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Abstract

Wage mobility reduces the persistence of wage inequality. We develop a framework to quantify the contribution of employer-to-employer movers to aggregate wage mobility. Using three decades of German social security data, we find that inequality increased while aggregate wage mobility decreased. Employer-to-employer movers exhibit higher wage mobility, mainly due to changes in employer wage premia at job change. The massive structural changes following German unification temporarily led to a high number of movers, which in turn boosted aggregate wage mobility. Wage mobility is much lower at the bottom of the wage distribution, and the decline in aggregate wage mobility since the 1980s is concentrated there. The overall decline can be mostly attributed to a reduction in wage mobility per mover, which is due to a compositional shift toward lower-wage movers.

Keywords: business dynamism, employer changes, German linked-employer-employee data, inequality persistence, wage inequality, wage mobility, wage premiums

JEL classification: D63, J30, J31, J62

1 Introduction

Wage inequality has experienced a sharp increase in most developed countries over the last few decades, and the resulting high levels of inequality are increasingly perceived as a threat to societal cohesion and the very project of liberal democracy. However, it is not only the magnitude of wage inequality that is important for individuals' opportunities in life; the degree of inequality persistence, i.e., one's chances of upward mobility, is crucial. While a burgeoning literature has analysed the rise in cross-sectional wage inequality, much less is known about trends in wage mobility and the factors driving it. Our interest in wage mobility related to changes in employers is primarily motivated by mounting evidence on the increasing relevance of employer wage premia (e.g., Card et al. 2013) and the seminal decline in labour reallocation across employers (e.g., Akcigit and Ates 2021). Intuitively, the rise in the importance of wage premia should increase wage mobility because employer changes will, on average, lead to stronger wage changes, whereas declining labour reallocation should decrease wage mobility in a labour market with employer wage premia. However, no study has quantified the actual importance of worker reallocation across firms for aggregate wage mobility.

We estimate aggregate wage mobility by calculating the difference between cross-sectional and long-run wage inequality (cf. Shorrocks 1978). Using entropy measures of inequality, we develop a framework to quantify the contribution of employer-to-employer movers to aggregate wage mobility. We apply this framework to three decades of German social security data, which covers several important shifts in business dynamism, including the rapid structural change that occurred in the formerly socialist planned economy of East Germany following German unification in 1990.

Most developed countries saw a significant rise in cross-sectional wage inequality over the last four decades. Germany followed this trend in the 1990s and witnessed a sharp rise in wage

inequality stemming from substantial losses at the lower percentiles of the wage distribution and gains at the top (Dustmann et al., 2009). A vast body of literature, using the two-way fixed-effects methodology pioneered by Abowd et al. (1999) (henceforth AKM), emphasizes the significance of firm-specific wage premiums for cross-sectional wage inequality in many advanced economies (e.g., Barth et al., 2016; Card et al., 2016; Macis and Schivardi, 2016; Song et al., 2019). Specifically for Western Germany, Card et al. (2013) demonstrate that the increase in the variance of AKM firm wage premiums contributed 28% to the rise in wage inequality between 1985 and 2009. Wage components linked to the employer give rise to wage mobility when workers switch employers.

Most studies focus on income or earnings mobility rather than on wage mobility. Descriptive studies on mobility in household income (mostly post-government) reveal that income mobility in Germany is higher than in the U.S. (Burkhauser and Poupore, 1997; Maasoumi and Trede, 2001) or the UK (Bartels and Boenke, 2013). Boenke et al. (2015) compute complete labour earnings over a working life (age 17-60) for German men born between 1935 and 1949 and find a strong increase in intragenerational lifetime earnings inequality across cohorts. Later cohorts face a much higher lifetime inequality than earlier cohorts.[1] They conclude that about 60% to 80% of the rise in intragenerational lifetime earnings inequality can be attributed to the evolution of the cohort-specific wage structure, while unemployment patterns account for only 20 to 40%.

Hence, wage mobility plays a dominant role in earnings mobility. Unlike post-government household income, studying wage mobility provides important insights into how labour market forces shape mobility. However, it has received limited attention in research. As an exception,

[1] Kopczuk et al. (2010) analyse within-worker earnings rank correlations between early and late working life in US data. They find an increase in long-run mobility between the 1930ies and 2000's but no increase in short-run mobility and explain this by a combination of high mobility in female earnings and an increase in female labour force participation.

Buchinsky and Hunt (1999) find that wage mobility reduces cross-sectional wage inequality among young U.S. workers by 12 to 26%. A prominent study on wage mobility in Germany is by Riphahn and Schnitzlein (2016) who use the same social security data (but a shorter time horizon) as we do. Riphahn and Schnitzlein (2016) transform the wage distribution into a wage rank distribution and analyse workers' changes within the distribution. Due to analysing a wage *rank* distribution instead of the wage distribution, Riphahn and Schnitzlein (2016) cannot assess the extent to which wage mobility reduces long-run wage inequality relative to cross-sectional wage inequality. Their main findings include a decline in mobility within the wage rank distribution in both Eastern and Western Germany in the late 1990s, with a sharp drop observed in the East following the initial high mobility caused by the transition of the East German economy after German Unification in 1990. Although not the central focus of their study, they also demonstrate that employer-to-employer transitions increase wage rank mobility, with this effect declining over time in Western Germany (Riphahn and Schnitzlein, Appendix Table A.2).

The only study that provides an analysis of the role of AKM firm wage premia in earnings mobility is Abowd et al. (2018). Abowd et al. (2018) underscore the importance of employers for mobility and find that working for a high-paying firm increases the probability of moving up in the earnings distribution. However, they do not provide a framework for quantifying the contribution of employer changes (wage premia changes) to aggregate mobility.

Our main contribution is to quantify the importance of employer-to-employer mobility for wage mobility. We use three decades of German social security data to document changes in inequality, mobility, and employer-to-employer mobility. Based on general entropy measures of inequality and earlier work on wage mobility by Buchinsky and Hunt (1999), we develop a unified quantitative framework for decomposing aggregate wage mobility into the contributions

of workers staying with their employer (stayers) and those who switch employers (movers).[2] More precisely, the quantitative framework allows us to decompose changes in aggregate mobility into the contributions of six composites of which the following four are informative: changes in the mobility within the groups of stayers versus movers, respectively, and changes in the relative importance of both groups.[3] Hence, we are able to show whether changes in aggregate wage mobility are due to a changing share of movers (stayers) or changing mobility among those who move (stay). As the wage mobility of employer-to-employer movers will crucially depend on wage differentials between employers, we further link this analysis to AKM firm wage premia.

Our main results are that cross-sectional wage inequality among full-time workers increased substantially since the mid-1980s, whereas aggregate wage mobility stayed constant at a moderate level and finally declined by 11.5% in the mid-2000s. Our decomposition scheme allows us to quantitatively assess the contribution of firm-to-firm movers to aggregate wage mobility and determine the factors influencing this contribution. Consistent with economic intuition, we find that wage mobility among firm-to-firm movers is much higher than among stayers and that this is driven by wage premia changes upon job change. This result is robust to including part-time workers in the sample. Were there no firm wage premia in the German labour market, aggregate wage mobility would be 11% lower, *ceteris paribus*. Business dynamism, measured as the fraction of movers, affects mover mobility but has only a modest impact on aggregate mobility.

Whereas wage mobility at the top of the distribution stayed constant, it was initially 29% lower at the bottom of the wage distribution and substantially declined over time. The decline in

[2] A substantial body of literature decomposes wage or income inequality into a permanent versus a transitory component (e.g. Haider 2001; Baker and Solon 2003) relying on various structural assumptions on the nature of wage growth. We deviate from this literature both in our methodological approach and in our focus on quantifying the contribution of firm-to-firm mobility to aggregate wage mobility.

[3] The remaining two composites are the changes of the between group mobility and changes in the between group mobility weight. Both turned out to be quantitatively irrelevant.

aggregate mobility was driven by a decline in within-mover mobility. The decline in within-mover mobility cannot be explained by compositional changes in worker characteristics such as education, age, and gender but can be attributed to an increase in the fraction of low-wage workers among movers.

We contribute to the literature on wage inequality and wage mobility by highlighting the importance of employer-to-employer mobility for wage mobility. We are the first to quantitatively assess both the wage mobility of movers versus stayers and their respective contributions to aggregate wage mobility. Our quantitative framework enables us to link wage mobility to the significance of movers and further quantitatively decompose movers' wage mobility into key economic components, such as the fraction of movers among all workers, their wage levels, and their wage heterogeneity. We emphasize that employer-to-employer mobility is crucial for understanding wage mobility and that changes in the fraction of movers and the significant decline in mobility within the group of movers were the key drivers of the evolution of wage mobility in Germany since the 1980s.

While Card et al. (2013) report that AKM firm wage premia explain about 20% of aggregate cross-sectional wage inequality, we extend this finding by demonstrating that these premia also increase aggregate wage mobility. This implies that AKM firm premia raise permanent inequality by less than they increase cross-sectional inequality. Holding the firm wage premia constant would reduce aggregate wage mobility by around 11% since German reunification and by 9% in the 1980s.

While earlier studies suggest that earnings mobility is connected to the unemployment rate (Boenke et al., 2015; Moffit and Zhang, 2022), episodic events such as the 'Great Recession' (Moffit and Zhang, 2022), or German unification (Riphahn and Schnitzlein, 2016); we systematically relate wage and employer-to-employer mobility to changes in business dynamism and structural change. By demonstrating that business dynamism is one of the

potential forces driving aggregate wage mobility, we show that declining mobility can be an additional, less-discussed side effect of the recent decline in business dynamism (Decker et al. 2020; Akcigit and Ates 2021). In the German case, we find that a reduction in job reallocation across employers has a moderate effect on aggregate wage mobility, while the decline in the wage mobility among movers has been more impactful. The fact that this decline came with a compositional shift from higher-wage movers to lower-wage movers indicates that aggregate wage mobility largely depends on who is moving. A high level of mobility among the poorest does not increasing aggregate mobility by much.

We further highlight the importance of dynamism and employer-to-employer mobility by using the prime example of radical structural change in recent history, namely the transformation of the planned economy of former socialist East Germany after the fall of the Berlin Wall and German unification in 1990. The massive restructuring in Eastern Germany, necessary to integrate it into the world economy and to adapt to market economy structures, was accompanied by unprecedented levels of wage mobility.[4] While high mobility during this transformation has already been discussed in Riphahn and Schnitzlein (2016) and is implied by the results of Dauth et al. (2019), we complement and provide an explanation for these findings. Specifically, we show that stayer wage mobility within Eastern Germany has always been lower than within Western Germany, and only the high dynamism and corresponding contribution of mover mobility to aggregate mobility lifted Eastern German mobility above Western German mobility during the 'hot phase' of structural change. Once this phase concluded and stayer mobility became dominant, Eastern Germany experienced very low wage mobility.

[4] Dauth et al. (2019) give a comprehensive assessment of labour reallocation during the Eastern German transformation.

2 Data

We use the Sample of Integrated Labour Market Biographies (SIAB) provided by the Institute for Employment Research (IAB).[5] The SIAB is a 2% random sample of all workers who are employed subject to social security contributions in Germany. It contains daily information on workers' employment histories including, among others, information on wage, education, age, sex, and the identity of the employer. The data starts in 1975 but to combine it with worker- and employer fixed effects data (described below), we will use the years 1985 to 2016.

We restrict the sample to all regularly employed workers between the age of 20 and 60.[6] The age cut-offs reduce the impact that periods of education and early retirement have on our results. The Shorrocks mobility index requires us to observe individuals in employment in each of the T years of a defined period. For reasons explained in the next section, we decide to use six-year periods. To be in the data, workers must be observed for at least one six-year period without interruption. Two thirds of all individuals meet this criterion.[7] In the raw data, we can potentially observe multiple employment spells per person per year. To obtain a panel dataset we select one spell per person per year. Following Card et al. (2013), we select the full-time spell with the highest total earnings in a given year.

Three limitations of the SIAB are relevant for our analysis. First, the data includes daily wages without providing the number of hours worked. Therefore, it is impossible to estimate hourly wages, which would be the ideal basis for our inequality and mobility measure. We assume that

[5] The data is described by Antoni et al. (2019) and Frodermann et al. (2021).
[6] We follow the IAB and define regularly employed as all employment subject to social security contributions. The workers must be age 20 to 55 at the start of each 6-year period in order to fulfil the above mentioned age restriction.
[7] Compare Table 1 and Table F.1: By construction, the six-year restriction disproportionately excludes workers with less stable employment biographies. Hence, the share of females is around 6 percentage points lower in our six-year sample; workers are on average 1-2 years older, the average number of job changes is somewhat smaller, and wages are about 8% higher (average establishment effects are up to 0.04 higher, and average person effects are up to 0.08 higher). The shares of college-educated workers and of workers in Eastern Germany are almost unaffected by the sample restriction. Reassuringly, shifts in wages driven by the six-year restriction are similar for movers and stayers and across time. See also Appendix F for further results without this restriction.

all full-time workers work similar hours implying that hourly wages can be approximated from daily wages. For part-time workers, the assumption seems too strong for the question analysed in our paper. Hence, we restrict our main analysis to full-time workers, only.[8] After deflating with the consumer price index, our wage measure thus becomes average daily real earnings from the full-time spell with the highest total earnings in a given year. We further exclude workers in marginal employment ('Minijobber') as information on marginal employment is unavailable for years prior to 1999. To avoid including misclassified marginal workers and to reduce the impact of implausibly low wages, we exclude all workers with CPI-deflated daily wages below a 2015 real value of 16 euros.[9]

Second, reporting requirements for employers changed in 2011, which led to a sharp increase in part-time jobs in 2011 in the data. Fitzenberger and Seidlitz (2020) argue that part-time work was under-reported before 2011. We build on their correction method and estimate the probability of a worker being a part-time worker before and after 2011. Reported full-time workers with an estimated likelihood of being full-time workers of less than 50% before 2011 are defined as part-time workers and consequently excluded from our analysis.

Third, 10% to 15% of observations are top-coded at the social security contribution ceiling. The threshold varies over time and between the Eastern German and Western German states. We address the censoring by imputing wages above the ceiling using multiple Tobit models.[10] Following the standard routines provided by the IAB (Drechsler et al., 2023), we estimate four Tobit models for each year, separately for Eastern and Western Germany and both sexes.[11] The

[8] The IAB distinguishes between full-time and part-time jobs using the relationship between working hours agreed upon in the employment contract and the usual working hours at the establishment.
[9] Our procedure for excluding implausible low daily wages is similar to Dustmann et al. (2009).
[10] We impute all wages above the social security threshold, as well as all wages that are only 2 percentage points below the threshold to avoid mistakes due to small variation at the reporting of censored wages. Consequently, the imputation applies to all wages above 98% of the respective social security threshold in a certain year and state.
[11] Since Eastern and Western Berlin cannot be differentiated in the data, the whole city of Berlin is treated as Eastern Germany for the purpose of the imputation. This approach is in line with the standard procedure of the IAB for imputing the wage. According to the IAB, the distortion resulting from this approach is acceptable.

Tobit models control for the employee´s age, education, and occupational group,[12] work experience, tenure, past unemployment, nationality, as well as the firm´s location (state), total employment, and 2-digit industry. As our main result will be a mobility decline at the bottom of the wage distribution, censoring at the top is not a first-order issue.

For our analysis of the role of firms, we use the AKM firm effects provided by Bellmann et al. (2020) based on the estimations by Card, Heining, and Kline (2013, hereafter CHK). CHK decompose the wage into a person effect, a firm effect, and a life-cycle effect (Xb). The firm effect captures the pay premium a firm pays its employees independently of their individual characteristics. The CHK-effects are estimated based on job changes of employees between firms during five separate periods. The SIAB data includes the CHK-effects for fixed periods. The CHK estimation periods are 1985-1992, 1993-1999, 1998-2004, 2003-2010, and 2010-2017 (see Bellman et al., 2020). Among other things, this leads to the aforementioned six-year observation periods for our mobility index. For consistency, we aligned our five six-year periods with the CHK estimation periods. The CHK firm-effects in their original form cannot directly be compared between the CHK estimation periods. For our analysis of the firm-effect we therefore use the yearly deviation of the CHK-effect from its period-specific mean to get a time-consistent estimate of the firm-effect. Note that we cannot compute our own AKM effects, as this would require access to the full population of workers (not just a 2% sample) and establishments, which is not available to us.

