// NO.21-066 | 09/2021

# DISCUSSION PAPER

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## The Evolution of Educational Wage Differentials for Women and Men, from 1996 to 2019

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# The Evolution of Educational Wage Differentials for Women and Men, from 1996 to 2019

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August 28, 2021

*Abstract*

This paper studies the evolution of three higher education wage differentials from 1996 to 2019 in Germany, a period when significant changes in the educational composition of the workforce took place. Based on regression analysis and samples of male and female workers from the Socio-Economic Panel Study, the study finds that while all three educational wage differentials increased, workers graduating from universities experienced an inverted u-shape pattern, reaching a plateau between 2011 and 2015. We argue that the decline which began after 2015, and which is detectable as well in the occupational prestige scores, may have resulted from a relative educational upskilling of the workforce as well as changes in the subject-choice composition of graduates. We also document differences between East and West Germany that appear to level off over time. The paper concludes with open questions related to these findings and potential future developments.

*Keywords (JEL)*: Educational Wage Differentials (J31), Gender Gaps (J16); Higher Education Expansion (I23), Occupational Prestige (J62), Participation (E24).

*Acknowledgment*: This paper resulted from a research cooperation between the two authors. We would like to thank Michael Gebel, Sarah McNamara, Matthias Parey, Stephan Thomsen, and Thomas Zwick for a significant number of insightful and very helpful comments, which changed the organization of the paper. All remaining errors are our own.

## *1. Introduction*

The expansion of university education has received attention from policymakers and scientists (Araki, 2020; Goldin and Katz, 2008; Horowitz, 2018; among others). An increase in the relative supply of highly educated individuals may, presumably with some lag, lead to increased competition among university graduates and put pressure on relative wages. Yet, the increase in highly educated individuals may also be beneficial for innovation and trade, boosting investment into new capital-intensive automation technologies like artificial intelligence. In such a scenario, highly educated individuals may experience an even larger skill premium (and vice versa for low-skilled individuals). Whether relative wages of high-skilled individuals increased or decreased during the recent expansion of university education in Germany is the empirical question studied in this paper.

The literature often investigates two educational categories, college graduates and others, and the resulting wage differential, referred to as the college wage or skill premium. According to Goldin and Katz (2008), the college wage premium in the United States increased from 0.4 log points in 1980 to 0.68 in 2005 (and began in 1915, Chapter 8, Figure 8.3); the increase is explained by a technology-driven increase in the demand for college graduates. This holds especially true for non-routine tasks (Lindley and Machin, 2016). However, recent evidence suggests a stagnating college wage premium in the US between 2010 and 2015 (Valletta, 2018). Based on data for seven European countries, Green and Henseke (2021) find that, on average, the skill premium declined (moderately) between 2005 and 2015, but not in Germany. Rather, Reinhold and Thomsen (2017) find that the skill premium in Germany for the cohort of young university graduates (compared to middle and low skilled employees) increased until 2010. In comparison, for France the relative wages of better-educated workers decreased between 1969 and 2008 (Verdugo, 2014).

The current study contributes to this literature in a novel way by looking at the evolution of three higher educational (gross) wage differentials between 1996 and 2019 in Germany, with analyses conducted separately for women and men. Using samples from the Socio-Economic Panel Study (SOEP, see Goebel et al., 2019), we examine descriptive differences, and the partial coefficients for tertiary education degrees from a multivariate regression. The latter are termed educational wage differentials. The analysis builds on four specific and well-defined educational degree categories in Germany (Authoring Group NRoE, 2018): Degrees from academic universities (referred to as universities, U, in what follows), degrees from universities of applied sciences (UAS), the master-craftsman certificate (MC), and degree obtained via the dual vocational apprenticeship system (named vocational education and training, VET). MC is the highest tertiary degree outside of the university system in Germany. The three higher education degrees vary in content and length of study, as explained in section 2. We also consider the subject, or major, studied while in university education, to highlight recent changes in the student composition of these majors.

The period from 1996 to 2019 in Germany is particularly interesting when studying the evolution of educational wage differentials. University graduation increased dynamically, especially among young women, and there was a notable change in the subject-choice composition of graduates towards arts and social sciences. Throughout the observation period, older, less-educated workers retired, among them more males than females, and more women entered the workforce compared to previous generations. These developments fostered a dynamic change in the educational and gender composition of the workforce, documented in this paper based on samples taken from the SOEP. Although wages often display some inertia over time (Franz and Pfeiffer, 2005, 2006), these changes should have been powerful enough to exert an influence on wage differentials.

We find that educational wage differentials increased despite the expansion of higher education and increased workforce participation rates, but in specific evolutionary patterns for each of the educational degrees. While all three educational wage differentials increased, workers graduating from universities experienced an inverted u-shape pattern, reaching a plateau between 2011 and 2015 (similar to the US, see Valletta, 2018). We argue that the observed decline beginning after 2015, which is also detectable in the occupational prestige scores, may have resulted from the educational upskilling of the workforce and changes in the subject-choice composition of graduates. During the expansion, relatively more students graduated in arts and social sciences, subjects for which educational wage differentials are lower than for economics, engineering, law, medicine, or natural sciences, confirming studies by Francesconi and Parey (2018), Klein (2016) or Kopecny and Hillmert (2021).

The paper furthermore highlights differences in the evolution of the educational wage differentials between East and West Germany, which seem to evaporate at the end of the observation period. Our findings are in line with related studies on the returns to education and wage inequality in Germany. When educational wage differentials increase, wage inequality may also increase as well as returns to education. Gebel and Pfeiffer (2007) report evidence on increasing returns to education in West Germany from 1996 to 2006, and wage inequality increased after 1995 (Card et al., 2013; Gernandt and Pfeiffer; 2007), until around 2010 (Fitzenberger and Seidlitz, 2020).

The article proceeds as follows. The next section highlights the expansion of higher education in Germany and the prominent role of women in this expansion. Section 3 summarizes our data and the research design. Section 4 provides new empirical findings on the evolution of employment participation, working hours, real wages, as well as educational wage differences. Section 5 presents the estimated wage differentials. Section 6 discusses related to university expansion that may have contributed to this evolution. Section 7 critically discusses the findings and presents some further evidence on the evolution of the occupational prestige score, whereas section 8 concludes.

