teleworkability index between household types see Figure S1 in the Supplementary Materials.
4. FLC include: Italy, Spain, Greece, Turkey, Morocco, Portugal, Montenegro, Serbia, Macedonia, Bosnia and Herzegovina and Croatia, EU-15 include: Iceland, Liechtenstein, Norway, Switzerland, Denmark, Finland, Sweden, France, Switzerland, Ireland, United Kingdom, Belgium, Luxemburg, Netherlands, Austria. EU-enlargement include: Bulgaria, Romania, Lithuania, Latvia, Czech Republic, Hungary, Poland. FSU include: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Moldova (San Marino, Andorra, Vatican), Russian Federation, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Ukraine. Some allocations are due to the categorisation of countries in the SUF of the Microcensus 2019. For more information on the region of birth and the year of migration, see Figure S2 of the Supplementary Material.
5. Following deHaan et al. (2023), we estimate a model where we interacted all controls (except region of birth) and household types. The results presented in Figure 3 are robust to this specification. This finding also holds if we consider interacted controls (see Model 6, Table A4 in the Appendix). Results are available upon request.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The replication code for all analysis is available here: https://osf.io/n47fq/. The data supporting this study's findings derive from the Scientific Use Files (SUF) of the German Microcensus 2019 (DOI: 10.21242/12211.2019.00.00.3.1.0), available from the Research Data Centre of the Federal Statistical Office. More information on access and restrictions to the availability of these data, see: https://www.forschungsdatenzentrum.de/en/access.

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Appendix

Table A1. Descriptive statistics (total n = 65,247).

		Non-migrant (N = 49,507)	Mixed (N = 6,818)	Migrant (N = 8,922)
Household Composition				
Dual Earner		89	83	73
Single Earner		11	17	27
Total		100	100	100
Work Arrangement				
Dual earner	both teleworkable	22	20	7
	man teleworkable	12	12	5
	woman teleworkable	22	20	11
	both non-teleworkable	32	31	49
Single earner	man teleworkable	3	5	4
	woman teleworkable	1	2	1
	man non-teleworkable	5	8	19
	woman non-teleworkable	2	3	4

Source: German Microcensus Scientific Use File 2019, weighted column percentages, total numbers are not weighted. If the partner is not mentioned, he/she is either in a non-teleworkable job (dual-earner households) or not employed (single-earner households). Due to rounding, the percentages presented in the tables and figures may not add up to exactly 100%.

Table A2. Characteristics of the main earner by work arrangements: dual-earner households.

	Both teleworkable			Man teleworkable			Woman teleworkable			Both non-teleworkable		
	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants
Woman	19%	22%	21%	14%	16%	14%	26%	31%	24%	17%	19%	14%
Average Age	44,56	41,92	40,19	44,67	41,75	42,45	44,70	42,02	41,16	44,47	42,23	43,96
Education												
Low	1	2	4	2	5	11	3	7	10	6	15	28
Medium	35	26	24	47	43	35	56	50	53	71	63	56
High	64	72	72	51	52	54	41	43	37	24	23	16
Type of contract												
Not applicable	14	19	19	12	12	17	10	13	14	7	9	7
Fixed-term	3	5	8	4	5	7	3	5	4	4	8	9
Permanent	82	76	73	85	82	76	87	82	82	88	84	84
Employment type												
Self-employment	14	19	18	12	12	17	10	13	14	7	9	7
PT-Atypical employment	1	2	2	2	2	4	2	3	1	3	3	4
FT-Atypical employment	3	4	8	4	5	7	3	6	6	5	9	12
PT-Employment	5	4	4	5	5	2	5	5	3	4	5	3
Full-time employment	76	71	68	78	75	70	79	74	75	80	75	74
Leadership responsibility												
No	50	53	62	54	59	62	60	62	72	67	70	86
Supervisor	20	20	16	21	20	21	21	19	14	21	19	9
Manager	30	27	22	24	21	17	19	19	13	12	11	5
Shift work												
Every day	1	1	1	4	5	4	10	9	15	19	21	22
>= half of the days	0	0	0	1	1	1	2	2	4	4	4	5
< half of the days	0	1	0	1	1	2	1	2	1	2	2	2
No	98	98	99	95	93	92	87	87	79	76	73	70
Regions of countries of birth												
Germany	100	64	0	100	62	0	100	55	0	100	57	0
FLC	0	7	16	0	7	19	0	14	16	0	15	22
EU-15	0	9	11	0	8	5	0	6	4	0	5	1
EU-enlargement	0	9	23	0	9	29	0	11	29	0	10	34
Former Soviet Union Countries	0	4	25	0	5	27	0	7	39	0	6	29
Other	0	7	25	0	8	19	0	8	13	0	7	14
Row percentages	25	24	9	14	15	8	24	22	14	36	39	68
N	10,454	1,199	518	5,687	756	431	9,930	1,115	790	14,976	1,976	3,761