3 Methodology

Our aim is to compute inequality, mobility, and the role of employers in wage mobility within a unified quantitative framework. To this end, we derive a mobility index from a standard class of inequality indices and then decompose the mobility index into the mobility contributions of

[12] We use the classification of occupational groups based on Blossfeld (1987) and provided by the IAB.

workers staying with their employer (stayers) and workers changing employers (movers). Our preferred measure of inequality of daily wages is the Theil index, as it has multiple features beneficial to our analysis. First, unlike the standard deviation, the Theil index is a general entropy measure taking into account that inequality may rise artificially simply because the mean wage increases. This concern is particularly important when analysing several decades of wage data. Second, the Theil index can be decomposed into within- and between-group inequalities, allowing us to assess the share of changes in inequality that occur within or between the groups of movers and stayers. Third, the Theil index can be used to construct a Shorrocks Index, which estimates mobility within the wage structure (see Shorrocks, 1978 and Shorrocks, 1981). Following Buchinsky and Hunt (1999), the aforementioned between/within decomposition can be further applied to the Shorrocks *mobility* index, enabling us to compute the mobility contributions of stayers and movers.

As inequality measure, we estimate the Theil T index. The Theil index can take on values between zero and infinity, with zero representing an equal distribution, while higher values represent a higher level of inequality. To estimate cross-sectional inequality for a single year ($I_y(z,t)$) the Theil index puts the yearly wage ($w(i,z,t)$) into relation to the average yearly wage in the population ($\overline{w}(z,t)$) (also see definition 1a). The subscript z describes a specific 6-year period and t the individual year. To estimate the inequality of long-term wages (I_{avg}) over the period z with the length T the Theil index relates the average wage of individual i over the period z ($w_{avg}(i,z)$) to the sample average in that period ($\overline{w}_{avg}(z)$) (also see definition 1b). The subscripts y and avg indicate whether the inequality index $I(z)$ is estimated for the *yearly* wage or the T-year *average* wage. We estimate the inequality and mobility indices for five different 6-year periods ($T = 6$) defined by the nested set S.

$$S_{z,t} = \{\{1985,..,1990\},\{1993,..,1998\},\{1999,..,2004\},\{2005,..,2010\},\{2011,..,2016\}\}$$

(1a) $$I_y(z,t) = \frac{1}{N_{z,t}} \sum_{i=1}^{N_{z,t}} \frac{w(i,z,t)}{\overline{w}(z,t)} \cdot \ln \frac{w(i,z,t)}{\overline{w}(z,t)}$$

(1b) $$I_{avg}(z) = \frac{1}{N_z} \sum_{i=1}^{N_z} \frac{w_{avg}(i,z)}{\overline{w}_{avg}(z)} \cdot \ln \frac{w_{avg}(i,z)}{\overline{w}_{avg}(z)}$$

with $w_{avg}(i,z) = \frac{1}{T}\sum_t^T w(i,z,t)$ and $\overline{w}_{avg}(z) = \frac{1}{N_z}\sum_i^{N_z}\left[\frac{1}{T}\sum_t^T w(i,z,t)\right]$.

$N_{z,t}$ is the number of observations in year t in period z, while N_z is the number of observations within the 6-year period z, yielding $N_{z,t} \cdot T = N_z$. All indices are estimated separately for all periods z defined in the set S and, to ease exposition, we will omit index z from this point onwards.

We use the Theil Index to estimate a Shorrocks mobility index (M). This measure captures the mobility within the wage distribution by relating the cross-sectional inequality (I_y) to the long-term wage inequality (I_{avg}). The Shorrocks index assesses mobility within the wage distribution over a specific time period z with the length T. Selecting an appropriate length for T involves a trade-off: on one hand, a longer T enhances the accuracy of the mobility index; on the other hand, the Shorrocks index requires all individuals i to be in the data for *all* years $t \in T$, which causes the sample to size shrinks with *T*. As we aim to compare changes in CHK firm effects with our mobility index, we align the estimation periods T of the mobility index (M) with the CHK estimation periods, which leads to a period length (T) of six years.[13]

The Shorrocks index (M) is given by definition (2), where the numerator I_{avg} represents the Theil Index estimated for the average wages over the T-year period for all individuals i (see definition 1b). The denominator $\sum_t^T \eta(t)\, I_y(t)$ represents the weighted sum of yearly wage inequality (see definition 1a). The weight $\eta(t)$ captures the share of the total wages in year t relative to the total wages over the whole period.

[13] We experimented with shorter values of T. This yielded lower mobility but did not change our main insights.

(2) $$M = 1 - \frac{I_{avg}}{\sum_t^T \eta(t)\, I_y(t)}, where\ \eta(t) = \frac{\sum_{i=1}^N w(i,t)}{\sum_{t=1}^T \sum_{i=1}^N w(i,t)}$$

The mobility index thus measures the extent to which cross sectional inequality exceeds long-run inequality. A larger gap between cross-sectional and long-run inequality indicates higher wage mobility. We decompose the mobility index into three components to estimate the contributions to aggregate wage mobility: (i) mobility within the group of movers, (ii) mobility within the group of stayers, and (iii) mobility between movers and stayers. Any individual who changes jobs at least once within a period z is defined as a mover. To achieve this decomposition, we apply a modified version of the methodology employed by Buchinsky and Hunt (1999), focusing solely on two within-group components (i.e., stayers and movers) and the between-group component. Generally, the Theil index can be decomposed into two within-group components ($\widetilde{IW}_1;\ \widetilde{IW}_2$) and a between group component ($\widetilde{IB}$).[14]

$$I = \widetilde{IW}_1 + \widetilde{IW}_2 + \widetilde{IB}$$

Leveraging the decomposability property of the Theil index, we can also decompose the Shorrocks mobility index M into these three components. The decomposition of the mobility index into these components is defined by equation (3). In this decomposition: $\widetilde{IW}$ represents the weighted within-group inequality, $\widetilde{IB}$ denotes the weighted between-group inequality and, $\widetilde{MW}$ and $\widetilde{MB}$ represent the weighted within- and between-group mobility, respectively. We use σ as the weight for the three components, which is explained below.[15]

(3)
$$M = 1 - \frac{I_{avg}}{\sum_t^T \eta(t)\, I_y(t)}$$
$$= \underbrace{\left[1 - \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\, \widetilde{IW}_{y,1}(t)}\right] \frac{\sum_t^T \eta(t)\, \widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)}}_{weighted\ within\ mover\ mobility} + \underbrace{\left[1 - \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\, \widetilde{IW}_{y,2}(t)}\right] \frac{\sum_t^T \eta(t)\, \widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)}}_{weighted\ within\ stayer\ mobility} +$$
$$\underbrace{\left[1 - \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\, \widetilde{IB}_y(t)}\right] \frac{\sum_t^T \eta(t)\, \widetilde{IB}_y(t)}{\sum_t^T \eta(t)\, I_y(t)}}_{weighted\ between\ mobility}$$

[14] The derivation of the decomposition of the Theil index is described in Appendix A. This decomposition applies to both yearly and long-term (six-year) wage inequality estimates.
[15] A more detailed derivation of equation (3) can be found in Appendix A.

$$= \underbrace{MW_1}_{\substack{mover\\ within\ mobility}} \underbrace{\sigma_1}_{\substack{mover\\ mobity\ weight}} + \underbrace{MW_2}_{\substack{stayer\\ within\ mobility}} \underbrace{\sigma_2}_{\substack{stayer\\ mobility\ weight}} + \underbrace{MB}_{\substack{between\ group\\ mobility}} \underbrace{\sigma_B}_{\substack{between\ group\\ mobility\ weight}}$$

$$= \underbrace{\widetilde{MW}_1}_{\substack{weighted\ within\\ mover\ mobility}} + \underbrace{\widetilde{MW}_2}_{\substack{weighted\ within\\ stayer\ mobility}} + \underbrace{\widetilde{MB}}_{\substack{weighted\ between\\ group\ mobility}}$$

Wage mobility within the groups of movers and stayers ($MW_1; MW_2$), compares the cross-sectional inequality within each group with its six-year inequality. Specifically, the within-group mobility of stayers measures the upward and downward wage mobility experienced by workers who remain with the same employer. This measure can be influenced by variations in wage profiles between different employers or sociodemographic groups (e.g., gender, education, or age).

Accurate weighting of the different mobility components is crucial, as the weights carry important information about the composition of the groups. To highlight their components, an alternative way to define the two within-group weights $\sigma(k)$ is provided in equation (4).[16] The weight $\sigma(k)$ is estimated separately for each six-year period T and encompassed three factors: the relative average wage $\left(\frac{\bar{w}(k)}{\bar{w}}\right)$, the relative inequality $\left(\frac{\sum_t^T \eta(t)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t)}\right)$, and the relative sample size $\left(\frac{n(k)}{N}\right)$. Importantly, the latter factor comprises the proportion of employer-to-employer movers and will thus vary directly with business dynamism and structural change.

$$\sigma(k) = \frac{\sum_t^T \eta(t)\, \widetilde{IW}_y\,(t,k)}{\sum_t^T \eta(t)\, I_y(t)} = \frac{n(k)\, \bar{w}(k) \sum_t^T \eta(t)\, IW_y(\,t,k)}{N\, \bar{w}\ \ \sum_t^T \eta(t)\, I_y(t)} \tag{4}$$

In summary, decomposition (3) presents a comprehensive framework for accounting for the contributions of different groups to aggregate mobility. When combined with definition (4), this accounting framework clarifies that aggregate mobility is influenced by both the

[16] The relationship between the two notations of the within-group weight $\sigma(k)$ can be found in Appendix A (equation A6).

unweighted mobility within the groups of stayers and movers (as well as the between-group component) and the group weights that represent meaningful combinations of significant economic variables. These variables will be analysed further below. If the groups of stayers and movers exhibit substantial differences in their within-group mobility ($MW_1 \neq MW_2$), variation in the importance of groups ($\sigma(k)$) will shape aggregate wage mobility. Similarly, any trends in within-group wage mobility will affect aggregate wage mobility based on the importance of these groups.

4 Results

4.1 Descriptive statistics

Table 1 presents summary statistics for each of the five periods analysed in this study. Each period consists of a balanced panel of full-time workers who were observed to be employed in each of the years within that period. For comparison, Table F.1 shows the same statistics for an unrestricted sample of full-time workers who do not need to be observed continuously over the 6-year span. Table 1 reveals a strong and monotone increase in inequality throughout the observation period. Additionally, there is a noticeable decrease in the proportion of workers changing employers (movers) since the mid-2000s. Among movers, the frequency of employer changes is very stable.[17] The fraction of women among full-time workers stays relatively constant below 30%, the fraction of college educated workers rises from 7% to 19%, average worker age increases from 39 to 42 years, and the fraction of workplaces located in Eastern Germany declines steadily. Consistent with previous research, movers are younger than stayers. Furthermore, movers are more likely to have a college degree, work in worse paying establishments, and have lower AKM person effects. The lower AKM effects among movers

[17] The employer change variable is a dummy variable describing whether a worker has changed job in a particular year. A mover can change jobs up to five times within a six-year period. Hence, if the dummy variable indicating a job change is 0.251 (as in Period 1), it implies that movers changed jobs on average 1.255 times (0.251*5).

can be partly attributed to their younger age, which typically correlates with less accumulated human capital and a more active search for job opportunities in high-paying firms. Additionally, movers are more likely to work in Eastern Germany, which is generally associated with lower AKM effects compared to other regions.

The proportion of workers switching employers within a six-year period increased from 7.4% in the late 1980s to 10% around the turn of the century, then declined to 8.7%. This trend is consistent with indicators of business dynamism, shown in Figure 1 (establishment entry rate) and Figure 2 (fraction of workers in young establishments).[18] Both business dynamism indicators were initially low for Western Germany in Period 1, increased up to Period 3, and then declined. In contrast, Eastern German numbers were notably higher in Period 2 (due to German reunification discussed below) but eventually converged to the standards observed in Western Germany. One objective of the following sections is to establish the close connection between these business dynamism trends and the changes in mover mobility.

Table 2 summarizes the changes in cross-sectional inequality and mobility. Cross-sectional inequality increased by 77% from the first period (1985-1990) to the last period (2011-2016). The increase was nearly linear from Period 1 to Period 4 and then slowed down in Period 5 (Figure 3), possibly due to the introduction of the national minimum wage on January 1, 2015, which reduced inequality (Bossler and Schank, 2023). Wage mobility was 0.087 in Period 1, indicating that six-year average inequality was 8.7% lower than cross-sectional inequality.[19] Mobility declined by 11.5% between Period 1 and Period 5, as will be discussed later. In summary, the examined period is characterized by a substantial increase in inequality among

[18] Numbers are computed from the IAB Establishment History Panel, which aggregates social security notifications at the establishment level and provides information for 50% of German establishments. For details on the data see Ganzer et al. (2022).

[19] Three-year average inequality in period 1 is 5.5% smaller than the cross-sectional inequality. Results using three-year windows instead of six-year windows are provided in Appendix E. Using three-year windows, naturally reduces the importance of movers. Most importantly, our main results of declining overall mobility and a significant drop in within-mover mobility remain robust with the three-year window.

full-time workers, initially moderate wage mobility that subsequently decreased, and a hump-shaped trajectory of business dynamism.

In Appendix B, we present inequality and mobility including part-time workers. Cross-sectional and six-year inequality in daily wages are, of course, higher when including part-time workers. Both types of inequality increased by approximately 5 percentage points, similar to the increase observed for full-time workers (Figure B.1). However, the decline in aggregate mobility is lower when including part-time workers (Figure B.2). When comparing our sample with a sample of full-time workers not restricted to those observed over the full six-year period, we find that our sample: i) accounts for about two-thirds of the full sample size with little variation over time, ii) has a very similar share of movers, iii) and exhibits higher inequality that, however, follows the same trend as in the unrestricted sample (Figures F.1-F.3).

4.2 Mobility of stayers and movers

Table 2 presents levels and trends for the unweighted within-group mobility among stayers and movers.[20] The most significant finding is that mobility among movers is much higher compared to mobility among stayers. For instance, in the period of 1985-1990, mobility reduces cross-sectional inequality among stayers by about 7.3% whereas it reduces inequality among movers by 11.9%. Cross-sectional inequality among movers exceeds that among stayers by between 15% and 29%, depending on the period. However, the greater wage mobility observed among movers narrows this gap, resulting in a six-year inequality difference of only 10% to 24%.

Secondly, there is a downward trend in mobility within both groups, while cross-sectional inequality continues to increase. Mobility stagnates for both groups in the last period. The

[20] Appendix D reports these results separately for Western Germany and formerly socialist East Germany.

decline in mobility between 1985-1990 and 2011-2016 amounts to 20% (8%) of the initial mobility levels for movers (stayers).

One interesting question is how important changes in employer wage premia are for movers' wage mobility. Employer wage premia are fixed employer-specific wage components that may stem from a variety of employer characteristics, including differences in productivity and labour market power (Card et al., 2018, Dobbelaere et al., 2024). According to the AKM model estimated by CHK, wage changes for movers (as opposed to stayers) are directly related to changes in employer wage premia.[21]

By excluding changes in wage premia from movers' wages, we can determine whether movers would have experienced higher wage mobility even if they had stayed with their employer.[22] Table 4 Panel D shows that unweighted within-mover mobility decreases by 2.1 to 2.3 percentage points when eliminating wage premia changes. In the later periods, when accounting for wage premia changes, the unweighted within-mover mobility is only slightly higher than the unweighted mobility of stayers reported in Table 2 (0.073 versus 0.067). This indicates that changes in wage premia largely explain the higher mobility among movers compared to stayers. In earlier periods, unweighted mover mobility after controlling for premia changes surpasses unweighted stayer mobility by 1.6 to 2.3 percentage points. This suggests that factors other than employer changes contributed to the higher mobility among movers. One plausible explanation is that movers tend to be younger (as shown in Table 1), and younger workers experience greater wage volatility even if they remain with the same employer (Boenke et al., 2015).