## 2. Educational Categories and University Expansion

### 2.1 Educational Categories Used in the Study

The German education system has traditionally been highly stratified and clearly separated between occupational and academic pillars. There are two types of academic educational institutions available, referred to as universities and universities of applied sciences. These vary in their academic orientation and the subjects offered. Universities of applied sciences focus on a practically relevant set of qualifications predominantly in economics (as a rule business economics), social work, and engineering. They often have strong ties to the local economy. Universities are broader and more academic in their portfolio, and offer subjects that encompass the entire spectrum from the arts, economics (including business economics), social and natural sciences, and sports to law and medicine (including veterinary). Despite some structural similarities, the former East German higher education system differed in content and entry qualification to the West German one (for more details see Kerbel, 2016 or Lambrecht, 2007). For example, higher educational degrees included courses with vocational contents, and entry into university education often required a vocational degree.

In Germany, matriculation at one of the two university types requires an entrance qualification, which in turn requires successful completion of graduation from upper secondary schooling (typically after 12 or 13 years of overall schooling).[1] Nowadays, both offer two degrees, which have gradually replaced traditional degrees such as the Diplom: A bachelor's degree requires an investment of at least three years, and a master's degree at least two additional years. Due to data restrictions, we are not to distinguish between these three degrees in this study. In addition to choosing the type of

[1] Higher education has gradually opened to individuals with vocational training and work experience or an MC certificate who do not otherwise possess a higher education entry qualification. The overall share of these students remains below four percent of all students, and less than two percent of all alumni (Brändle and Ordemann, 2020). We do not investigate the pathways into higher education or this subpopulation. According to Ordemann (2019) they have slightly lower labour market returns then the other alumni.

degree and higher education institution, students can also choose between a wealth of different subjects. There are more than 17,000 different courses available for study (see Authoring Group NRoE, 2018). While it will not be possible to analyze such a variety, we will group and examine seven majors in section 6 below.

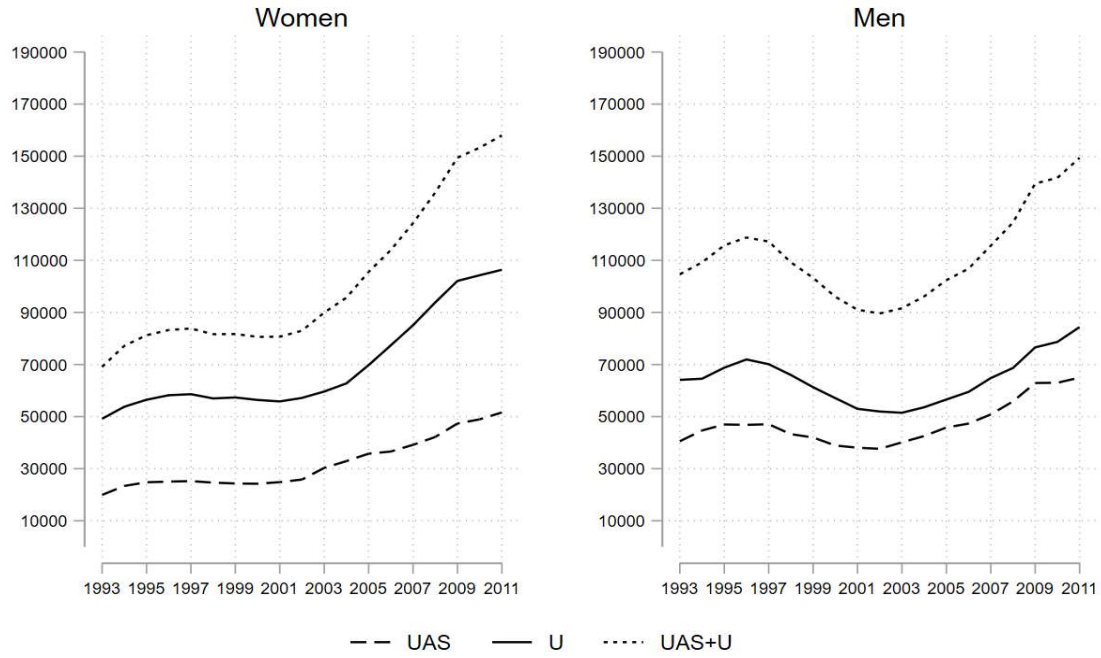
In Germany, there also exists a third avenue to achieving a tertiary educational qualification, the MC certificate, which is part of the dual vocational apprenticeship system, the main qualification system outside the two academic institutions. It is specific to a craft (such as a hairstylist or mechatronic technician) and less academic in its learning contents. It enables certificate holders to open their own firms in the respective craft. Furthermore, industrial firms are obliged to employ workers with an MC certificate for supervising specific production processes, such as car manufacturing. To attain an MC certificate, it is necessary to have already acquired a qualification via VET, which typically lasts three to four years. The acquisition of the MC certificate then lasts an additional two to three years. We add civil servant education and education at vocational academies to the MC category, both of which require successful graduation from upper secondary schooling and take, as a rule, three years to acquire.

### *2.2 The Expansion of University Graduation after 2001*

Germany recently experienced a significant expansion in university education. The educational expansion in the decades after World War II mainly resulted from an expansion of the upper secondary school system and VET (Schofer and Meyer, 2005; Teichler, 2008; Windolf, 1997). This historical expansion of the upper-secondary education system, together with the subsequent economic performance, also laid the foundation for the recent university expansion. For instance, according to Dauth et al. (2021), continued automation in Germany positively affected incumbent high-skilled workers, decreased the demand for workers with vocational education, and increased the incentives for young adults to enter university instead of vocational education.

To illustrate this expansion, we gathered data for the period 1993 to 2011. Table A2 (Appendix) shows the numbers of first qualifying degrees, such as a Bachelor's degree or a Diploma from U and UAS, for women and men for the selected years. Between 2001 and 2011, the number of graduates finishing with a first degree from both types of higher education increased from 171.7 to 307.3 thousand, an increase of 79 percent. Even more striking is the larger increase that took place in absolute terms, and in the relative share of female graduates (Figure 1).

**Figure 1:** First Degrees in Higher Education 1993–2011 (Women/Men; in Thousands)




Source: DZHW ICE 2020 (Federal Statistical Office, Main Reports), own calculations.