Source: German Microcensus Scientific Use File 2019, own calculations, percentages weighted, total numbers and row percentages are not weighted. FLC: former labour recruitment countries. If the partner is not mentioned, he/she is in a non-teleworkable job.

Table A3. Characteristics of the main earner by work arrangements: single-earner households.

	Man teleworkable			Woman teleworkable			Man non-teleworkable			Woman non-teleworkable		
	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants	Non-migrant	Mixed	Migrants
Woman	3%	1%	1%	100%	100%	100%	4%	5%	2%	100%	100%	100%
Average Age	46,15	42,61	39,25	48,75	41,62	40,28	45,81	41,76	40,54	48,01	42,59	45,60
Education												
Low	2	3	9	3	4	7	9	22	37	11	23	29
Medium	39	34	19	56	42	32	68	54	45	70	51	50
High	59	64	71	41	54	61	23	24	18	19	26	21
Type of contract												
Not applicable	11	14	15	4	7	11	5	7	6	5	3	2
Fixed-term	4	5	11	6	11	16	6	8	14	8	9	11
Permanent	84	81	75	90	81	74	89	85	81	87	88	86
Employment type												
Self-employment	11	14	14	4	7	10	5	7	6	5	3	2
PT-Atypical employment	2	1	3	6	8	8	3	4	9	14	16	21
FT-Atypical employment	4	5	10	4	9	11	7	11	15	5	5	8
PT-Employment	2	4	2	18	12	10	3	3	3	23	23	14
Full-time employment	81	76	71	68	64	61	82	76	67	53	53	55
Leadership responsibility												
No	51	55	65	74	71	76	70	73	88	79	86	89
Supervisor	21	21	18	17	21	16	19	17	8	14	8	10
Manager	28	23	17	9	8	7	11	10	4	7	7	1
Shift work												
Every day	2	2	2	1	3	3	18	21	20	20	18	21
>= half of the days	0	0	1	0	1	0	4	6	5	5	4	8
< half of the days	0	0	0	0	1	1	1	2	2	3	0	1
No	97	97	97	98	96	96	77	70	74	72	78	71
Regions of countries of birth												
Germany	100	72	0	100	71	0	100	52	0	100	61	0
FLC	0	5	19	0	5	14	0	25	27	0	11	21
EU-15	0	6	7	0	3	6	0	4	1	0	4	2
EU-enlargement	0	6	14	0	12	27	0	4	23	0	8	25
Former Soviet Union Countries	0	3	18	0	6	13	0	5	15	0	8	34
Other	0	7	43	0	3	39	0	10	34	0	8	19
Row percentages	28	31	16	10	8	2	51	54	74	11	7	8
N	2,388	546	535	839	141	76	4,318	960	2,549	915	125	262

Source: German Microcensus Scientific Use File 2019, own calculations, percentages weighted, total numbers and row percentages are not weighted. FLC: former labour recruitment countries. If the partner is not mentioned, he/she is not employed.

Table A4. Odds ratios (or) for living in a poor household.