[21] The CHK model additionally considers changes in life-cycle wage profiles (Xb); i.e. year dummies as well as quadratic and cubic terms in age fully interacted with education. As these are smooth functions over time, the differential wage changes for movers during the year they change employers is dominated by the wage premia change.

[22] To this end, we subtract the change of the AKM firm effect (γ) from the wage the mover is earning at the new employer: $w_{cf}(t+1) = exp[\ln \mathrm{w}(\mathrm{t}+1) - (\gamma(t+1) - \gamma(t))]$. One may wonder whether match-specific or time-varying employer effects could still play a role. However, CHK demonstrate that match-specific wage effects are negligible for full-time employed workers in Germany. Following the CHK framework, we also assume that time-varying employer effects are random and thus do no systematically affect our results.

4.3 Mobility weights

Table 3 shows the components of the mobility weight $\sigma(k)$. The three components of the group weight (wage gap, group heterogeneity, and fraction of movers) are individually analysed. Mobility weights themselves exhibit significant changes over time. As displayed in the last row of Table 3 (Panel B), the importance of mover mobility rose substantially from 0.311 to 0.431 between the first and the third period and then declined to 0.355 by the last period. These swings underscore the significant role of mobility weights in shaping the contributions of movers and stayers to aggregate wage mobility. The detailed analysis of these patterns is complex and warrants further examination.

Panel B of Table 3 shows the evolution of average wages, number of workers, and inequality per period separately for stayers and movers. The relative significance of movers surged from 0.311 in Period 1 (1985-1990) to 0.380 in Period 2 (1993-1998). As the within-group inequality as well as the wage of movers developed in tandem with aggregate inequality and wages, the strong increase in the fraction of movers from 30% to 38% is the main explanation for the significant shift in the importance of movers for mobility. Panels B1 and B2 of Table 4 show counterfactuals holding constant the fraction of movers $\left(\frac{n(k)}{N}\right)$ and the ratio of the average wages of movers to average total wages $\left(\frac{\bar{w}(k)}{\bar{w}}\right)$, respectively. These counterfactuals provide insight into the importance of the fraction of movers compared to the relative wages paid to them in determining the weight. Importantly, if the fraction of movers had remained at the level observed in period 1 (30%), the weight would not have increased from 0.311 to 0.380 in period 2, but instead declined to 0.300 (Table 4, Panel B1). On the other hand, holding the ratio of average wages constant does not alter the weight.

Following the reunification of Germany in 1990, Eastern Germany was included in our dataset starting from Period 2. The transition from the formerly planned economy in East Germany to a market economy implied radical structural change, which is further detailed in section 4.5. In Appendix Tables D.1 to D.3, we present our core findings separately for Eastern and Western Germany. The substantial increase in the importance of movers between Period 1 and Period 2, as discussed earlier, is mainly driven by a moderate rise in mover importance within Western Germany (0.311 to 0.344, Appendix Table D.2), and a notably higher mover importance of 0.427 in Eastern Germany (Appendix Table D.1).

The relative importance of movers continued to increase, although at a slower pace, from Period 2 to Period 3 (0.380 to 0.431; Table 3, Panel B), driven by slightly different factors. Notably, the fraction of movers continued to rise, peaking at 39%. Furthermore, both $\left(\frac{\sum_t^T \eta(t)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t)}\right)$ and $\left(\frac{\bar{w}(k)}{\bar{w}}\right)$ showed slight increases and, as shown in Table 4 Panel B1, even at constant mover share, the mover weight would have increased from 0.300 to 0.323. Appendix Tables D.1 and D.2 demonstrate that this increase in the mover weight was driven entirely by Western Germany, while in Eastern Germany, the mover weight declined and consistently remained lower than in the West.

The mobility weight of movers declines in Periods 4 and 5, although for different reasons. In Period 4, the decrease in the mobility weight is driven by a decline in the fraction of movers from 39% to 35%. If the fraction of movers had remained constant, the mover weight would have stayed the same in Period 4 (refer to Table 4, Panel B1), indicating that neither $\left(\frac{\sum_t^T \eta(t)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t)}\right)$ nor $\left(\frac{\bar{w}(k)}{\bar{w}}\right)$ played a role. In Period 5, the fraction of movers remains at 35%, and the decline in movers' mobility weight from 0.388 to 0.360 (Table 3, Panel B) is attributed

to small reductions in both $\left(\frac{\sum_t^T \eta(t)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t)}\right)$ and $\left(\frac{\bar{w}(k)}{\bar{w}}\right)$. These trends hold true for both Eastern and Western Germany.

In summary, changes in the fraction of movers among all workers play a dominant role in shaping the changes in movers' mobility weight. Fixing the mover share at its Period 1 level would have resulted in significantly lower mover weights in subsequent periods. For example, the mover weight in Period 3 would have been 0.323 instead of 0.431 (Table 4, Panel B1), representing a reduction of 25%.

4.4 Aggregate wage mobility

We combine the results of the previous sections on changes in within-group mobility (MW_k) and on mobility weights of stayers and movers ($\sigma(k)$) to determine the contribution of movers to aggregate wage mobility. While only around a third of workers change employers within six years, the higher within-group mobility of movers leads to a disproportionately high contribution to aggregate mobility. Table 4 (Panel A) and Figure 4 illustrate that the contribution of movers to aggregate wage mobility increased from 43% in the first period to a peak of 54% in the third period, before declining to 44% in the final period.

Result 1: Because of their much higher within-group mobility, movers account for almost half of aggregate wage mobility despite accounting for only one third of the workforce.

Having established that the fraction of movers is the main driver of the mobility weight, we conducted counterfactual analyses to explore whether changes in i) the fraction of movers (Table 4, Panel B1), ii) the within-group mobility (MW_k) of stayers (Table 4, Panel C1), or iii) the within-group mobility of movers (Table 4, Panel C2) can explain the evolution in aggregate mobility. Fixing the fraction of movers to its Period 1 level is substantially reducing mover mobility. Interestingly, it is not changing the evolution of aggregate mobility by much. Hence,

the fraction of movers and thus business dynamism was of only moderate importance for the evolution of aggregate mobility.

Result 2: Business dynamism is the main driver of movers' contribution to aggregate wage mobility but has only a modest impact on aggregate wage mobility.

Section 4.2 reveals that, depending on the period analysed, between 50% and 79% of the mobility gap between movers and stayers can be explained by job changes rather than by any inherent characteristics that would lead to increased wage mobility even without switching employers. Table 4, Panel D depicts the evolution of aggregate mobility net of changes in wage premia upon employer change. By comparing aggregate wage mobility with that after eliminating changes in wage premiums, we can assess the significance of wage premium variations for aggregate mobility and how it changes over time. Figure 5 illustrates that eliminating premia changes does indeed reduce aggregate wage mobility. Compared to counterfactual wage mobility, the reduction amounts to 9% in the 1980s and to 11% after the German reunification.

Result 3: The existence of firm wage premia drives mover mobility and increases aggregate wage mobility by up to 11%.

After determining that the fraction of movers is responsible for the cyclicality of movers' contribution to aggregate wage mobility and that wage changes upon job changes play a critical role in their higher wage mobility, we now examine the reasons behind the long-term decline in aggregate mobility.

The decline in aggregate mobility can be attributed to decreases in mobility within both groups of stayers and movers. When we keep the within-group mobility of stayers in Period 1 constant, the drop in aggregate mobility decreases from 0.011 to 0.007 (as shown in Table 4, Panel C1). However, fixing within-mover mobility to its Period 1 level has the most significant impact on

aggregate mobility. This is not surprising given that mover mobility experienced a substantial decrease from 0.119 to 0.095 (as seen in Table 2). While aggregate mobility declined by 11.5% over the entire period, counterfactual aggregate mobility, where within-mover mobility is fixed, declines by only 3.4% (Table 4, Panel C2).[23]

Result 4: The decline in the within-group mobility among movers explains most of the decline in aggregate wage mobility.

Tables 5a and 5b provide core results for mobility at the lower and upper ends of the wage distribution, using adjusted versions of the Theil index that place greater emphasis on the tails. The findings reveal that mobility is significantly higher at the upper end of the wage distribution, primarily due to a much larger contribution from stayers. Stayer mobility is expected to account for a larger share of mobility at the top because low-wage firms generally offer fewer within-firm wage growth opportunities compared to high-wage firms. The latter, which are typically larger, tend to have steeper tenure-wage profiles (Fackler et al., 2015) and internal labour markets. Importantly, mobility slowed down at the bottom of the distribution but remained constant at the top.[24] Thus, the overall finding of decreasing mobility is primarily driven by the low-wage segment. Within-group mobility of both movers and stayers decreased at the bottom of the wage distribution, whereas it remained stable at the top.

Result 5: Wage mobility is much lower and more dependent on mover mobility at the bottom of the wage distribution, where it is also declining. In contrast, mobility is higher, primarily driven by stayers, and remains unchanged at the top of the wage distribution.

[23] Figure B.2 confirms the following main findings derived from the sample of full-time workers for a sample that includes part-time workers: i) aggregate mobility is similar (9%), ii) magnitude and evolution in the unweighted mobility among movers is very similar, iii) magnitude and evolution in the unweighted mobility among stayers is very similar, and iv) the contribution of movers to aggregate mobility is around 50%.

[24] Confirming Result 2, the contribution of movers to mobility shows the familiar hump-shaped evolution in both tails of the wage distribution and, again, mobility weights drive this pattern.

4.5 Marked differences between the 'two Germanys'

The development of wage mobility differed markedly between Eastern and Western Germany. After the fall of the Berlin Wall, the formerly planned economy of East Germany underwent a radical transformation. Most pre-existing firms were uncompetitive and downsized or closed within a few years while, at the same time, new firms were created in unprecedented numbers. During this process, manufacturing employment fell by more than two thirds within just a few years, while the construction sector and service sectors expanded rapidly (Weigt 2021). Western Germany also experienced structural changes, but they were much less radical. Major events included increased openness to trade after the fall of the Wall, the introduction of the European Single Market, and China's entry into the WTO (Dauth et al. 2014). Following major labour market reforms and important concessions by unions in the early 2000s, Germany transformed from the 'sick man of Europe' to 'economic superstar' (Dustmann et al. 2014). Subsequently, unemployment was low and so was business dynamism.

Figures D.1 and D.2 show the evolution of cross-sectional and six-year average inequality for both parts of the country. The first period for Eastern Germany spans from 1993 to 1998 (i.e. Period 2). Cross-sectional inequality increased in tandem in both Eastern and Western Germany for most of the observation period. However, the increase halted in the latest period in Eastern Germany, partly because the nationwide minimum wage introduced in 2015, which had a much higher bite there (Bossler and Schank 2023). Six-year average inequality in the East grew faster but stabilized in the last period. Tables D.1 to D.3 show our core results separately for Eastern (Western) Germany. Aggregate mobility was higher in the East than in the West in Period 2 (0.096 versus 0.088, Tables D.1 and D.2), which is readily explained by the radical transformation the East was still undergoing. Eastern Germany exhibited a higher unweighted mover mobility (0.126 versus 0.116, Tables D.1 and D.2) than the West and a higher mover weight (0.427 versus 0.344, Tables D.1 and D.2) leading to a mover contribution to mobility of

0.054 in the East versus 0.040 in the West (Tables D.1 and D.2). Mover mobility accounted for 56% to Eastern German aggregate wage mobility but only 45% to Western German mobility (Panel A and B of Table D.3). After the initial turbulent period, within-stayer mobility was lower in the East, indicating a more homogeneous wage growth among Eastern German stayers.

Mobility in the East declined sharply after the bulk of the transformation process was completed around the turn of the century.[25] This drop was driven by a reduction in the mover contribution to mobility, which decreased from 0.054 to 0.027 between Periods 2 and 4 (Figure D.3). Reductions in the mover share (from 56% to 45%) and in unweighted mover mobility (from 0.126 to 0.059) explain most of this sharp decline. Meanwhile, Western German wage mobility remained relatively stable (Figure D.4) and significantly exceeded that of the East in Period 4 (0.083 versus 0.059, Panel A and B of Table D.3).[26] Interestingly, the relative contributions of movers and stayers to aggregate mobility are remarkably similar in both parts of the country after transformation was completed (Panel A and B of Table D.3).

4.6 Explaining the decline in aggregate wage mobility

The decline in business dynamism contributes to the decline in wage mobility (Result 2). The decline in aggregate wage mobility is primarily due to a decrease in mobility within the movers group (Result 4). Mobility not only declined at the lower end of the wage distribution but also exhibited a greater reliance on movers at lower wages (Result 5). Therefore, understanding the factors behind the decline in within-group mobility among movers is crucial.

Decline in within-mover mobility

[25] There is no precise date after which the transition process was completed. However, the fast catch up in productivity markedly slowed down already in the late 1990ies (Mertens and Mueller 2022) and the job reallocation rate almost halved from about 44% in 1993 to 23% in 2004 (own calculations based on the IAB establishment history panel, available upon request). It is thus fair to say that the period of rapid structural change ended around the turn of the century.

[26] Riphahn and Schnitzlein (2016) find qualitatively similar patterns.

As discussed in Section 4.2 and shown in Panel D of Table 4, the within-group mobility of movers primarily depends on how strongly AKM firm wage premia change upon employer change. Since the change in unweighted mover mobility of -0.024 (Table 3, Panel A) is virtually identical to the counterfactual change eliminating premia changes of -0.023 (Table 4, Panel D), other factors must be responsible for the *reduction* in mover mobility.[27]

The composition of movers underwent significant changes over time. Between Period 1 and Period 5, the proportion of college-educated individuals among movers increased from 8.8% to 21.4%, whereas the average age rose from 35.5 years to 39.5 years, as shown in Table 1. In Appendix Figure C.1, we observe that college education became increasingly relevant for mover mobility, while the importance of age and gender remained relatively stable. Specifically, college educated workers accounted for 27% of mover mobility in Period 1 and 50% in Period 5. To assess the impact of changes in the college share on mover mobility, we calculate a counterfactual scenario in which the college share remains constant. In this scenario, we find that mover mobility would have decreased to 0.076 instead of 0.095, as depicted in Appendix Figure C.2. However, holding the fraction of older and female workers constant would not have had a substantial effect on mover mobility. Thus, we conclude that the decline in mover mobility cannot be explained by compositional changes related to college education, age, or gender.

Importantly, Table 1 indicates that the composition of firm-to-firm movers in later periods is increasingly concentrated among low-wage workers (with lower AKM worker effects) employed in low wage firms (with lower AKM firm effects). In particular, the mover-stayer gaps in wages, establishment wage premia, and person effects, respectively, are largest in the most recent period. As we have established that mobility is lower at lower wages (Result 5),

[27] Note that eliminating premia changes also captures the impact a potential change in the average number of moves per mover could have on mobility. However, the average number of moves per mover within a six-year window stayed constant (Table 1).

the compositional shift towards lower relative wages among movers helps explain the decline in within-mover mobility (Result 4).

Why did mobility only decline at the bottom of the wage distribution?

We showed in Table 5a and Table 5b that mover mobility stayed constant at the top of the wage distribution but declined at the bottom (where mover mobility tends to be more important).[28] To investigate whether the decline in mover mobility at lower wages is due to changes in the variability of employer wage premia, we repeated the analysis from Table 4, Panel D, for both the upper and lower segments of the wage distribution. Specifically, we examined the counterfactual wage mobility of movers would there be no firm wage premia changes upon employer change (i.e. we purge wage premia changes from the wage). The difference between actual and counterfactual mobility turns out to be constant over time at both ends of the distribution (see Panel A2 of Table 5a and B2 of Table 5b). Therefore, the decline in mover mobility cannot be explained by trends in the dispersion of wage premia changes. It is more likely driven by changes in worker characteristics beyond age, education, and gender (as studied in section 4.5) or alterations in the characteristics of their employers.