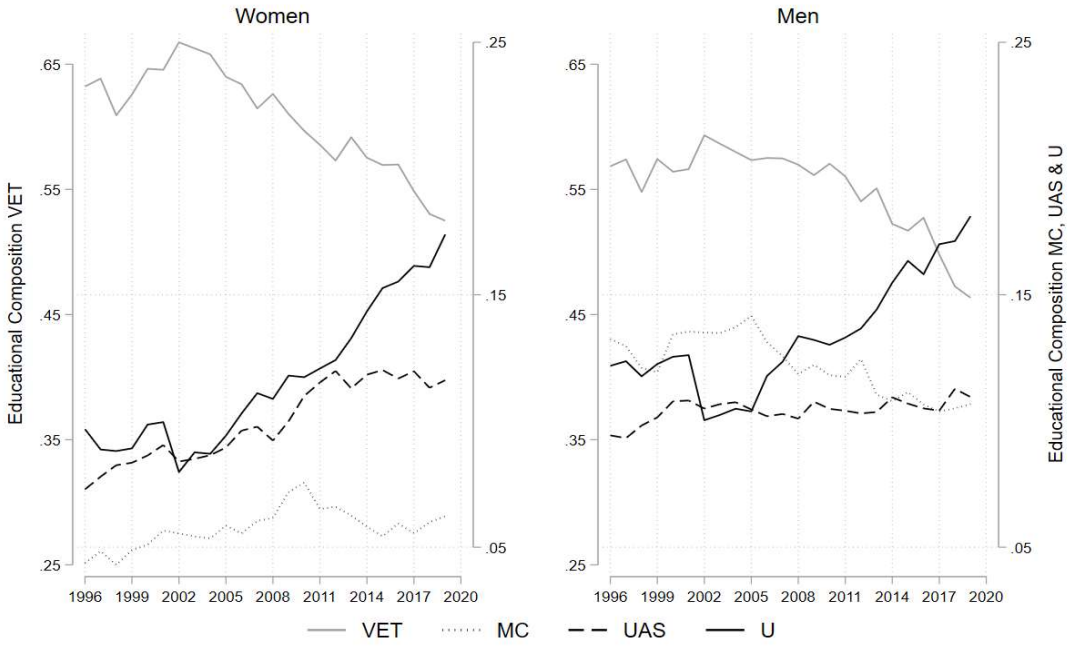
The number of U degrees held by women increased by 116.3 percent, compared to 31.7 percent for men. The number of UAS degrees held by women increased by 159.3 percent, compared to 60.2 percent for men. In 2011, 51.4 percent of graduates from both institutions were women, compared to 39.8 percent in 1993. In 2011, approximately four years after the first people graduated with a Bachelor's degree, 106.4 thousand women and 84.4 thousand men received a first U degree. Among men, a

reduction in graduates occurred between 1996 and 2003 followed by a significant increase afterward. The next section shows that there was no comparable expansion in MC certificates.

### *2.3 The Evolution of the Educational Composition in the Population*

The expansion of university education has changed the composition of the German population (see also Authoring Group NRoE, 2018). Figure 2 illustrates the evolution of the educational composition in the population aged 30 to 55, separately for women and men. Note that the scales used for VET (left side) and the three higher educational degrees (right side) differ in Figure 2 (Table A2 in the Appendix documents numbers for selected years).

**Figure 2:** The Educational Composition in the Population Aged 30–55 (Women/Men; in %)




Note: The shares of the four educational categories do not add to 100 percent because the fifth category, no degree, is not visible in the figure.

Source: SOEP v36, own calculations, weighted.

In the 24 years considered here, highly educated young people steadily entered the observed age group whereas older and less educated people left it. As a result, the share of individuals with a U

(UAS) degree increased from 11.0 (8.4) percent in 1996 to 17.8 (11.3) percent in 2019. The share of individuals with a VET degree decreased by 10.7 percentage points, from 60.0 percent in 1996 to 49.3 percent in 2019. There is also some change in the group of higher educated individuals with an MC certificate. The share of women with this certificate increased from 4.4 to 6.2 percent, whereas the share of men decreased by 2.5 percentage points, from 13.2 to 10.7 percent in 2019. Upskilling among women is an important driver of the change in the educational composition. The share of women with a U degree increased by 7.7 percentage points from 1996 to 2019, whereas the share of men increased, from a higher initial level, by 5.9 percentage points. The share of women (men) with UAS degrees increased by 4.3 (1.5) percentage points. Over the same period, the share of women (men) with a VET degree decreased by 10.7 (10.5) percentage points.

Summing up the findings, in 2019 approximately 29.0 percent of both women and men in the 30 to 55 age-bracket held either a UAS or a U degree, compared to 17.0 percent for women and 21.6 percent for men, in 1996. There are two main differences when looking at East Germany separately (results are available upon request). First, the share of VET was significantly higher in East Germany at the beginning of the observation period, and the share of workers with no degree was very low (2 percent). Second, the share of UAS among women was significantly higher in East Germany, whereas the share of MC was lower in 1996. Over our observation window, both these shares converged to West German levels.

## *3 Research Questions and Design*

### *3.1 On the Emergence and Evolution of Educational Wage Differentials*

Economic reasoning suggests that young adults invest in higher education, comparing costs and returns over the life cycle and considering their occupational preferences (see Backes-Gellner et al., 2021; Flossmann and Pohlmeier, 2006; or Pfeiffer and Stichnoth, 2015). Wage differentials emerge in order to compensate for these investments (and for other reasons, such as amenities, skills, effort,

risk, or social interactions, see Anger and Heineck, 2010; Gebel and Heineck, 2019; Krueger and Schkade, 2008; Pfeiffer and Franz, 2006; among others). In a thought experiment where wage (or prestige) differentials were zero, the incentives for educational investments would be low or absent. The higher the educational wage differentials are, the higher the returns to education will be, as well as the incentives to invest. Educational wage differentials signal investment opportunities and differential costs to acquire specific degrees.

Since average wages and educational wage differentials are the results of a number of economy-wide and individual-specific factors, the identification of specific factors strong enough to change their trajectory is challenging. The part of the wage attributed to the level of education is dependent on the competencies that are actually attained in formal educational institutions, and self-selection of individuals into these institutions often depends on the individual's socio-economic background (Becker and Hecken, 2008; Hillmert and Jacob, 2003; Müller and Pollak, 2007). Educational degrees aggregate factors that are subject to individual actions, such as the willingness and capacity to invest in one's education and the skills attained. The overall amount of educational investment in society, or the wage levels for a given competence profile, are driven by factors that the investing individual as a rule cannot control. Thus, educational wage differentials depend on the amount and quality of educational investments and on competencies, which are not certified or are hard to certify, and on factors, which determine the overall supply of and demand for competencies in the economy.