		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
		OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
Household type (Ref. non-migrants)													
	Mixed	2.12***	0.10	1.73***	0.12	1.70***	0.12	1.48***	0.11	1.26	0.39	1.15	0.53
	Migrants	6.76***	0.23	3.84***	0.39	3.54***	0.38	2.44***	0.28	2.10*	0.66	0.64	0.27
Work arrangements (Ref. both t, non-migrants)													
Dual earner	man t							1.56***	0.20	1.57**	0.23	1.56**	0.23
	woman t							1.52***	0.17	1.37*	0.18	1.36*	0.18
	both non-t							3.25***	0.32	3.22***	0.36	3.15***	0.36
Single earner	man t							6.56***	0.76	6.25***	0.85	6.23***	0.86
	woman t							9.89***	1.57	9.57***	1.70	9.71***	1.78
	man non-t							17.83***	1.78	16.22***	1.85	15.99***	1.84
	woman non-t							24.24***	3.23	27.01***	4.04	26.63***	4.18
Interaction work arrangements and household type (Ref. men t, wom t, non-migrants)													
Dual earner	both t* mixed									1.00	0.00	1.00	0.00
	both t* migrant									1.00	0.00	1.00	0.00
	man t* non-migrant									1.00	0.00	1.00	0.00
	man t* mixed									1.22	0.49	1.00	0.00
	man t* migrant									0.82	0.34	1.24	0.50
	woman t* non-migrant									1.00	0.00	0.84	0.35
	woman t* mixed									1.52	0.55	1.00	0.00
	woman t* migrant									1.31	0.45	1.61	0.58
	both non-t* non-migrant									1.00	0.00	1.29	0.45
	both non-t* mixed									1.24	0.40	1.00	0.00
	both non-t* migrant									1.04	0.32	1.27	0.42
Single earner	man t* non-migrant									1.00	0.00	1.08	0.34
	man t* mixed									1.18	0.43	1.00	0.00
	man t* migrant									1.18	0.40	1.13	0.41
	woman t* non-migrant									1.00	0.00	1.16	0.40
	woman t* mixed									1.65	0.71	1.00	0.00
	woman t* migrant									0.68	0.37	1.82	0.83
	man non-t* non-migrant									1.00	0.00	0.56	0.32
	man non-t* mixed									1.09	0.35	1.00	0.00

(*Continued*)

Table A4. Continued.

		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
		OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
	man non-t* migrant									1.33	0.40	1.05	0.35
	woman non-t* non-migrant									1.00	0.00	1.37	0.43
	woman non-t* mixed									0.84	0.33	1.00	0.00
	woman non-t* migrant									0.73	0.26	0.97	0.41
Household: West Germany (Ref. East Germany)				0.56***	0.02	0.61***	0.03	0.56***	0.03	0.57***	0.03	0.57***	0.03
Number of children (Ref. No children)													
	1			1.49***	0.07	1.57***	0.08	1.58***	0.09	1.57***	0.09	1.44***	0.11
	2			3.31***	0.14	3.77***	0.17	4.30***	0.22	4.30***	0.22	4.07***	0.27
	3+			8.20***	0.44	9.51***	0.55	8.35***	0.53	8.35***	0.54	8.09***	0.68
Main earner: Woman (Ref. Man)				1.46***	0.07	0.86**	0.05	0.89	0.07	0.89	0.07	0.89	0.08
Main earner: Age				0.98***	0.00	0.98***	0.00	0.98***	0.00	0.98***	0.00	0.98***	0.00
Main earner: Educational level (Ref. Low)													
	Medium			0.34***	0.02	0.40***	0.02	0.44***	0.02	0.44***	0.02	0.38***	0.03
	High			0.09***	0.01	0.11***	0.01	0.16***	0.01	0.16***	0.01	0.11***	0.01
Regions of countries of birth (Ref. Germany)													
	FLC			1.19	0.12	1.17	0.13	1.05	0.12	1.07	0.12	1.08	0.13
	EU-15			0.43***	0.10	0.46***	0.11	0.53**	0.13	0.55*	0.13	0.53**	0.13
	EU-enlargement			0.93	0.10	0.86	0.10	0.92	0.11	0.93	0.11	0.92	0.12
	Former Soviet Union Countries			0.68***	0.08	0.70**	0.08	0.86	0.11	0.88	0.11	0.86	0.11
	Other			2.22***	0.23	1.87***	0.20	1.58***	0.19	1.59***	0.19	1.55***	0.19
Type of contract (Ref. Not applicable)													
	Fixed-term					0.54	0.22	0.47	0.24	0.47	0.23	0.50	0.25
	Permanent					0.27***	0.11	0.22**	0.11	0.21**	0.10	0.17***	0.08
Employment type (Ref. Self-employment)													
	PT-Atypical employment					20.75***	8.54	17.27***	8.62	17.43***	8.70	15.11***	7.48
	FT-Atypical employment					2.58*	1.07	2.08	1.05	2.09	1.05	1.44	0.74
	PT-Employment					7.42***	2.99	7.33***	3.60	7.32***	3.60	6.85***	3.29
	Full-time employment					2.25*	0.91	2.11	1.04	2.13	1.05	2.13	1.04
Leadership responsibility (Ref. No)													
	Supervisor					0.38***	0.02	0.40***	0.03	0.40***	0.03	0.37***	0.03