The analysis in Panel A2 of Table 5a and B2 of Table 5b reveals that changes in wage premia significantly contribute to mover mobility, particularly at the bottom of the wage distribution, both in relative and absolute terms. Consequently, counterfactual mover mobility without wage premia is substantially lower at the bottom compared to the top of the distribution, as is the case with stayers. Remember that removing wage premia changes eliminates a pivotal reason for differences in mover and stayer mobility and that remaining mobility differences root in worker characteristics or intra-employer wage mobility. A further result is that, at the bottom of the

[28] The described trends are to some degree driven by differences between Eastern and Western Germany. While in Eastern Germany mobility declines at the top and the bottom of the distribution, in Western Germany the mobility declines at the bottom but stays constant at the top. The West dominates the overall trend because it is much bigger than the East.

distribution, mover mobility without premia rapidly converged to stayer mobility. The gap was 0.031 in Period 1 (equivalent to 53% of stayer mobility) and narrowed to 0.013 in Period 5 (28% of stayer mobility). This convergence between mover and stayer mobility largely explains the decline in mover mobility at the bottom of the wage distribution.

5 Conclusions

Our study examines aggregate wage mobility in Germany, recognizing the importance of considering the persistence of inequality for a comprehensive analysis of wage inequality. In addition to updating trends in inequality and wage mobility, our main contribution is the detailed analysis of employer-to-employer movers. The interest in mover mobility is mainly spurred by the mounting evidence on the relevance of employer wage premia (e.g. Card et al. 2013) and the seminal decline in business dynamism (e.g. Akcigit and Ates 2021), respectively. Intuitively, the former should raise aggregate and mover mobility whereas the latter should reduce the importance of mover mobility.

We developed a framework using entropy measures of inequality to quantify the contributions of mover mobility and stayer mobility to aggregate wage mobility. This framework enables us to assess the impact of employer wage premia and business dynamism on aggregate wage mobility and its constituent components. By decomposing aggregate mobility into the within-group mobility of movers and stayers, weighted by their respective proportions, we gain insights into the significance of these factors. This framework provides a comprehensive analysis of the role played by the magnitude of employer wage premia and business dynamism in shaping aggregate wage mobility and its various components.

Our analysis confirms that cross-sectional inequality among full-time workers has increased in the German economy. However, we also find that mobility has decreased during the same period. This suggests that the rise in long-run inequality has been even more pronounced than

the increase in cross-sectional inequality alone. Notably, the decline in mobility was particularly strong in Eastern Germany, where the rapid structural changes following German unification led to initially high mobility rates that subsequently declined as the transformation process matured. Consequently, wage mobility within Eastern Germany was significantly lower compared to that within Western Germany, highlighting the contrasting mobility dynamics between the two regions.

In general, movers exhibit significantly higher mobility compared to stayers, largely due to changes in employer wage premia upon job change. If there were no employer wage premia, aggregate wage mobility would decrease by approximately 11%. Consequently, wage premia have had a greater impact on raising cross-sectional inequality compared to long-run inequality. Additionally, wage mobility varies across the wage distribution: it is notably lower, more dependent on mover mobility, and declining at the bottom of the wage distribution. In contrast, mobility is higher, more reliant on stayer mobility, and remains unchanged at the top of the distribution.

During the 1990s and around the turn of the century, the German economy experienced relatively high levels of business dynamism, which significantly amplified the contribution of movers to wage mobility. While business dynamism explains the relative contributions of movers and stayers to aggregate wage mobility, it accounts for only a moderate portion of the changes observed in aggregate wage mobility. The primary factor driving the decline in aggregate wage mobility is the decrease in mobility within the group of movers rather than the decline in business dynamism. Our findings indicate that mobility tends to be lower at the bottom of the wage distribution. This decline in mover mobility is associated with a compositional shift, where a greater proportion of low-wage workers have become movers in later years. Additionally, we observe that wage mobility among movers decreased at the bottom of the wage distribution while remaining relatively stable at the top.

The rise in the persistent component of wage inequality raises important societal concerns that warrant further investigation. By demonstrating that persistence in inequality is influenced by the within-group mobility of both movers and stayers, weighted by the level of business dynamism, our study takes an initial step towards understanding this phenomenon. To reduce persistence, it would be necessary to increase mobility within the group of movers and simultaneously promote higher levels of business dynamism. As employer change is particularly impactful for wage mobility, especially for low-wage movers, policymakers aiming to increase wage mobility should consider facilitating worker transitions between employers. One potential approach is to subsidize moving costs, which would particularly benefit low-wage workers who are often financially constrained. Such measures could help improve wage mobility and address some of the underlying issues contributing to persistent wage inequality.

Supplementary Material

Supplementary material is available at the *Oxford Economic Papers Journal* online. The data used in this paper are available from the Institute for Employment Research (IAB) in Nuremberg (Germany).

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Conflict of Interest

All authors declare that they have no conflicts of interest.

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Tables and Figures

Table 1: Summary Statistics

	Mean wage (std. dev.)	Mean Firm effect (std. dev.)	Mean person effect (std. dev.)	Assortative matching (corr. coeff.)	Female	College	Worker Age	Workplace Eastern Germany	Employer Change
	1985-1990 (1,316,154 observations: 389,340 mover and 926,814 stayer)								
Total	108.9 (41.77)	0.030 (0.150)	0.074 (0.295)	0.047	0.259	0.073	39.20	-	0.074
Mover	103.4 (42.16)	0.010 (0.157)	0.060 (0.280)	0.141	0.246	0.088	35.51	-	0.251
Stayer	111.3 (41.39)	0.039 (0.146)	0.081 (0.300)	0.004	0.265	0.067	40.75	-	-
	1993-1998 (1,719,660 observations: 645,480 mover and 1,074,180 stayer)								
Total	110.7 (46.22)	0.036 (0.187)	0.083 (0.292)	0.151	0.286	0.103	39.09	0.212	0.096
Mover	104.3 (45.49)	0.007 (0.194)	0.052 (0.277)	0.256	0.262	0.117	37.06	0.285	0.257
Stayer	114.5 (46.23)	0.053 (0.181)	0.101 (0.299)	0.076	0.300	0.095	40.31	0.169	-
	1999-2004 (1,636,974 observations: 645,738 mover and 991,236 stayer)								
Total	117.3 (54.73)	0.041 (0.204)	0.088 (0.312)	0.184	0.292	0.137	40.04	0.195	0.100
Mover	114.2 (56.59)	0.025 (0.211)	0.072 (0.306)	0.312	0.272	0.159	38.13	0.209	0.253
Stayer	119.3 (53.39)	0.052 (0.199)	0.098 (0.315)	0.094	0.305	0.122	41.29	0.186	-
	2005-2010 (1,598,148 observations: 553,722 mover and 1,044,426 stayer)								
Total	116.9 (58.84)	0.047 (0.228)	0.088 (0.334)	0.210	0.286	0.155	41.48	0.187	0.087
Mover	111.3 (60.87)	0.016 (0.239)	0.060 (0.332)	0.352	0.271	0.181	39.27	0.196	0.252
Stayer	119.9 (57.51)	0.063 (0.220)	0.102 (0.334)	0.121	0.295	0.141	42.65	0.182	-
	2011-2016 (1,642,554 observations: 570,006 mover and 1,072,548 stayer)								
Total	121.4 (62.63)	0.042 (0.197)	0.083 (0.361)	0.295	0.278	0.193	42.34	0.183	0.087
Mover	112.4 (61.55)	0.011 (0.204)	0.042 (0.359)	0.396	0.265	0.214	39.51	0.191	0.251
Stayer	126.1 (62.68)	0.059 (0.191)	0.105 (0.360)	0.227	0.285	0.182	43.84	0.179	-

Notes: SIAB data, full-time workers, 20-60 years old, observed over at least one complete 6-year period as described in the text. The last column captures the share of observations belonging to individuals who change jobs per six-year period.

Table 2: Aggregate and within-group wage inequality and mobility

	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Yearly Inequ.	6-year average Inequ.	Mobility index	Yearly Inequ.	6-year average Inequ.	Mobility index	Yearly Inequ.	6-year average Inequ.	Mobility index	Yearly Inequ.	6-year average Inequ.	Mobility index	Yearly Inequ.	6-year average Inequ.	Mobility index
Aggregate	0.065	0.059	0.087	0.077	0.071	0.083	0.095	0.086	0.087	0.110	0.102	0.076	0.115	0.106	0.077
Group components of inequality and mobility:															
Within Stayers	0.061	0.057	0.073	0.072	0.067	0.069	0.087	0.081	0.071	0.100	0.094	0.064	0.107	0.100	0.067
Within Movers	0.072	0.063	0.119	0.083	0.074	0.109	0.106	0.095	0.108	0.129	0.117	0.096	0.127	0.115	0.095
Between stayers/movers	0.001	0.001	0.051	0.001	0.001	0.004	0.000	0.000	0.094	0.001	0.001	0.020	0.002	0.001	0.027

Notes: SIAB data, full-time workers, 20-60 years old. Yearly inequality measured by Theil T is $\sum_t^T \eta(t)\, I_y(t)$; six-year average inequality is I_{avg} and mobility is $1 - \frac{I_{avg}}{\sum_t^T \eta(t)\, I_y(t)}$, (see section 3 for further details). These three components are calculated separately for workers staying with their employer throughout the six-year period (stayer) and those who switch employer (mover).

Table 3: Weighting group mobility

	Panel A – Weighting Group Mobility														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility
Aggregate	0.087	1	0.087	0.083	1	0.083	0.087	1	0.087	0.076	1	0.076	0.077	1	0.077
Group components of mobility:															
Stayers	0.073	0.680	0.050	0.069	0.607	0.042	0.071	0.566	0.040	0.064	0.608	0.039	0.067	0.632	0.042
Movers	0.119	0.311	0.037	0.109	0.380	0.041	0.108	0.431	0.047	0.096	0.387	0.037	0.095	0.355	0.034
Between stayers/movers	0.051	0.009	0.000	0.004	0.013	0.000	0.094	0.003	0.000	0.020	0.006	0.000	0.027	0.013	0.000

	Panel B – Components of Mobility Weights $\sigma(k)$														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality
Aggregate	108.9	219359	0.065	110.7	286610	0.077	117.3	272829	0.095	116.9	266358	0.110	121.4	273759	0.115
Stayers	111.3	154469	0.061	114.5	179030	0.072	119.3	165206	0.087	119.9	174071	0.100	126.1	178758	0.107
Movers	103.4	64890	0.072	104.3	107580	0.083	114.2	107623	0.106	111.3	92287	0.129	112.4	95001	0.127
Mobility weight for stayers		0.680			0.607			0.566			0.608			0.632	
Mobility weight for movers		0.311			0.380			0.431			0.387			0.355	

Notes: SIAB data, full-time workers, 20-60 years old. Panel A: Unweighted group mobility (presented in Table 2) is weighted with mobility weight $\sigma(k)$ to yield group (stayer and mover) contributions to aggregate mobility. Panel B shows components of mobility weight $\sigma(k)$. Weighting and weights ($\sigma(k)$) are described in section 3.

Table 4: Contribution of mover and stayer wage mobility to aggregate wage mobility and counterfactuals

	Period 1(1985-1990)		Period 2 (1993-1998)		Period 3 (1999-2004)		Period 4 (2005-2010)		Period 5 (2011-2016)		Change from Period 1 to 5	
	1	2	3	4	5	6	7	8	9	10	11	12
	Mobility component	Share of aggregate	Mobility component	Share of aggregate	Mobility component	Share of aggregate	Mobility component	Share of aggregate	Mobility component	Share of aggregate	Mobility component	Share of aggregate
Panel A - Contribution of mover and stayer wage mobility to aggregate wage mobility												
Aggregate mobility	0.087	100	0.083	100	0.087	100	0.076	100	0.077	100	-0.011	100
Stayers	0.050	57	0.042	50	0.040	46	0.039	51	0.042	55	-0.007	68
Movers	0.037	43	0.041	49	0.047	54	0.037	49	0.034	44	-0.003	31
Between stayers/movers	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	-0.000	1
Panel B1 – Holding period 1 mover share constant												
Aggregate mobility	0.087	100	0.080	100	0.083	100	0.074	100	0.075	100	-0.012	100
Weighted mover mobility	0.037	43	0.033	41	0.035	42	0.032	43	0.029	38	-0.008	68
Mover Mobility Weight	0.311	-	0.300	-	0.323	-	0.330	-	0.303	-	-0.008	-
Panel B2 – Holding period 1 ratio of mover wage to aggregate wage constant												
Aggregate mobility	0.087	100	0.083	100	0.087	100	0.076	100	0.077	100	-0.010	100
Weighted mover mobility	0.037	43	0.042	50	0.045	52	0.037	49	0.035	45	-0.002	24
Mover Mobility Weight	0.311	-	0.383	-	0.420	-	0.385	-	0.364	-	0.053	-
Panel C1 – Holding period 1 within-stayer mobility constant												
Aggregate mobility	0.087	100	0.085	100	0.088	100	0.081	100	0.080	100	-0.007	100
Panel C2 – Holding period 1 within-mover mobility constant												
Aggregate mobility	0.087	100	0.087	100	0.091	100	0.085	100	0.084	100	-0.003	100
Panel D – Eliminating within-period changes in AKM firm wage premia												
Aggregate mobility	0.079	100	0.075	100	0.078	100	0.068	100	0.068	100	-0.011	100
Unweighted mover mobility	0.096	-	0.086	-	0.087	-	0.075	-	0.073	-	-0.023	-

Notes: SIAB data, full-time workers, 20-60 years old. Table summarizes group (stayer and mover) contributions to aggregate mobility. Group contributions are a multiplicative of unweighted group mobility (presented in Table 2) and mobility weights $\sigma(k)$ (presented in Table 3). Methodological details are described in section 3.

Table 5a: Weighting Group Mobility emphasizing the lower bound of the wage distribution

	Panel A1 – Weighting Group Mobility – Emphasizing the lower bound of the wage distribution (c=0)														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)
Aggregate	0.079	1	0.079 (100)	0.075	1	0.075 (100)	0.074	1	0.074 (100)	0.064	1	0.064 (100)	0.063	1	0.063 (100)
Group components of mobility:															
Stayers	0.059	0.666	0.039 (49)	0.054	0.587	0.031 (42)	0.051	0.554	0.028 (38)	0.044	0.589	0.026 (41)	0.046	0.609	0.028 (45)
Movers	0.122	0.325	0.040 (50)	0.108	0.339	0.043 (58)	0.103	0.444	0.046 (62)	0.093	0.405	0.038 (59)	0.091	0.377	0.034 (54)
Between stayers/movers	0.052	0.009	0.000 (1)	0.004	0.014	0.000 (0)	0.000	0.003	0.000 (0)	0.021	0.006	0.000 (0)	0.028	0.013	0.000 (1)

	Panel A2 – Eliminating within-period changes in AKM firm wage premia (c=0)				
	Period 1(1985-1990)	Period 2 (1993-1998)	Period 3 (1999-2004)	Period 4 (2005-2010)	Period 5 (2011-2016)
Unweighted mover mobility	0.090	0.076	0.073	0.062	0.059

Notes: SIAB data, full-time workers, 20-60 years old. Unweighted group mobility is weighted with mobility weight $\sigma(k)$ to yield group (stayer and mover) contributions to aggregate mobility. Panel A: All indices are based on the Theil L index $I_{Theil\ L}(c=0)=\frac{1}{N}\sum_{i=1}^{N}\ln\frac{\bar{w}(t)}{w(i,t)}$, which puts more emphasize on the lower bound of the wage distribution. $\sigma(k,c=0)=\frac{n(k)\sum_t^T \eta(t)\, IW_y(k,t)}{N\sum_t^T \eta(t) I_y(t)}$.