### *3.2 The Empirical Approach to Assess Educational Wage Differentials*

In the empirical section, we apply wage regression models with the highest educational qualification for each year from 1996 to 2019. We use the natural logarithm (ln) of (gross) wages and control for education, age, family, migration status, and East and West Germany; Table A1 in the Appendix contains descriptive statistics of the variables and Table A8 from the estimation samples. The estimated

partial coefficients of the educational categories from this approach are termed educational wage differentials. The main investigation includes employees and the self-employed. Although the wage determining processes may differ between the two groups, economic reasoning suggests that they nevertheless are related. While the self-employed have to generate their wages from residual profits, employees receive a fixed wage bargained ex ante (see, e.g., Pfeiffer and Pohlmeier, 1992). If a risk-adjusted wage in self-employment differs from an employee's wage, workers can become employees and vice versa. In this sense, their wages are related and the study includes employees and the self-employed. For robustness reasons, we also compute the estimates for the sample of employees only.

The investigation starts in 1996 for two reasons. The first reason is that, according to Gebel and Pfeiffer (2010), 1996 was the year in which returns to education reached their minimum value in the period 1984 to 2006 in West Germany. The period of strong educational expansion after World War II exerted downward pressure on wages for skilled workers, and returns to education were (moderately) decreasing from 1984 onward. However, after 1996 returns to education started to increase once again. The second reason is that German reunification in 1990 influenced the German wage structure, especially during the years immediately following reunification (see Gernandt and Pfeiffer, 2007; 2009; among others). Thus by 1996, six years after reunification, a relevant part of the specific impact of reunification on the educational wage differentials already should have already taken place. Nevertheless, we also performed the analysis separately for East and West Germany. Arguably, the content of the educational degrees may have differed at the beginning of the observation period from those common in (West) Germany, and this may have influenced the evolution of educational wage differentials.

We concentrate on prime-age workers in the age group 30 to 55. In this age group, as a rule, individuals are members of the workforce. Thus, potential estimation biases associated with the endogeneity of labour market entries and exits in young adulthood and retirement should be lower. We do the

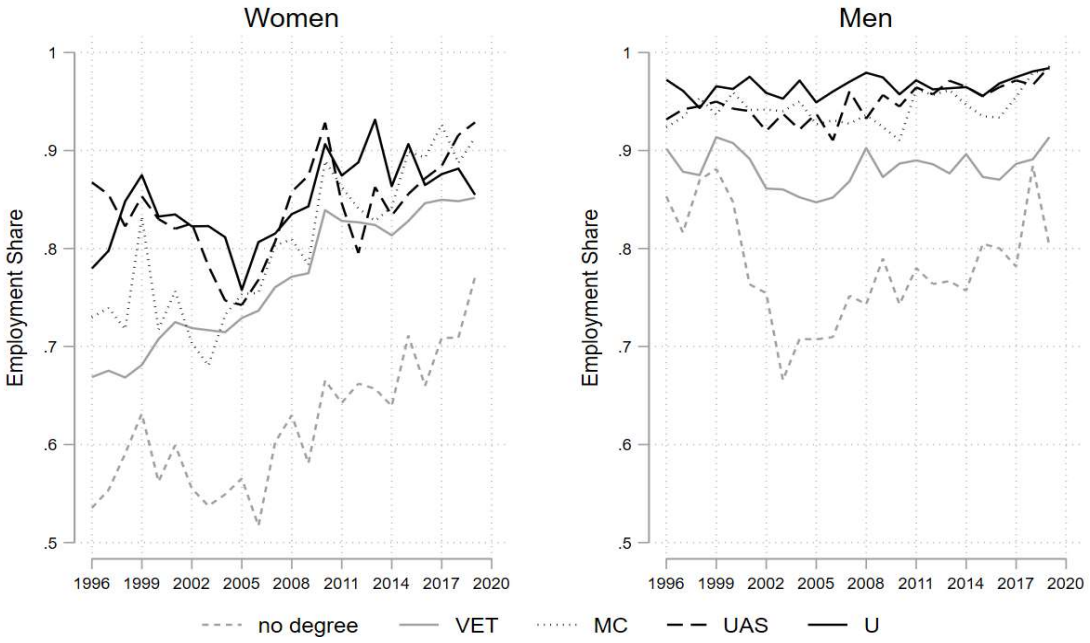
analysis in separate samples for women and men, and separately for younger (30–39) and older workers (40–55). For robustness checks, we also document findings based on samples of employees for the age group 25 to 65 and perform median regressions to assess limits of the OLS estimates.

## *4 Participation Rates, Working Hours, and Educational Wage Differences 1996–2019*

### *4.1 Increasing Participation Rates, Decreasing Working Hours*

We start with an analysis of employment participation and working hours. In our SOEP samples of the population aged 30 to 55, the share of working women increased from 67.6 percent in 1996 to 85.5 percent in 2019 and from 91.2 to 92.6 percent among men. More investment in education increases the opportunity cost of not working. Therefore, individuals with a higher educational degree tend to show higher participation rates compared to VET (see Figure 3).

**Figure 3:** Participation Rates by Education in the Population Aged 30–55 (Women/Men; in %)

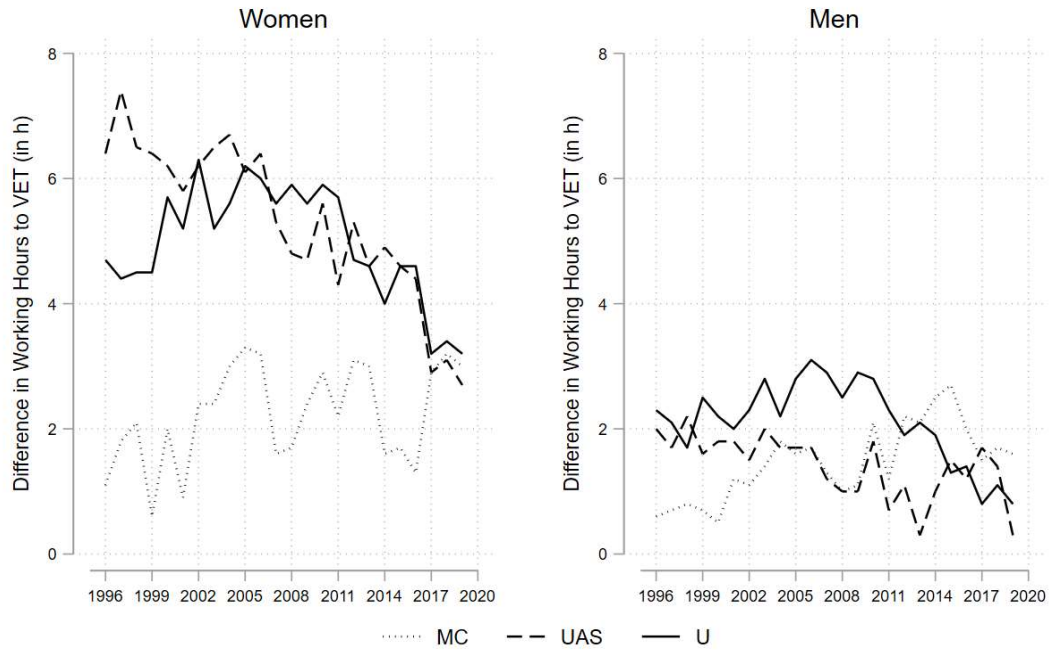



Source: SOEP v36, own calculations, weighted.