(*Continued*)

Table A4. Continued.

		Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
		OR	SE	OR	SE	OR	SE	OR	SE	OR	SE	OR	SE
	Manager					0.27***	0.02	0.33***	0.03	0.33***	0.03	0.37***	0.04
Shift work (Ref. Every day)													
	>= half of the days					1.37**	0.14	1.37**	0.15	1.38**	0.15	1.04	0.17
	< half of the days					0.86	0.15	0.98	0.18	0.98	0.18	0.93	0.26
	No					1.46***	0.08	1.81***	0.10	1.82***	0.10	1.73***	0.13
Interaction between all controls (except region of birth) and household type included												X	X
Constant		0.05***	0.00	0.32***	0.03	0.30***	0.04	0.07***	0.01	0.07***	0.01	0.12***	0.02
Observations		65,247		65,247		65,247		65,247		65,247		65,247	

Source: German Microcensus Scientific Use File 2019; odds ratios, significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. For work arrangements: t = teleworkable; nt = non-teleworkable; ne = not employed; FLC = Former labour recruitment countries.

Table A5. Formal test for the comparison between the key predicted probabilities' estimates across the step-wise models.

	Model 1 Baselevel	Model 2 + household and main earner's characteristics	Model 3 + job characteristics	Model 4 + work arrangements
Panel A: Predicted Probabilities (percentages)				
Non-migrant	4.87	3.60	2.88	2.15
	[4.67 - 5.07]	[3.38 - 3.83]	[2.68 - 3.08]	[1.98 - 2.33]
Mixed	9.80	6.07	4.81	3.16
	[9.07 - 10.54]	[5.46 - 6.69]	[4.28 - 5.34]	[2.77 - 3.55]
Migrant	25.71	12.56	9.50	5.10
	[24.75 - 26.67]	[10.81 - 14.3]	[8.05 - 10.95]	[4.19 - 6.01]
Panel B: Average discrete change (percentage points)				
Mixed – Non-migrant	4.93 ***	2.47 ***	1.93 ***	1.01 ***
	(.39)	(.35)	(.30)	(.22)
Migrant – Non-migrant	20.84 ***	8.95 ***	6.62 ***	2.95 ***
	(.50)	(.95)	(.79)	(.50)
Migrant – Mixed	15.91 ***	6.48 ***	4.69 ***	1.94 ***
	(.62)	(.80)	(.66)	(.41)
Panel C: Cross-model differences (percentage points)	Model 1 - 2	Model 2 - 3	Model 3 - 4	
Non-migrant	1.27 ***	.73 ***	.72 ***	
	(.09)	(.05)	(.05)	
Mixed	3.73 ***	1.27 ***	1.65 ***	
	(.23)	(.11)	(.12)	
Migrant	13.15 ***	3.06 ***	4.40 ***	
	(.87)	(.31)	(.37)	

Source: German Microcensus Scientific Use File 2019, own calculations based on models displayed in Table A4 in the Appendix 95% confidence intervals in square brackets and standard errors in parentheses. Significance: + $p < 0.5$; *$p < 0.1$; **$p < .01$ and ***$p < .001$. Total N = 65,185.