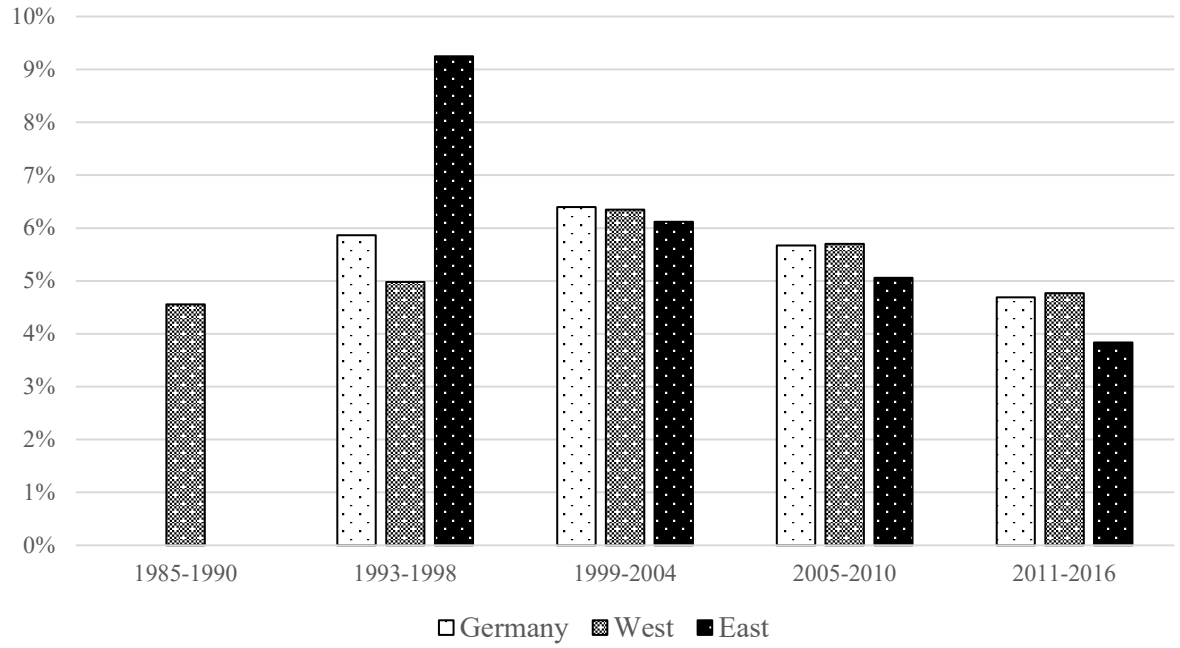
Table 5b: Weighting Group Mobility emphasizing the upper bound of the wage distribution (continued)

	Panel B1 – Weighting Group Mobility – Emphasizing the upper bound of the wage distribution (c=2)														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)	Mobility	Weight	Weighted mobility (Share)
Aggregate	0.111	1	0.111 (100)	0.111	1	0.111 (100)	0.123	1	0.123 (100)	0.112	1	0.112 (100)	0.115	1	0.115 (100)
Group components of mobility:															
Stayers	0.101	0.693	0.070 (63)	0.102	0.625	0.064 (57)	0.112	0.577	0.064 (52)	0.104	0.624	0.065 (58)	0.110	0.655	0.072 (63)
Movers	0.137	0.299	0.041 (37)	0.130	0.363	0.047 (43)	0.140	0.421	0.059 (48)	0.126	0.371	0.047 (42)	0.127	0.334	0.042 (37)
Between stayers/movers	0.050	0.008	0.000 (0)	0.004	0.012	0.000 (0)	0.094	0.002	0.000 (0)	0.020	0.005	0.000 (0)	0.027	0.011	0.000 (0)

	Panel B2 – Eliminating within-period changes in AKM firm wage premia (c=2)				
	Period 1(1985-1990)	Period 2 (1993-1998)	Period 3 (1999-2004)	Period 4 (2005-2010)	Period 5 (2011-2016)
Unweighted mover mobility	0.119	0.114	0.125	0.112	0.110

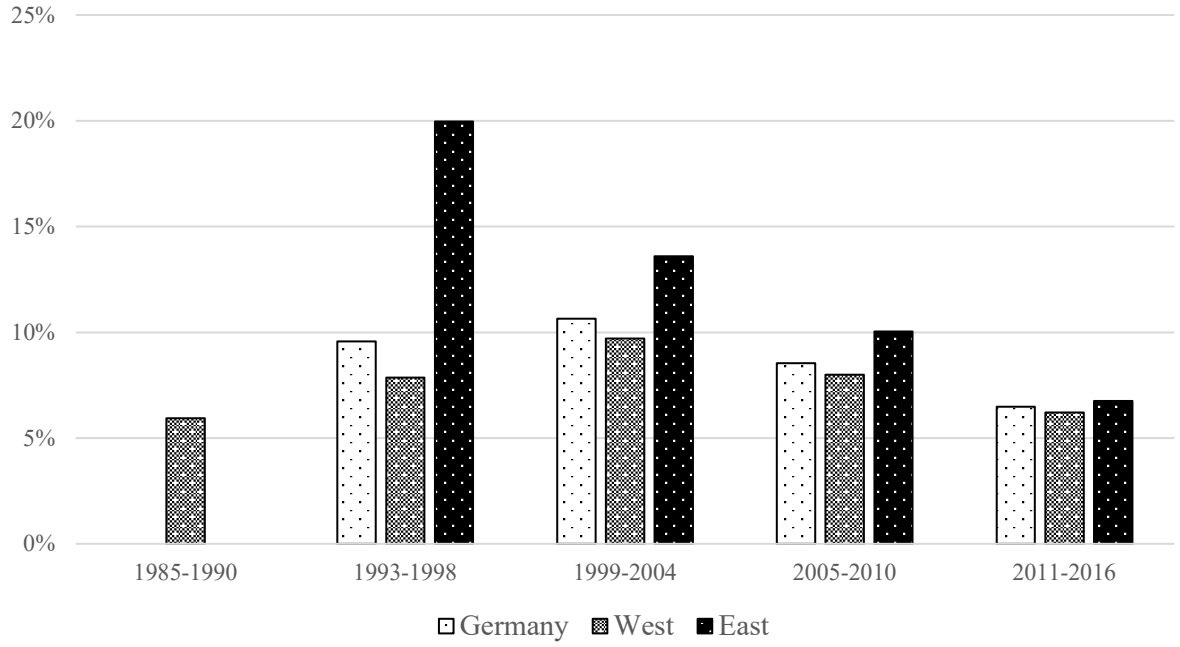
Notes: SIAB data, full-time workers, 20-60 years old. Unweighted group mobility is weighted with mobility weight $\sigma(k)$ to yield group (stayer and mover) contributions to aggregate mobility. Panel B: All indices are based on the generalized Theil index $I_{Theil}(c) = \frac{1}{c(c-1)} \cdot \frac{1}{N} \sum_{i=1}^{N} \left(\frac{w(i,t)}{\bar{w}(t)}\right)^{c} - 1 \;\; \forall\, c \in \mathbb{R} \;/\; \{0,1\}$, which puts more emphasize on the upper bound of the wage distribution. $\sigma(k, c=2) = \frac{n(k) \; \sum_t^T \eta(t) I W_y(k,t)}{N \; \sum_t^T \eta(t) I_y(t)} \left(\frac{\bar{w}(k)}{\bar{w}}\right)^{c}$.

Figure 1: Establishment entry rate



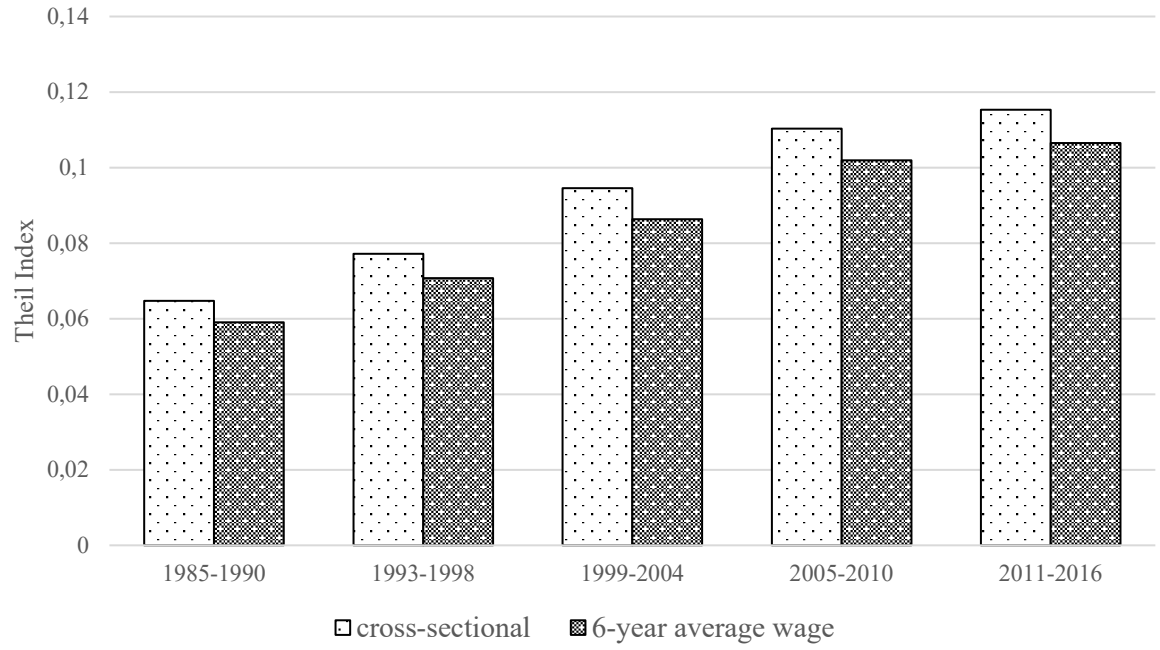
Notes: IAB Establishment history panel. The entry rate is the fraction of new establishment identifiers over all establishments in a given year and region.

Figure 2: Young establishment employment share



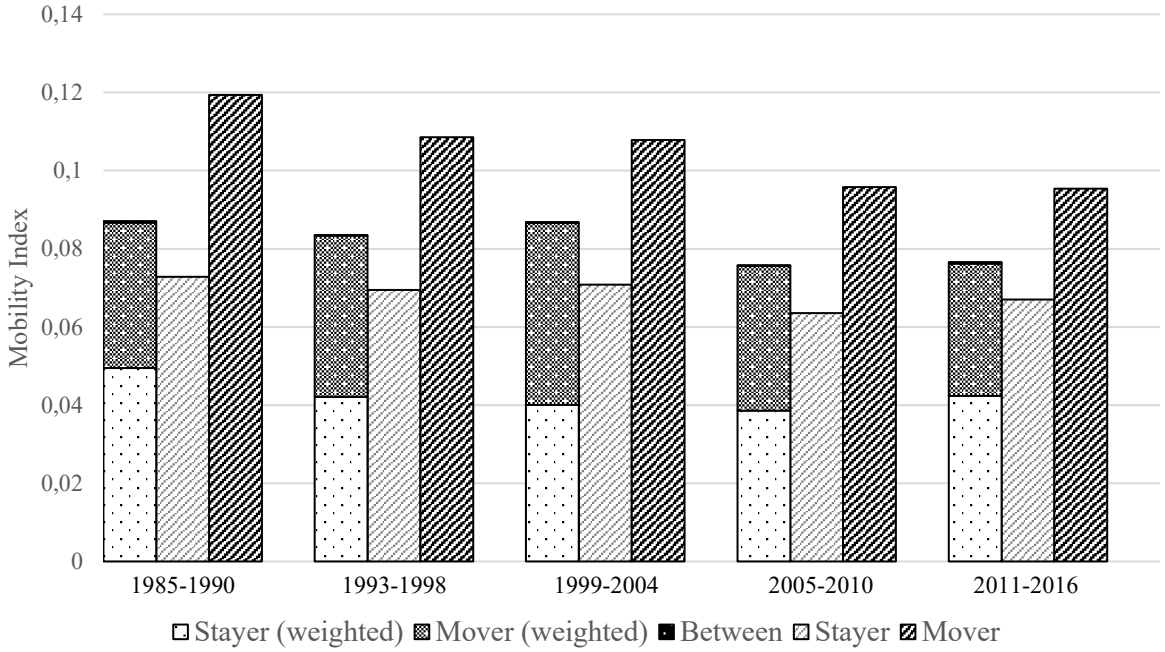
Notes: IAB Establishment history panel. The young establishment employment share is the fraction of workers employed in establishments younger than 5 years among all workers in a given year and region.

Figure 3: Wage inequality



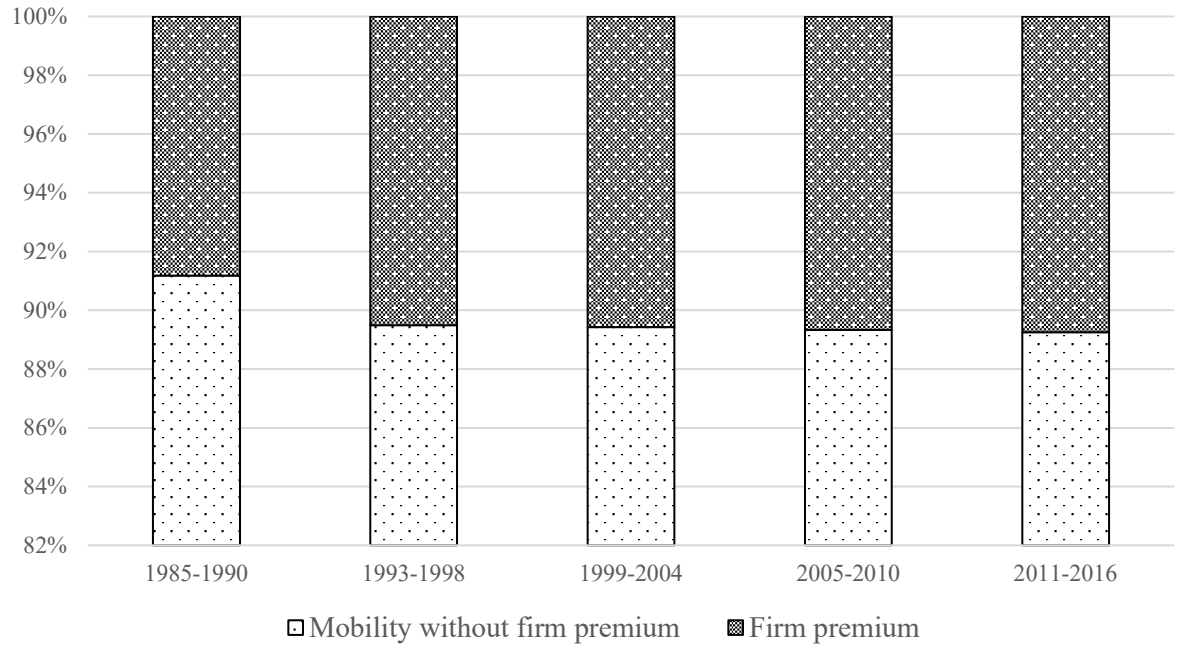
Notes: The figure is based on the numbers reported in Table 2.

Figure 4: Weighted and unweighted mover and stayer mobility



Notes: The figure is based on the numbers reported in Table 4, Panel A. The first bar shows aggregate wage mobility consisting of the weighted within-stayer component, the within-mover component, and the between-component. The second and the third bar show unweighted mover and stayer mobility, respectively.

Figure 5: Aggregate wage mobility subtracting changes in the firm wage premium



Notes: The figure is based on the numbers reported in Table 4, Panel D. The figure shows the contribution of changes in firm wage premia (for movers) to aggregate mobility.

Appendix

Appendix A - Methodology

We provide a detailed derivation of the formulas presented in the methodology section, which are based on Buchinsky and Hunt (1999). We start with the decomposition of the Theil inequality index, which forms the basis for the Shorrocks mobility index decomposition. We present two variations of the decomposition: the general approach and the adapted approach specifically designed for our analysis. The general approach allows for the decomposition of both the Theil inequality index and the Shorrocks mobility index into within-group and between-group components. The within-group component captures the inequality or mobility within any number of sub-groups, denoted by k. However, the general approach does not distinguish the contributions of individual groups. For our analysis, we require two distinct within-group components, corresponding to stayers and movers ($k = 2$). To achieve this, we adapt the methodology by Buchinsky and Hunt (1999) to our specific application.

Inequality Index

Following Buchinsky and Hunt (1999) the Theil T index can be decomposed as following.