However, the employment participation rates also increased for women with a VET degree and for women with no degree. While the participation rates of women increased, men still display higher

participation rates. Participation rates among men exceeded the ones for women by 7.1 percentage points in 2019 (23.6 in 1996). With higher investment into education, not only participation rates tend to increase, but also the hours worked. Higher educated people, on average, earn higher wages. Thus, if wages stay the same when hours of work increase, working more hours is a way to improve the returns to educational investments. Women with a VET degree worked, on average, 31.3 hours per week in 2019 compared to 41.9 hours for men with the same degree. Women with a higher educational degree worked 34.0 to 34.5 hours, on average, while men worked between 42.2 and 43.5 hours (see Table A4, Appendix). Figure 4 shows the differences in hours worked by workers with a tertiary qualification compared to VET.

**Figure 4:** Difference in Weekly Working Hours Compared to VET (Women/Men)




Note: Derived from samples of working individuals age 30–55 with all information available. Women (men) without a degree worked on average 2.8 (1.9) hours less than women (men) with VET.

Source: SOEP v36, own calculations.

In 2019, women (men) with higher educational degrees worked roughly three hours (one hour) more compared to women with a VET degree. In 1996, women with a U degree worked roughly seven

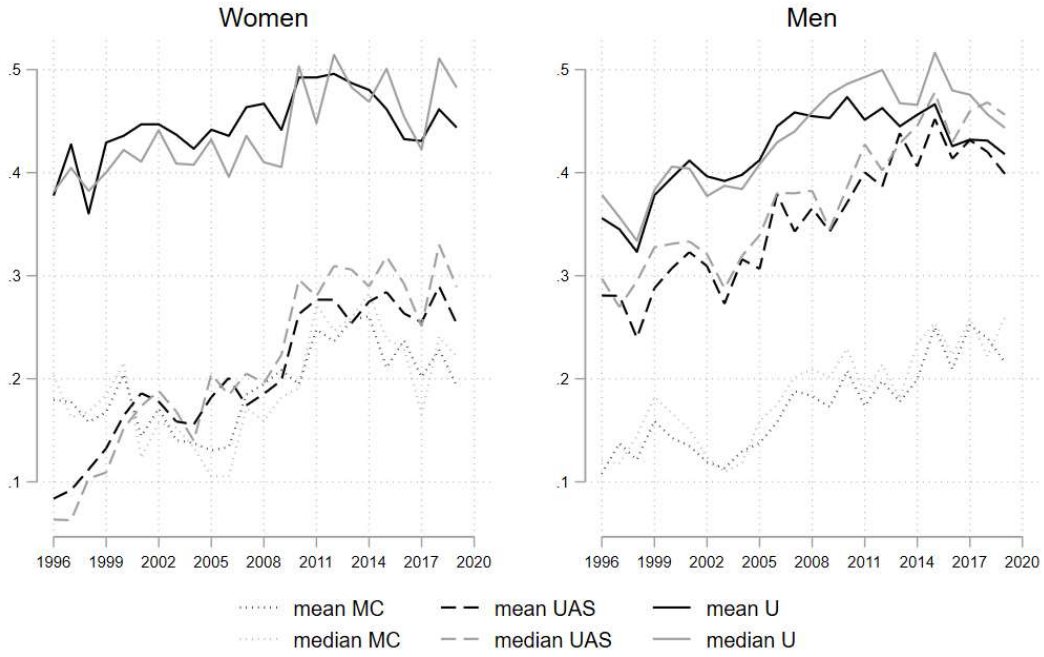
hours more compared to women with a VET degree. The corresponding difference was two hours for men. A possible reason for the decline in this hours-worked gap among working women is the increase in participation rates. More women participated, and the differences in hours between women and men narrowed. Despite the expansion in higher education, the average hours worked in the samples of workers aged 30 to 55 decreased by 2.3 hours (from 39.4 hours in 1996 to 37.1 hours in 2019). The overall decrease in working hours may have resulted from an income effect and/or the result of collective bargaining processes to save employment. According to Bick et al. (2019), working hours and wages display an inverted u-shape pattern, such that wages decline when working hours per week exceed specific benchmarks such as the average working hours. This may have restricted the expansion of working hours in times of increasing wage differentials and even cause working hours to decline.

### *4.2 The Evolution of Educational Wage Differences*

Next, we look at wage differences for women and men over time. Figure 5 shows the average educational ln (gross) wage differences (black lines), together with the median (light grey lines), of the three highest educational degrees relative to VET (for average real wages, see Table A5 in the Appendix). The educational wage differences display some degree-specific patterns over time. The upward trend confirms the increase in the wage differences for the three categories of higher education compared to the VET degree and is in line with an increase in wage inequality. The wage differences for U graduates are higher for women compared to men, although the numbers narrow toward the end of the observation period. For UAS, the differences among women are lower, compared to the ones among men. The three educational wage differences among women increase until 2012 but have since stagnated (UAS), or even declined after 2015 (MC, U). Among men, the average wage differences increased steadily for MC (after 2005). For workers graduating from U and UAS, these differences increased until 2012 and declined from 2015 onward. Average wage differences for U and

UAS converged from 2015 onward. For women holding a UAS degree, wage differences increased strongly, although starting below the wage differences of MC at the beginning of the observation period. The mean and median wage differences develop similarly across most of the period studied here. However, more recently the median wage differences for graduates from U and UAS seem to exceed the mean wage differences to a certain extent.

**Figure 5:** Mean and Median Wage Differences by Education 1996–2019 (Women/Men; in ln)




Note: Difference in the natural logarithm of real wages compared to VET; Sample of employed individuals aged 30–55 with all relevant information available. The average (over the period) mean (median) differences of no degree to VET for men are -.09 (0.08) and for women -.15 (0.20).

Source: SOEP v36, own calculations.

Table A6 in the Appendix displays the annualized growth rates of real average wages for women and men, for educational groups, and separately for younger and older workers. We use a two-year average of real wages to reduce stochastic influences on the wages calculated from the samples taken from the SOEP waves. In the years under investigation, real wages in the estimation samples doubled. On average, they grew annually by 3.12 percent among women and 2.98 percent among men, which shows significant growth and is the result of the stable performance of the German economy

and the labour market (see Burda and Seele, 2017, 2020; Dustmann et al., 2014). The wage growth rates vary between the educational categories, although relatively moderate with the exception of workers with a degree from UAS, who experienced higher growth rates (especially women, at 3.78, and to a lesser extent men, at 3.20), and workers with no degree, whose growth rates were rather low (2.43 for women, 2.48 for men). Women with an MC certificate experienced below average growth rates (3.05), men above (3.30). Both women and men with a U degree also experienced below average growth rates. Despite the significant decrease in the share of workers with a VET, wages also grew less compared to the average. The average growth rates vary between the age groups. They are, on average, higher for the samples of younger women compared to the samples of older women, which reflects the process of upskilling among young women in particular. Among men, younger workers experienced moderately lower wage growth.

## *5 The Evolution of Educational Wage Differentials 1996 to 2019*

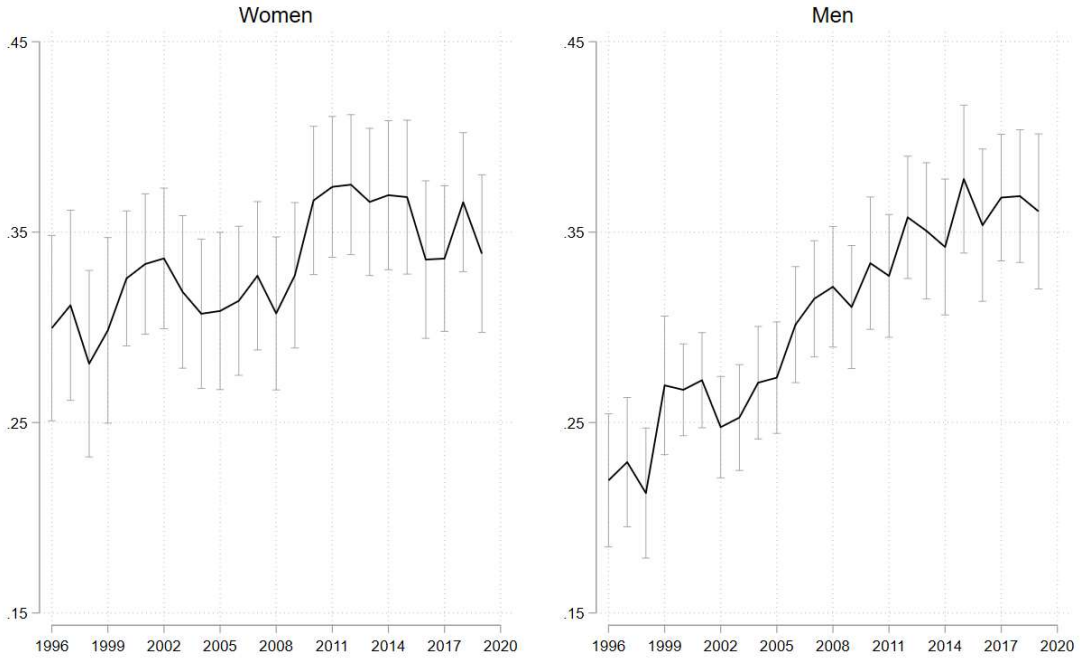
### *5.1 The Tertiary Education Premium*

The analysis of educational wage differentials starts with the tertiary wage premium, where tertiary education consists of the three higher educational degrees. Figure 6 highlights the estimated higher education wage premium in Germany relative to VET (for the number of observations and the adjusted $R^2$, see Table A7 in the Appendix). The higher education wage premium increased significantly, although differently for women and men. The premium for men increased steadily from 0.22 log points in 1996 to 0.36 log points in 2019. A more considerable increase occurred between 1996 and 2011, followed by a more moderate increase afterwards.

In the sample of women, the increase of the skill premium is also visible, although it started at higher levels, around 0.3 log points in 1996, and growth has slowed since 2011. At the end of the observation period, the estimated tertiary wage premiums of women and men are rather similar in magnitude (and less than half the size of the college wage premium in the US in 2005 (Goldin and Katz, 2008,

see also Antonczyk et al., 2018, for a more general comparison on wage inequality between the US and Germany). The confidence intervals indicate the relative variation of MC, UAS, and U degrees. We follow up on these differentials in the next section.