(A1)
$$I_k(t) = \frac{1}{N}\sum_{i=1}^{N}\frac{w(i,t)}{\overline{w}(t)}\cdot \ln\frac{w(i,t)}{\overline{w}(t)}$$
$$= \sum_k \underbrace{v(k)}_{\substack{inequality\\ weight}} \underbrace{I(k)}_{\substack{within\ group\ k\\ inequality}} + \underbrace{\sum_k v(k)\, ln\left[\frac{v(k)}{n(k)/N}\right]}_{\substack{weighted\ between\ group\\ inequality}}$$
$$= \underbrace{\widetilde{IW}}_{\substack{weighted\ within\ group\\ inequality}} + \underbrace{\widetilde{IB}}_{\substack{weighted\ between\ group\\ inequality}}$$

The within part of the wage inequality decomposition is the weighted sum of the inequality within each of the k groups. The Theil index I_k is the inequality estimated for a subsample of group k.

(A2)
$$I(k) = \frac{1}{n(k)}\sum_{i=1}^{N}\frac{w(i,k)}{\overline{w}(k)}\cdot \ln\frac{w(i,k)}{\overline{w}(k)} \forall k \in K$$

The weight $v(k)$ captures the wage share of group k in total wages.

(A3) $$v(k) = \frac{\sum_{i=1}^{N} w(i,k)}{\sum_{i=1}^{N} w(i)} \forall k \in K = \frac{n(k)\bar{w}(k)}{N\ \bar{w}}$$

The between-part captures the inequality between the groups. To derive the special case of the decomposition for the Theil inequality index when there are only two groups ($k = 2$), we obtain the following formula:

(A4) $$I = v_1\, IW_1 + v_2\, IW_2 + \sum_{k=1}^{2} v_k\, ln\left[\frac{v(k)}{n(k)/N}\right]$$

$$= \underbrace{\widetilde{IW_1}}_{\substack{weighted\ inequ.\\ group\ 1}} + \underbrace{\widetilde{IW_2}}_{\substack{weighted\ inequ.\\ group\ 2}} + \underbrace{\widetilde{IB}}_{\substack{weighted\ inequ.\\ between\ group\ 1\ and\ 2}} .$$

Mobility Index

Having decomposed the Theil inequality index, we can utilize the within-group and between-group inequality measures to estimate the mobility within the different components. By appropriately weighting the mobility within those components, we can decompose the overall Shorrocks mobility index, which is the primary objective of our analysis. Following Buchinsky and Hunt (1999), the Shorrocks index can be decomposed as follows:

(A5) $$M = 1 - \frac{I_{avg}}{\sum_t^T \eta(t)\, I_y(t)} = \underbrace{\left[1 - \frac{\widetilde{IW}_{avg}}{\sum_t^T \eta(t)\, \widetilde{IW}_y(t)}\right] \frac{\sum_t^T \eta(t)\, \widetilde{IW}_y(t,k)}{\sum_t^T \eta(t)\, I_y(t,k)}}_{weighted\ within\ mover\ mobility} + \underbrace{\left[1 - \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\, \widetilde{IB}_y(t)}\right] \frac{\sum_t^T \eta(t)\, \widetilde{IB}_y(t)}{\sum_t^T \eta(t)\, I_y(t)}}_{weighted\ between\ mobility}$$

$$= \underbrace{MW}_{\substack{unweighted\\ within\ mobility}}\ \underbrace{\sigma_W}_{\substack{mobility\\ weight}} + \underbrace{MB}_{\substack{unweighted\\ between\ mobility}}\ \underbrace{\sigma_B}_{\substack{mobility\\ weight}}$$

$$= \underbrace{\widetilde{MW}}_{\substack{weighted\\ within\ mobility}} + \underbrace{\widetilde{MB}}_{\substack{weighted\\ between\ mobility}}$$

The unweighted mobility indices MW and MB represent the mobility within the within-group ($\widetilde{IW}$) and between-group ($\widetilde{IB}$) components of the Theil inequality, the latter being weighted using the inequality weight v (see equation A4). Consequently, the mobility weight σ incorporates the inequality weight v. Equation 6 denotes the within-group weight $\sigma(k)$ of group

k estimated over the T-year period.[29]

(A6) $$\sigma_W(k) = \frac{\sum_t^T \eta(t)\, \widetilde{IW}_y\,(t,k)}{\sum_t^T \eta(t)\, I_y(t,k)} = \frac{\sum_t^T \eta(t)\, v(k)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t,k)} = \frac{v(k)\sum_t^T \eta(t)\, IW_y(t,k)}{\sum_t^T \eta(t)\, I_y(t,k)}$$

$$= \frac{n(k)\bar{w}(k)\sum_t^T \eta(t)\ IW_y(t,k)}{N\ \bar{w}\sum_t^T \eta(t)\, I_y(t,k)}$$

We find that the within-group mobility weight $\sigma_W(k)$ over the T-year period depends on the number of observations, the average wage, and the unweighted within-group inequality in the subsample (k) relative to the total sample.

In the next step, we derive the special case of the mobility decomposition for only two distinguishable within-group components as well as one between-component. In analogy to the general approach with two components (only one within- and one between-component) we can rewrite the general formula with three instead of two summands.

(A7) $$M = 1 - \frac{I_{avg}}{\sum_t^T \eta(t)\, I_y(t)}$$

$$= \underbrace{\left[1 - \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}\right]\frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t) I_y(t)}}_{weighted\ within\ group\ 1\ mobility} + \underbrace{\left[1 - \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}\right]\frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t) I_y(t)}}_{weighted\ within\ group\ 2\ mobility} +$$

$$\underbrace{\left[1 - \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}\right]\frac{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}{\sum_t^T \eta(t) I_y(t)}}_{\substack{weighted\ between\ group \\ 1\ and\ 2\ mobility}}$$

$$= \underbrace{MW_1}_{\substack{group\ 1 \\ within \\ mobility}}\ \underbrace{\sigma_1}_{\substack{group\ 1 \\ mobility\ weight}} + \underbrace{MW_2}_{\substack{group\ 2 \\ within \\ mobility}}\ \underbrace{\sigma_2}_{\substack{group\ 2 \\ mobility\ weight}} + \underbrace{MB}_{\substack{between \\ group \\ mobility}}\ \underbrace{\sigma_B}_{\substack{between\ group \\ mobility\ weight}}$$

$$= \underbrace{\widetilde{MW}_1}_{\substack{weighted\ group\ 1 \\ within\ mobility}} + \underbrace{\widetilde{MW}_2}_{\substack{weighted\ group\ 2 \\ within\ mobility}} + \underbrace{\widetilde{MB}}_{\substack{weighted\ between \\ group\ mobility}}$$

[29] Equation A6 only holds for the within- group weight (σ_W). For the between group weight (σ_B) this deviation is not possible. $\sigma_B = 1 - \sum \sigma_W$.

Proof

We know from the decomposition of the inequality index into three components, as shown in equation A4, that $I_{avg} = \widetilde{IW}_{avg,1} + \widetilde{IW}_{avg,2} + \widetilde{IB}_{avg}$. Therefore, we can rewrite the general formula for mobility (equation 2) as in equation A8.

(A8) $$M = 1 - \frac{\widetilde{IW}_{avg,1} + \widetilde{IW}_{avg,2} + \widetilde{IB}_{avg}}{\sum_t^T \eta(t)\, I_y(t)}$$

Rewriting the equation we get:

(A9) $$M = 1 - \left[\frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\, I_y(t)} + \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\, I_y(t)} + \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\, I_y(t)}\right]$$

Expanding each term in brackets by one we get:

(A10) $$M = 1 - \left[\frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\, I_y(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)} + \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\, I_y(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}\right.$$
$$\left. + \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\, I_y(t)} \frac{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}\right]$$

Rewriting A10 yields:

(A11) $$M = \frac{\sum_t^T \eta(t)\, I_y(t)}{\sum_t^T \eta(t)\, I_y(t)} - \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$- \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)} - \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)} \frac{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$

Replacing $I_y(t)$ by $\widetilde{IW}_{y,1}(t) + \widetilde{IW}_{y,2}(t) + \widetilde{IB}_{y}(t)$ (equation 4) yields:

(A12) $$M = \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t) + \eta(t)\widetilde{IW}_{y,2}(t) + \eta(t)\widetilde{IB}_{y}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$- \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)} - \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$- \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)} \frac{\sum_t^T \eta(t)\widetilde{IB}_{y}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$

After rearranging terms we get A13.

(A13)
$$M = \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)} - \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)} + \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$- \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)} \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)} + \frac{\sum_t^T \eta(t)\widetilde{IB}_y(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$- \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\widetilde{IB}_y(t)} \frac{\sum_t^T \eta(t)\widetilde{IB}_y(t)}{\sum_t^T \eta(t)\, I_y(t)}$$

Rewriting equation A13 we get to equation A14, which is the same equation A8.

(A14)
$$M = \left[1 - \frac{\widetilde{IW}_{avg,1}}{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}\right] \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,1}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$+ \left[1 - \frac{\widetilde{IW}_{avg,2}}{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}\right] \frac{\sum_t^T \eta(t)\widetilde{IW}_{y,2}(t)}{\sum_t^T \eta(t)\, I_y(t)}$$
$$+ \left[1 - \frac{\widetilde{IB}_{avg}}{\sum_t^T \eta(t)\widetilde{IB}_y(t)}\right] \frac{\sum_t^T \eta(t)\widetilde{IB}_y(t)}{\sum_t^T \eta(t)\, I_y(t)}$$

q.e.d.

Appendix B: Including part-time workers

Figure B.1: Evolution of cross-sectional and six-year inequality including part-time workers

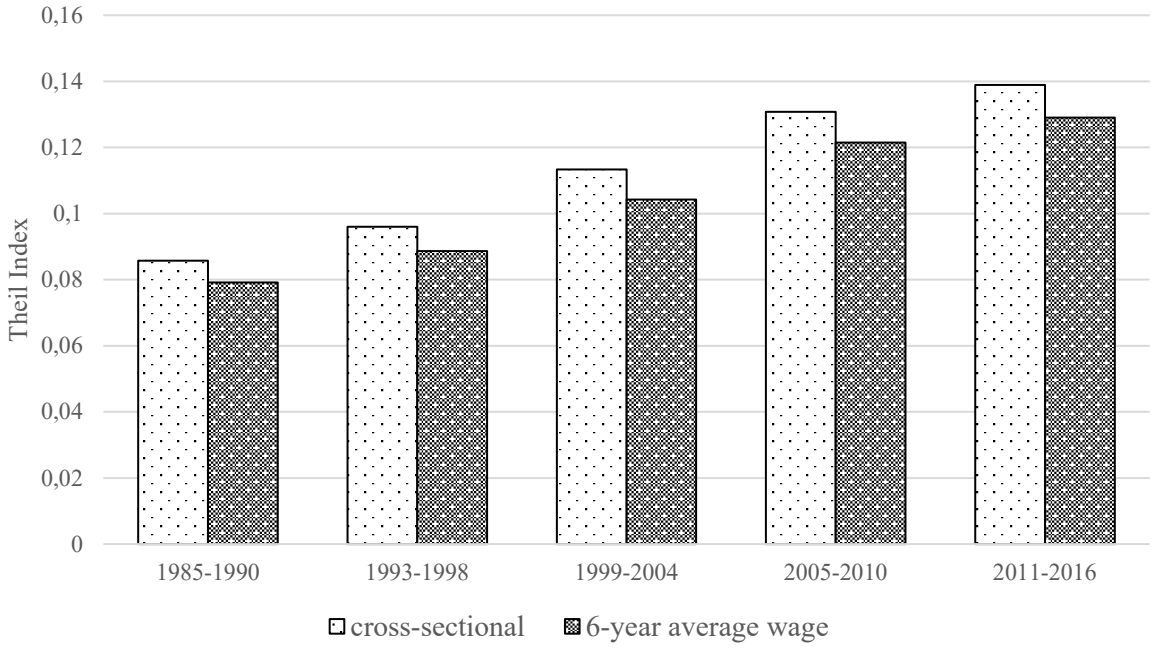
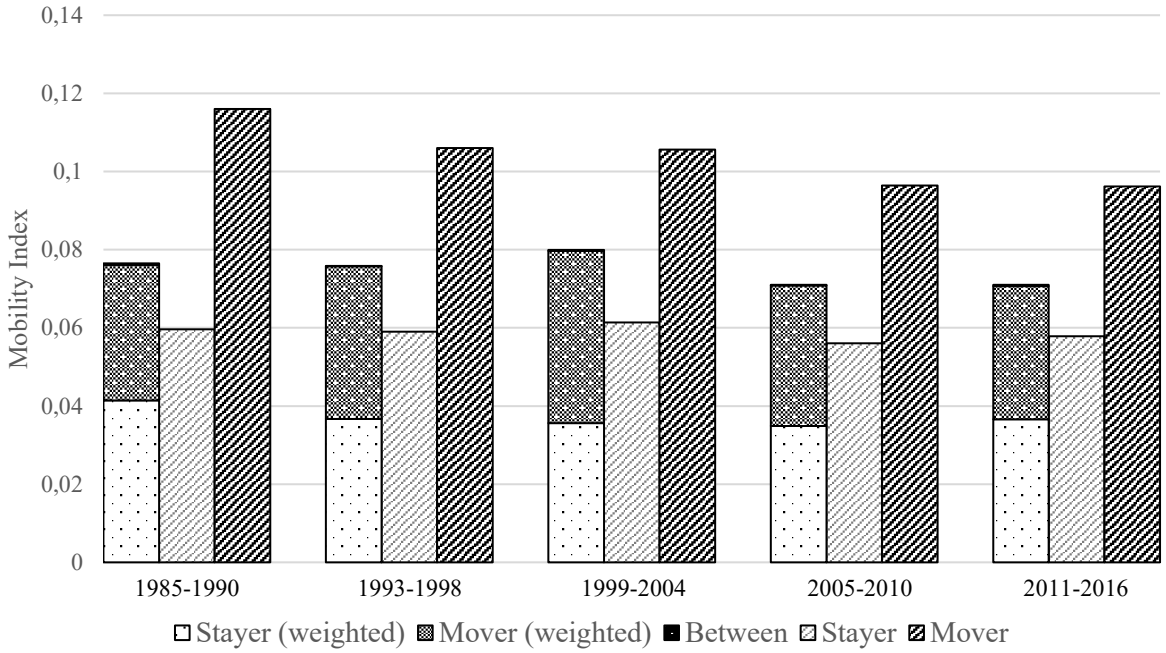


Figure B.2: Evolution of aggregate, mover, and stayer mobility including part-time workers