**Figure 6:** Estimated Tertiary Wage Premium 1996 to 2019 (Women/Men; in ln)



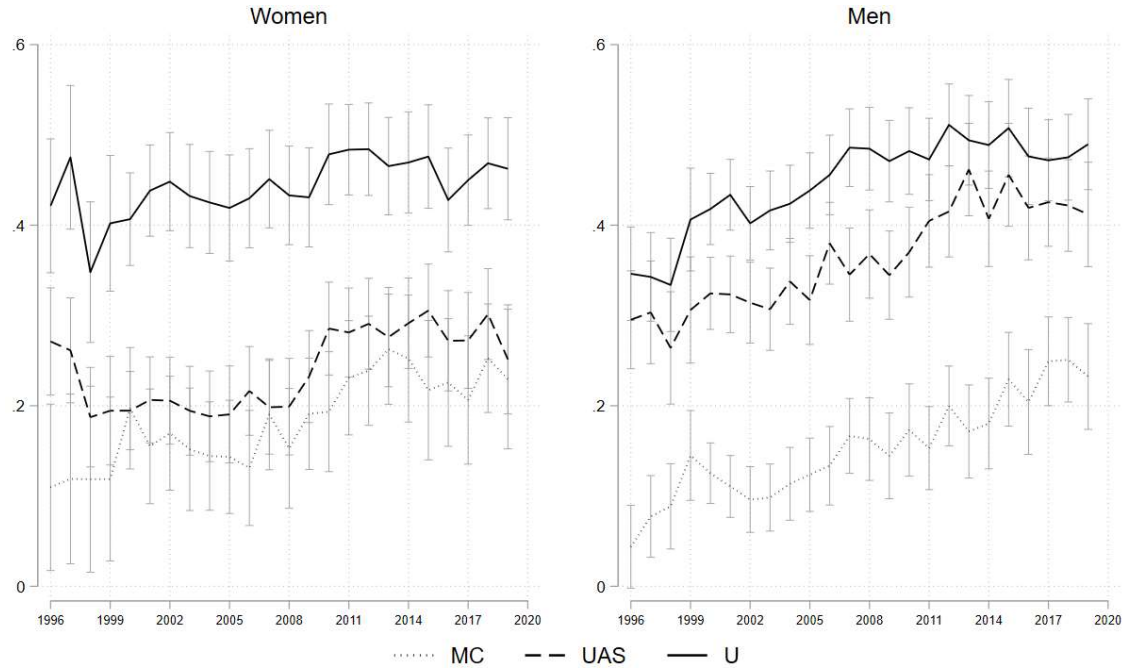

Note: Wage premium for MC, UAS, and U compared to VET. Working individuals aged 30–55; OLS estimates with ln real wages, 95%-confidence interval based on robust errors. The educational category, "no degree", is included in the estimations but not displayed in the figure. Table A8 documents the estimates. Source: SOEP v36, own calculations.

### *5.2 Three Higher Educational Wage Differentials*

The evolution of the estimated three higher educational wage differentials for U and UAS degrees as well as for MC (the reference category is VET) from 1996 to 2019 is shown in Figure 7 (for the number of observations and the adjusted $R^2$, see Table A7 in the Appendix). The estimates show some similarities to the evolutionary pattern of average wage differentials observed in Figure 5, particularly toward the end of the observation period, although relevant differences remain. The estimated wage differentials are higher than the mean wage differences, especially for women with UAS

degrees. For master-craftsmen, OLS estimates are lower, and for master craftswomen, higher, compared to the mean wage differences.

**Figure 7:** Estimated Educational Wage Differentials 1996 to 2019 (Women/Men; in ln)




Note: Workers aged 30–55; OLS estimates with ln real wages (educational reference category vocational degree), 95 %-confidence interval based on robust errors. Individuals without any degree earn significantly less (on average, 19.6 percent (11.8) per year for women (men) without a clear time trend) compared to individuals with a VET degree. For detailed estimation results, see Table A9 in the Appendix.

Source: SOEP v36, own calculations.

The findings indicate some notable differences between the three categories of higher education and between women and men. While a moderate decrease or stagnation among women occurred in the three categories of higher education starting around 2015, this is only the case among men graduating from U and UAS. The figures instead show a steady increase for MC throughout the observation period for men and a steady increase for UAS until 2015, followed by stagnation and a (moderate) decrease. The U differentials indicate a visible inverted u-shaped pattern, reaching their plateau from 2011 to 2015. The estimated wage differentials for men between U and UAS narrow after 2015. The wage differentials for women with a U degree were higher (in comparison to those for men) until

2012, when they start to decline and appear to converge. A very similar pattern is visible for the educational wage differentials of MC, which are relatively high at the beginning of the observation period and narrow slowly over time. For workers with a UAS degree, the estimated wage differentials are higher for men compared to women. The wage differential over time between UAS and MC is relatively stable and lower for women compared to men.

The narrowing of the gender gap in the estimated educational wage differentials for the group of workers with a U degree may have several causes (on the gender pay gap see the recent summary by Blau and Kahn, 2017). One cause, presumably, is the rapid expansion of university education among women after 2000. This expansion should have been the consequence of the relatively high and rising U wage premium women experienced relative to VET. Given the increasing number of highly educated women, however, it was no longer necessary to increase monetary incentives for the participation of women compared to men. Such an explanation assumes that women and men with a U degree compete in comparable economic segments and are substitutes at this aggregate level. There is some evidence to support this idea from Francesconi and Parey (2018), who find that there is no gender wage gap at the beginning of the career. A second cause may result from a change in the composition of subject-choice. During the expansion process, relatively more women and men graduated in arts and social sciences, where wage differentials are on average lower compared to disciplines such as law, medicine, economics, or engineering (see Section 6.2).

We performed additional estimations with two other samples to check whether the basic findings are restricted to the specific samples of workers aged 30 to 55. First, the age interval now includes workers aged 25 to 65 (see Figure A1, Table A10). The evolutionary patterns do not differ much from the more restrictive previous sample. Thus, the main qualitative findings remain unchanged, although the confidence intervals are larger, as is expected due to higher turnover in and out of the workforce

among the youngest and oldest groups. In a second analysis, only employees are included in the sample of 30- to 55-year-old, thus excluding the self-employed workers (see Figure A2, Table A11 in the Appendix). Again, the main patterns are very similar to the ones in Figure 7, and the qualitative conclusions seem to remain.

### *5.3 East-West Differences and Age-Related Heterogeneities*

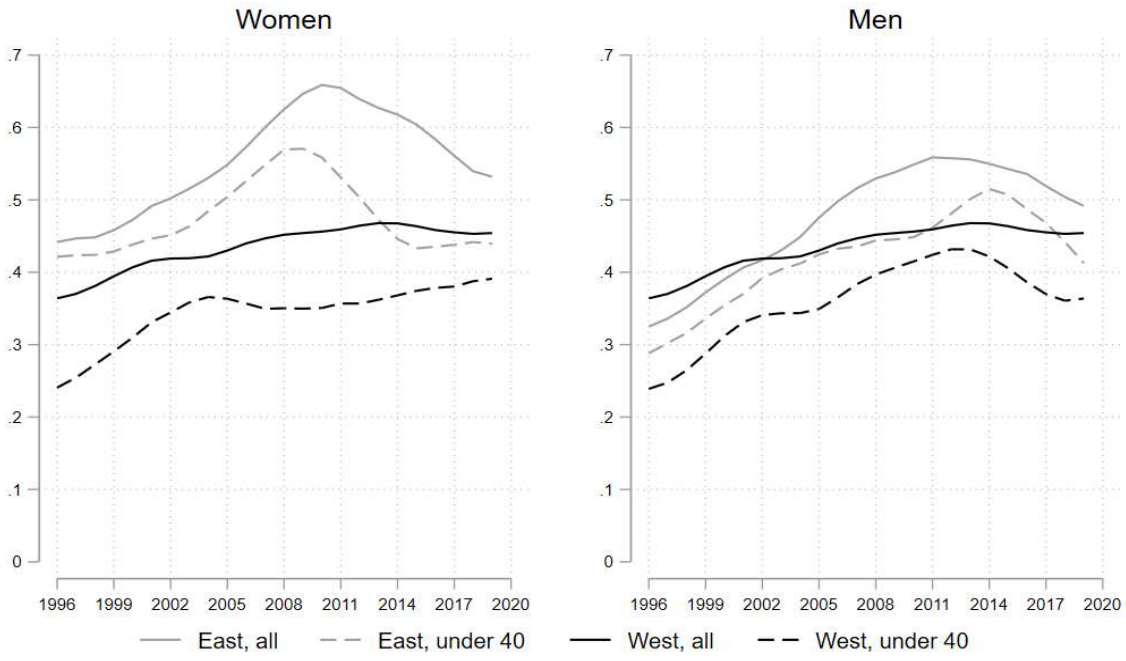
This section examines the educational wage differentials separately for East and West Germany (for estimation results, see Tables A12a, b and A13a, b in the Appendix). Educational wage differentials may diverge between East and West German workers, particularly between different age groups, for several reasons. First, wages between East and German workers did not converge instantaneously after reunification (see Gernandt and Pfeiffer, 2009, among others). Second, the educational composition differed in the two German regions at the time of the reunification. In East Germany, the share of workers with a VET degree was higher in 1996. Third, the learning contents in the educational categories may have also been different, especially before reunification. These reasons changed over time and should be less relevant toward the end of the observation period.