Appendix C: Exploring changes in within-mover mobility

Figure C.1 Mover mobility decomposed by college education, gender, and age

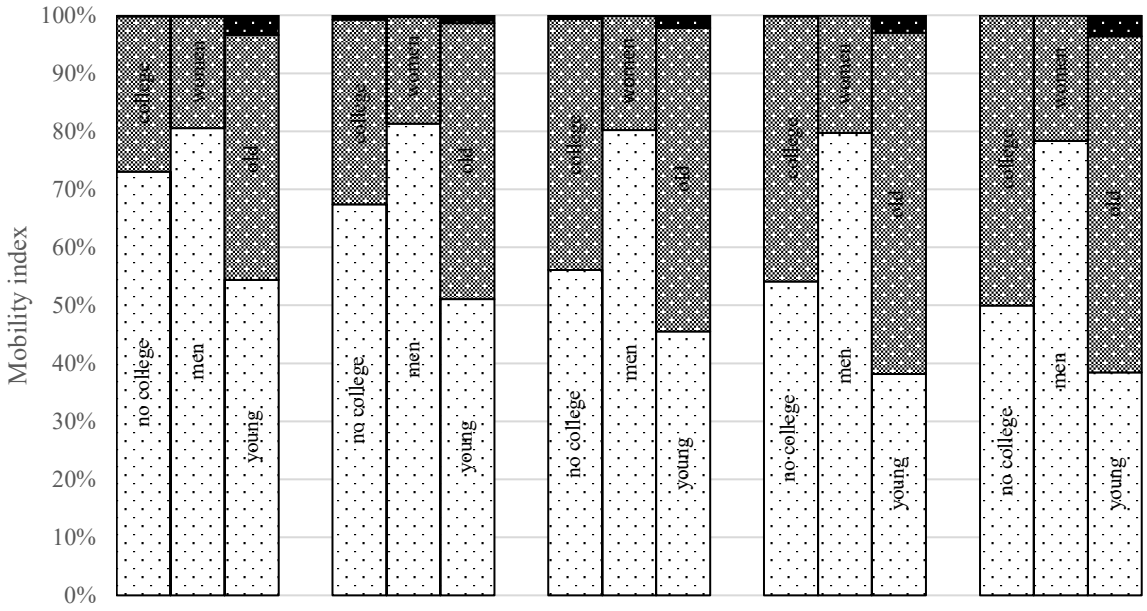
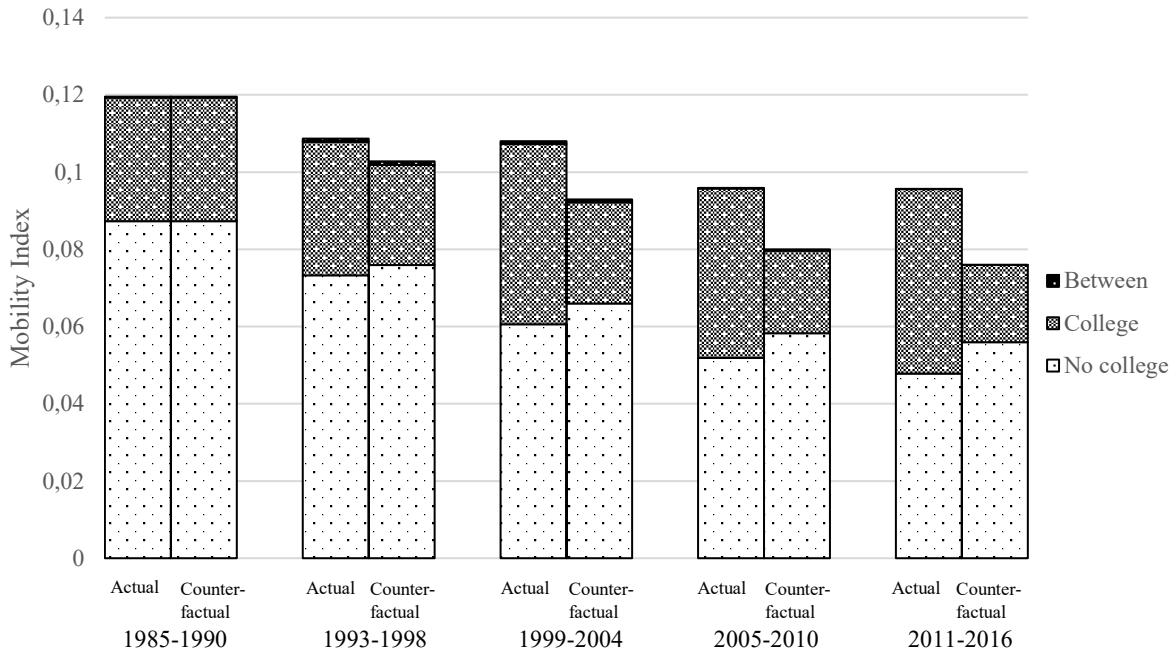


Figure C.2: Counterfactual mover mobility decomposed by college education



Appendix D: Eastern and Western Germany

Figure D.1: Wage inequality (Eastern Germany)

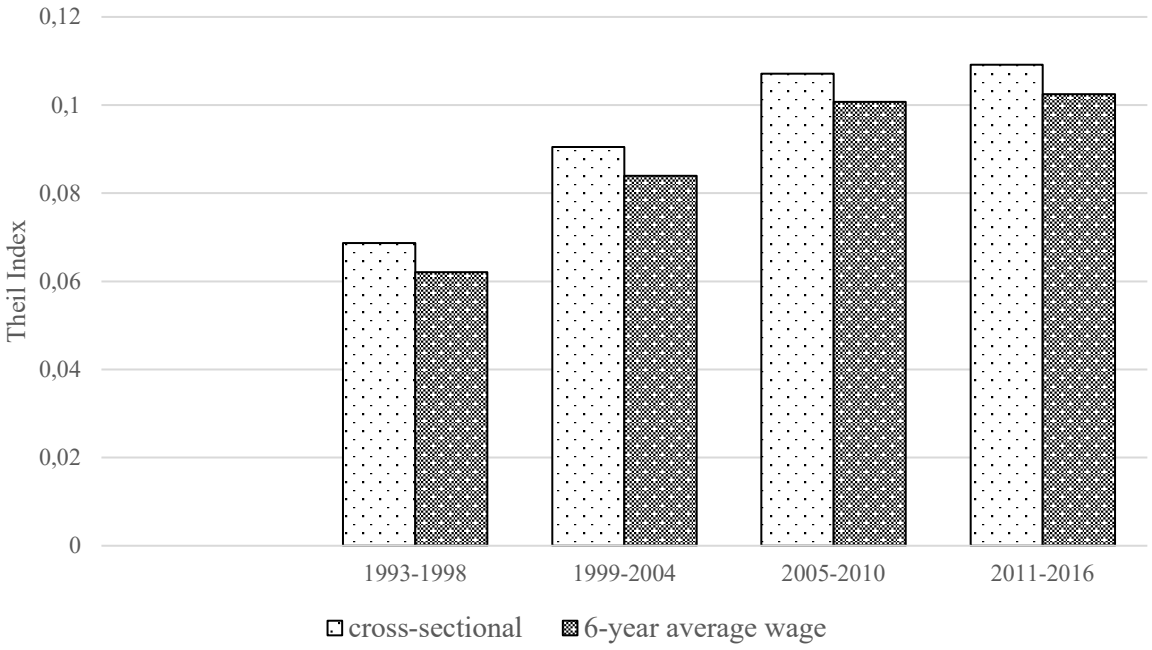


Figure D.2: Wage inequality (Western Germany)

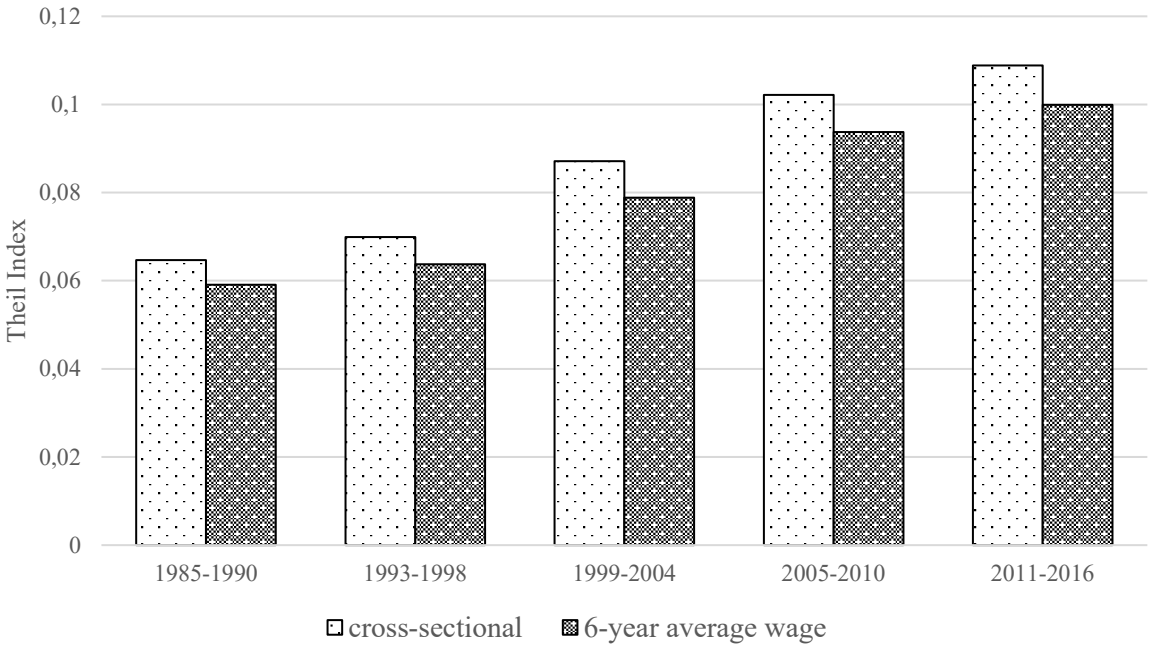


Figure D.3: Wage mobility (Eastern Germany)

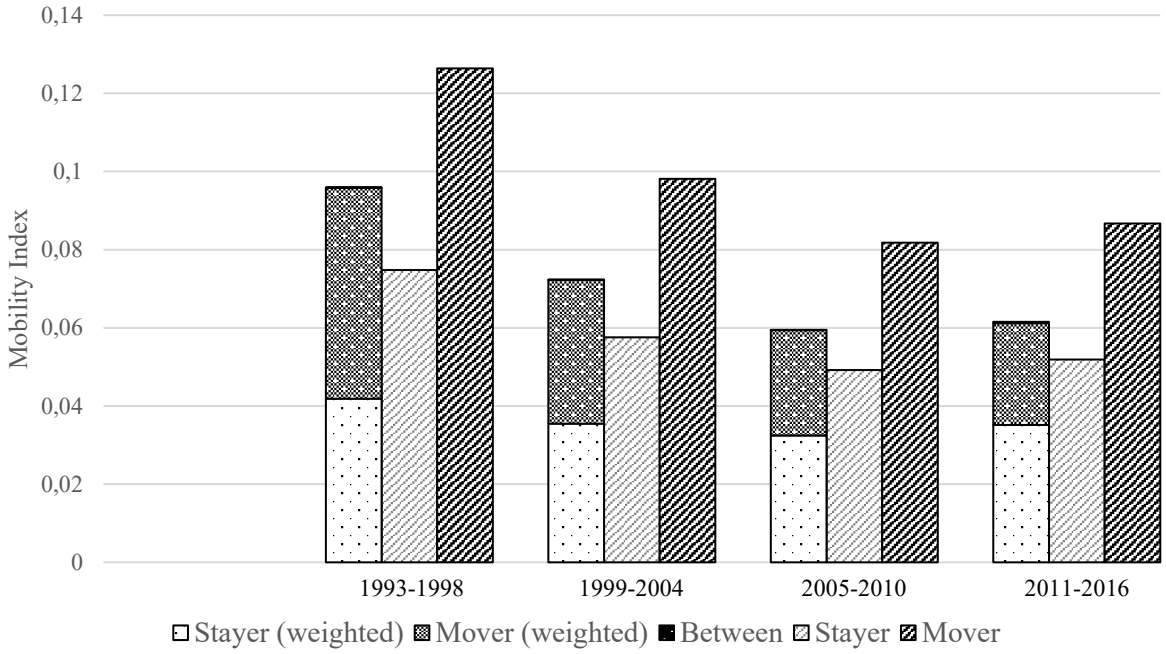


Figure D.4: Wage mobility (Western Germany)

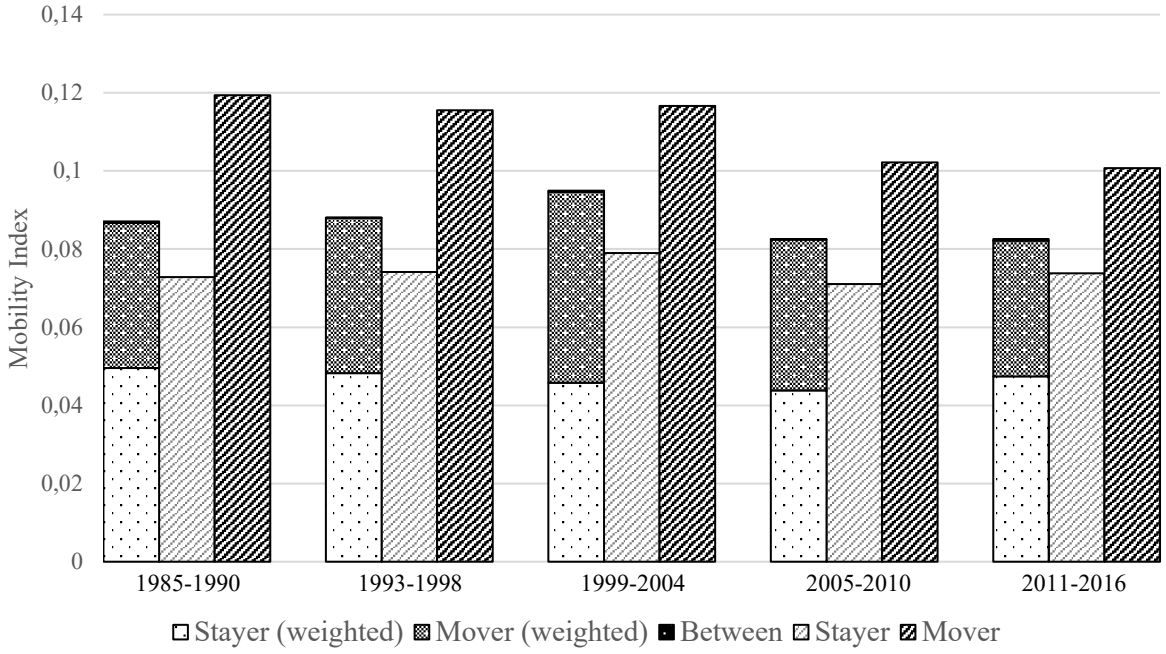


Table D.1: Weighting group mobility (Eastern Germany)

	Panel A – Weighting Group Mobility											
	Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility
Aggregate	0.096	1	0.096	0.072	1	0.072	0.059	1	0.059	0.062	1	0.062
Group components of mobility:												
Stayers	0.075	0.560	0.042	0.058	0.617	0.036	0.049	0.659	0.032	0.052	0.677	0.035
Movers	0.126	0.427	0.054	0.098	0.375	0.037	0.082	0.330	0.027	0.087	0.301	0.026
Between stayers/movers	0.008	0.013	0.000	0.001	0.009	0.000	0.001	0.011	0.000	0.014	0.022	0.000

	Panel B – Components of Mobility Weights $\sigma(k)$											
	Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality
Aggregate	86.1	57500	0.069	91.1	49896	0.091	89.4	46742	0.107	94.1	47056	0.109
Stayers	89.6	30172	0.070	93.9	30774	0.088	92.3	31671	0.101	98.5	31878	0.104
Movers	82.2	27328	0.065	86.5	19122	0.093	83.2	15071	0.118	84.8	15178	0.113
Mobility weight for stayers		0.560			0.617			0.659			0.677	
Mobility weight for movers		0.427			0.375			0.330			0.301	

Notes: SIAB data, full-time workers, 20-60 years old. Panel A: Unweighted group mobility is weighted with mobility weight $\sigma(k)$ to yield group (stayer and mover) contributions to aggregate mobility. Panel B shows components of mobility weight (k) . Weighting and weights $(\sigma(k))$ are described in section 3.

Table D.2: Weighting group mobility (Western Germany)

	Panel A – Weighting Group Mobility														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility
Aggregate	0.087	1	0.087	0.088	1	0.088	0.095	1	0.095	0.083	1	0.083	0.083	1	0.083
Group components of mobility:															
Stayers	0.073	0.680	0.050	0.074	0.650	0.048	0.079	0.580	0.046	0.071	0.617	0.044	0.074	0.643	0.047
Movers	0.119	0.311	0.037	0.116	0.344	0.040	0.117	0.418	0.049	0.102	0.378	0.039	0.101	0.345	0.035
Between stayers/movers	0.051	0.009	0.000	0.011	0.005	0.000	0.194	0.002	0.000	0.027	0.005	0.000	0.030	0.012	0.000

	Panel B – Components of Mobility Weights $\sigma(k)$														
	Period 1(1985-1990)			Period 2 (1993-1998)			Period 3 (1999-2004)			Period 4 (2005-2010)			Period 5 (2011-2016)		
	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality
Aggregate	108.9	219359	0.065	117.3	222931	0.070	123.7	216028	0.087	123.3	213453	0.102	127.6	220453	0.109
Stayers	111.3	154469	0.061	119.6	148854	0.067	125.1	134400	0.080	126.0	142297	0.093	132.2	146787	0.101
Movers	103.4	64890	0.072	112.8	74077	0.075	121.4	81628	0.098	117.8	71156	0.121	118.5	73666	0.121
Mobility weight for stayers		0.680			0.650			0.580			0.617			0.643	
Mobility weight for movers		0.311			0.344			0.418			0.378			0.345	

Notes: SIAB data, full-time workers, 20-60 years old. Panel A: Unweighted group mobility is weighted with mobility weight $\sigma(k)$ to yield group (stayer and mover) contributions to aggregate mobility. Panel B shows components of mobility weight (k) . Weighting and weights $(\sigma(k))$ are described in section 3.

Table D.3: Contribution of mover and stayer wage mobility to aggregate wage mobility in Eastern and Western Germany

	Period 1(1985-1990)		Period 2 (1993-1998)		Period 3 (1999-2004)		Period 4 (2005-2010)		Period 5 (2011-2016)		Change from Period 2 to 5	
	1	2	3	4	5	6	7	8	9	10	11	12
	Mobility component	Share of total	Mobility component	Share of total	Mobility component	Share of total	Mobility component	Share of total	Mobility component	Share of total	Mobility component	Share of total
Panel A – Eastern Germany												
Aggregate			0.096	100	0.072	100	0.059	100	0.062	100	-0.034	100
Stayers			0.042	44	0.036	49	0.032	55	0.035	57	-0.007	19
Movers			0.054	56	0.037	51	0.027	45	0.026	42	-0.028	81
Between stayers/movers			0.000	0	0.000	0	0.000	0	0.000	1	-0.000	0
Panel B – Western Germany												
Aggregate	0.087	100	0.088	100	0.095	100	0.083	100	0.083	100	-0.005	100
Stayers	0.050	57	0.048	55	0.046	48	0.044	53	0.047	57	-0.001	14
Movers	0.037	43	0.040	45	0.049	51	0.039	47	0.035	42	-0.005	91
Between stayers/movers	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	-6

Notes: SIAB data, full-time workers, 20-60 years old.

Appendix E: Robustness check with 3-year periods

Table E.1: Aggregate and within-group wage inequality and mobility for 3-year periods

	Period 1(1985-1987)			Period 2 (1988-1990)			Period 3 (1993-1995)			Period 4 (1996-1998)			Period 5 (1999-2001)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index
Aggregate	0.068	0.065	0.055	0.071	0.067	0.060	0.082	0.077	0.057	0.084	0.080	0.052	0.100	0.094	0.061
Group components of inequality and mobility:															
Within Stayers	0.066	0.063	0.046	0.068	0.064	0.051	0.078	0.075	0.048	0.080	0.077	0.042	0.094	0.090	0.050
Within Movers	0.076	0.068	0.100	0.081	0.073	0.100	0.087	0.079	0.095	0.094	0.086	0.088	0.115	0.105	0.092
Between stayers/movers	0.001	0.001	0.012	0.001	0.001	0.017	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.019
	Period 6(2002-2004)			Period 7 (2005-2007)			Period 8 (2008-2010)			Period 9 (2011-2013)			Period 10 (2014-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index	Yearly Inequ.	3-year average Inequ.	Mobility index
Aggregate	0.104	0.098	0.052	0.114	0.109	0.048	0.121	0.116	0.049	0.122	0.116	0.051	0.119	0.113	0.050
Group components of inequality and mobility:															
Within Stayers	0.098	0.094	0.044	0.106	0.102	0.040	0.113	0.109	0.042	0.116	0.110	0.045	0.114	0.109	0.044
Within Movers	0.124	0.114	0.079	0.142	0.131	0.076	0.147	0.136	0.075	0.139	0.128	0.077	0.132	0.121	0.078
Between stayers/movers	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.001	0.002	0.002	0.009	0.002	0.002	0.007

Notes: SIAB data, full-time workers, 20-60 years old.

Table E.2: Weighting group mobility for 3-year periods

	Panel A – Weighting Group Mobility														
	Period 1(1985-1987)			Period 2 (1988-1990)			Period 3 (1993-1995)			Period 4 (1996-1998)			Period 5 (1999-2001)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility
Aggregate	0.055	1	0.055	0.060	1	0.060	0.057	1	0.057	0.052	1	0.052	0.061	1	0.061
Group components of mobility:															
Stayers	0.046	0.817	0.038	0.051	0.784	0.040	0.048	0.765	0.037	0.042	0.764	0.032	0.050	0.721	0.036
Movers	0.100	0.170	0.017	0.100	0.198	0.020	0.095	0.214	0.020	0.088	0.223	0.020	0.092	0.269	0.025
Between stayers/movers	0.012	0.013	0.000	0.017	0.018	0.000	0.001	0.021	0.000	0.001	0.013	0.000	0.019	0.010	0.000

	Panel B – Components of Mobility Weights $\sigma(k)$														
	Period 1(1985-1987)			Period 2 (1988-1990)			Period 3 (1993-1995)			Period 4 (1996-1998)			Period 5 (1999-2001)		
	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality
Aggregate	101.8	268811	0.068	107.9	283232	0.071	106.3	376165	0.082	107.6	356180	0.084	111.3	356091	0.100
Stayers	103.7	223698	0.066	110.5	228388	0.068	109.7	291673	0.078	110.3	278283	0.080	114.1	265971	0.094
Movers	92.4	45113	0.076	97.1	54844	0.081	94.8	84492	0.087	98.3	77897	0.094	102.9	90120	0.115
Mobility weight for stayers		0.817			0.784			0.765			0.764			0.721	
Mobility weight for movers		0.170			0.198			0.214			0.223			0.269	

Table continues next page

Table E.2: Weighting group mobility for 3-year periods (continued)

	Panel A – Weighting Group Mobility														
	Period 6(2002-2004)			Period 7 (2005-2007)			Period 8 (2008-2010)			Period 9 (2011-2013)			Period 10 (2014-2016)		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility	Mobility	Weight	Weighted mobility
Aggregate	0.052	1	0.052	0.048	1	0.048	0.049	1	0.049	0.051	1	0.051	0.050	1	0.050
Group components of mobility:															
Stayers	0.044	0.763	0.034	0.040	0.761	0.031	0.042	0.764	0.032	0.045	0.777	0.035	0.044	0.786	0.035
Movers	0.079	0.229	0.018	0.076	0.227	0.017	0.075	0.220	0.016	0.077	0.205	0.016	0.078	0.196	0.015
Between stayers/movers	0.001	0.008	0.000	0.002	0.012	0.000	0.001	0.016	0.000	0.009	0.019	0.000	0.007	0.018	0.000

	Panel B – Components of Mobility Weights $\sigma(k)$														
	Period 6(2002-2004)			Period 7 (2005-2007)			Period 8 (2008-2010)			Period 9 (2011-2013)			Period 10 (2014-2016)		
	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality	Avg. wage	# of workers	Inequality
Aggregate	114.0	336626	0.104	112.8	327502	0.114	111.6	333244	0.121	114.4	334575	0.122	119.2	340407	0.119
Stayers	116.4	266528	0.098	115.7	260878	0.106	115.1	264488	0.113	118.3	265437	0.116	123.1	270875	0.114
Movers	104.8	70098	0.124	101.2	66624	0.142	98.2	68756	0.147	99.6	69138	0.139	104.1	69532	0.132
Mobility weight for stayers		0.763			0.761			0.764			0.777			0.786	
Mobility weight for movers		0.229			0.227			0.220			0.205			0.196	

Notes: SIAB data, full-time workers, 20-60 years old.

Appendix F: Robustness checks with unrestricted sample

For our main analysis, we first restrict the sample to only full time workers between the age of 20 and 60 years. Second, we restrict the sample to only workers that can consistently be observed for all 6-years of a period z. In appendix F, we provide additional information on how this second restriction affects our results. If we apply the 6-year restriction to the sample, we refer to it as restricted sample, while we refer to the sample as unrestricted if we consider all 20 to 60 year old full time workers, regardless of whether they can be observed consistently within our 6-year periods.

Figure F.1: Number of workers in the restricted sample as share of the unrestricted sample

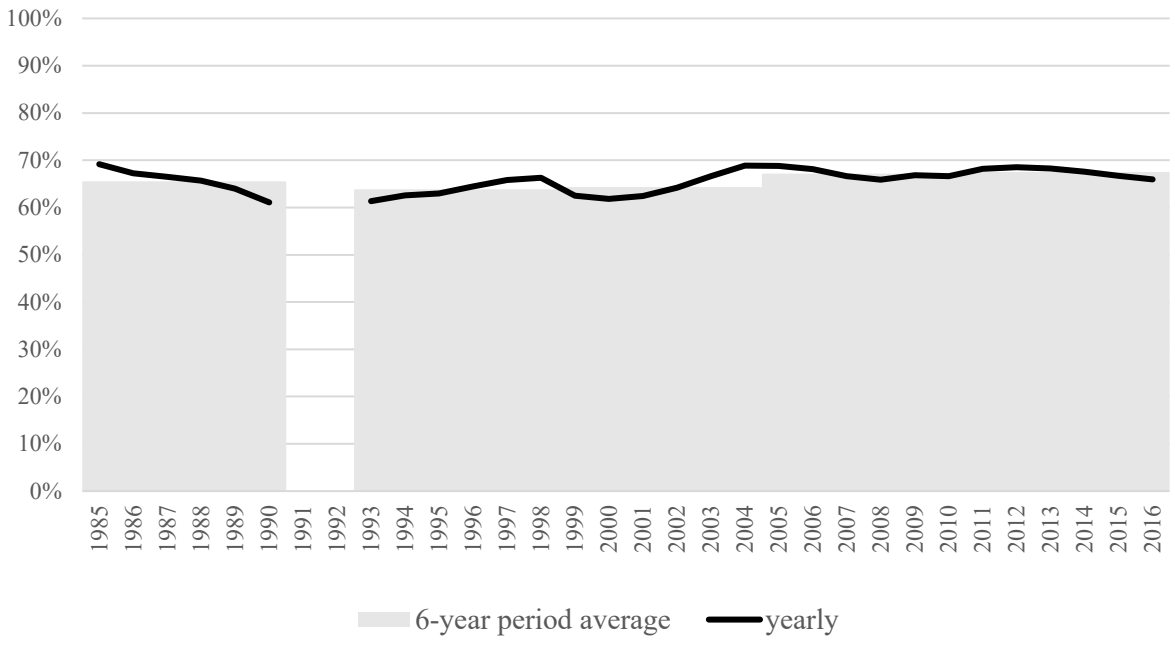


Figure F.2: Wage inequality for different samples

Figure F.3: Share of movers in the restricted and the unrestricted sample

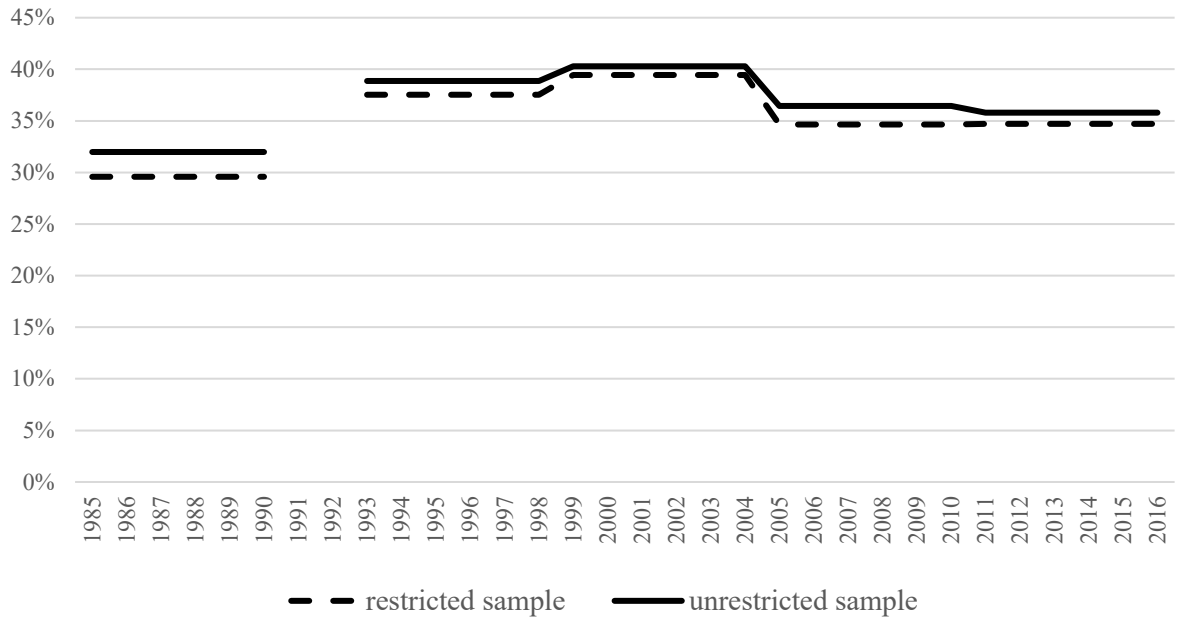


Table F.1: Summary Statistics for the unrestricted sample

	Mean wage (std. dev.)	Mean Firm effect (std. dev.)	Mean person effect (std. dev.)	Assortative matching (corr. coeff.)	Female	College	Worker Age	Workplace Eastern Germany	Employer Change
	1985-1990 (2,008,954 observations: 642,532 mover and 1,366,422 stayer)								
Total	100.5 (41.61)	0.011 (0.166)	0.029 (0.312)	0.094	0.323	0.075	37.35	-	0.095
Mover	93.87 (40.46)	-0.013 (0.174	0.006 (0.289)	0.157	0.313	0.084	33.40	-	0.298
Stayer	103.7 (41.77)	0.022 (0.161)	0.040 (0.322)	0.059	0.329	0.070	39.21	-	-
	1993-1998 (2,693,113 observations: 1,046,885 mover and 1,646,228 stayer)								
Total	102.6 (46.36)	0.009 (0.206)	0.028 (0.319)	0.193	0.341	0.107	38.25	0.227	0.116
Mover	95.86 (44.16)	-0.021 (0.211)	-0.005 (0.291)	0.264	0.306	0.116	35.94	0.291	0.299
Stayer	106.9 (47.21)	0.028 (0.200)	0.049 (0.334)	0.140	0.363	0.100	39.72	0.186	-
	1999-2004 (2,545,383 observations: 1,025,522 mover and 1,519,861 stayer)								
Total	107.0 (54.32)	0.007 (0.231)	0.026 (0.345)	0.230	0.344	0.132	39.08	0.205	0.119
Mover	102.3 (54.64)	-0.017 (0.237)	0.001 (0.324)	0.329	0.311	0.144	36.93	0.219	0.295
Stayer	110.2 (53.87)	0.023 (0.225)	0.043 (0.357)	0.161	0.366	0.123	40.54	0.195	-
	2005-2010 (2,380,492 observations: 867,474 mover and 1,513,018 stayer)								
Total	106.6 (58.03)	0.008 (0.255)	0.031 (0.358)	0.252	0.337	0.155	40.20	0.192	0.107
Mover	98.87 (57.98)	-0.032 (0.264)	-0.009 (0.341)	0.364	0.310	0.168	37.76	0.201	0.294
Stayer	111.0 (57.60)	0.031 (0.246)	0.055 (0.366)	0.177	0.353	0.148	41.59	0.188	-
	2011-2016 (2,432,975 observations: 871,019 mover and 1,561,956 stayer)								
Total	111.2 (61.01)	0.015 (0.214)	0.033 (0.387)	0.320	0.328	0.197	40.91	0.186	0.104
Mover	101.7 (58.32)	-0.019 (0.218)	-0.014 (0.370)	0.395	0.304	0.206	38.03	0.193	0.291
Stayer	116.4 (61.84)	0.033 (0.209)	0.060 (0.393)	0.268	0.341	0.191	42.51	0.182	-

Notes: SIAB data, full-time workers, 20-60 years old, not restricted to workers observed over at least one complete 6-year period as described in the text. The last column captures the share of observations belonging to individuals who change jobs per six-year period.

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