The section also takes a closer look at the group of younger workers (aged 30 to 39) compared to older workers (aged 40 to 55). The younger age group is relevant for our purpose because it is, as a rule, a period of significant wage dynamics during the life cycle. In addition, the expansion of university education may initially have the most direct relevance for the group of younger workers before it starts to spill over to all age groups. In a period of 24 years, the educational composition of the individuals who belong to the age groups in each year will change. Individuals who are 30 years old in 1996 will no longer be present in the samples in 2006. Thus, educational differences in the group of younger workers between East and West Germany may lose their relevance faster over time compared to the group of older workers. The change in the educational composition of the workforce may also have affected older workers aged 40 to 55. Older workers with lower education retire, and

younger, better-educated workers enter employment. Workers aged 40 to 55 have more professional experience, and more of them are, as a rule, in management positions. Therefore, younger and older workers may play specific roles in this process of change. *A priori*, however, it remains an open question whether the empirical wage differentials of younger and older workers are differentially affected.

The estimated educational wage differentials shown in Figure 7 exhibit, to some degree, erratic patterns from year to year. Although there is no explicit theory arguing that educational wage differentials should not display such a pattern, it is nevertheless likely that part of this pattern is the result of the various samples and sample sizes retrieved. For instance, the number of observations in the estimation samples changes every year (it varied in our samples from 3,681 to 7,990). This, arguably, should be even more prominent in the regional and age-restricted samples. To get rid of randomness to some degree for our subsequent analysis, we use smoothed figures produced from the estimates and present our findings separately for all three higher education categories. Figure 8.1 illustrates the wage differentials for U graduates compared to VET, separately for men and women.

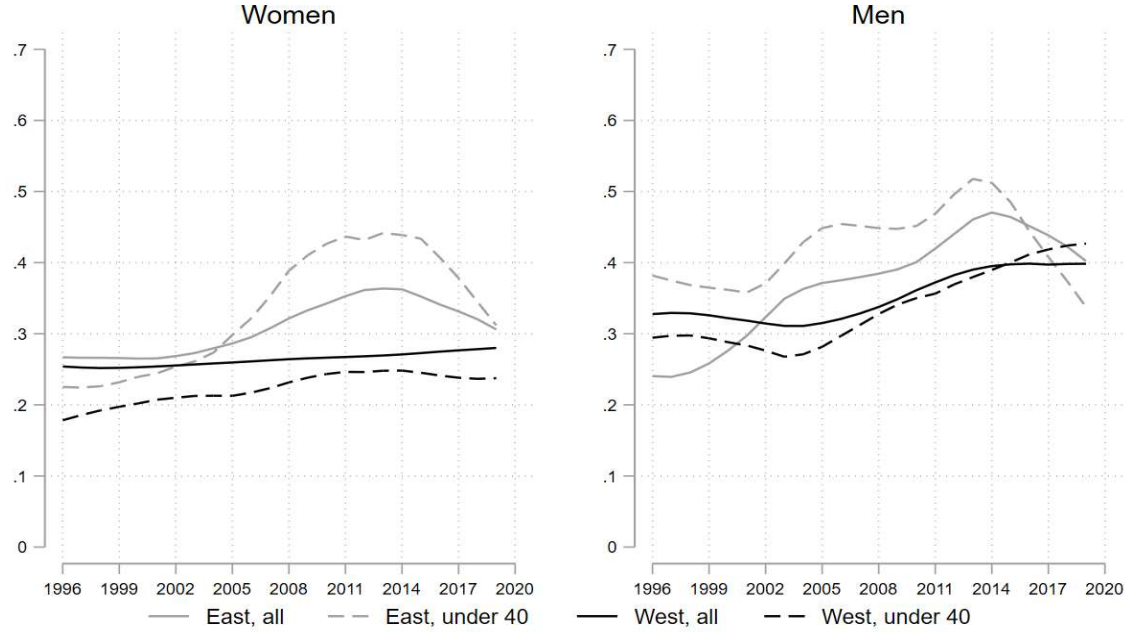
**Figure 8.1:** Estimated Smoothed Wage Differentials, U/VET, 1996 to 2019 (Women/Men; in ln)




Source: SOEP v36; own calculations.

There are four lines in each of the two figures, showing the (smoothed) evolution of this wage differential for East and West German workers aged 30 to 55 (solid line) and East and West German workers aged 30 to 39 (dashed line). The inverted u-shape pattern in the evolution of wage differentials is stronger for workers in East Germany relative to West Germany. In addition, the maximum wage differential occurred three to four years earlier. Furthermore, the estimated wage differentials are lower in the samples of young workers (same pattern, but grey lines). While these distinctions are more prominent among East German workers in the first decade, they seem to fade away at the end of the observation period. Young women in West Germany have not experienced a decrease in their estimated wage differential thus far, unlike young men in both regions of Germany. Figure 8.2 shows the (smoothed) wage differentials for UAS graduates compared to VET.

**Figure 8.2:** Estimated Smoothed Wage Differentials, UAS/VET 1996 to 2019 (Women/Men; in ln)

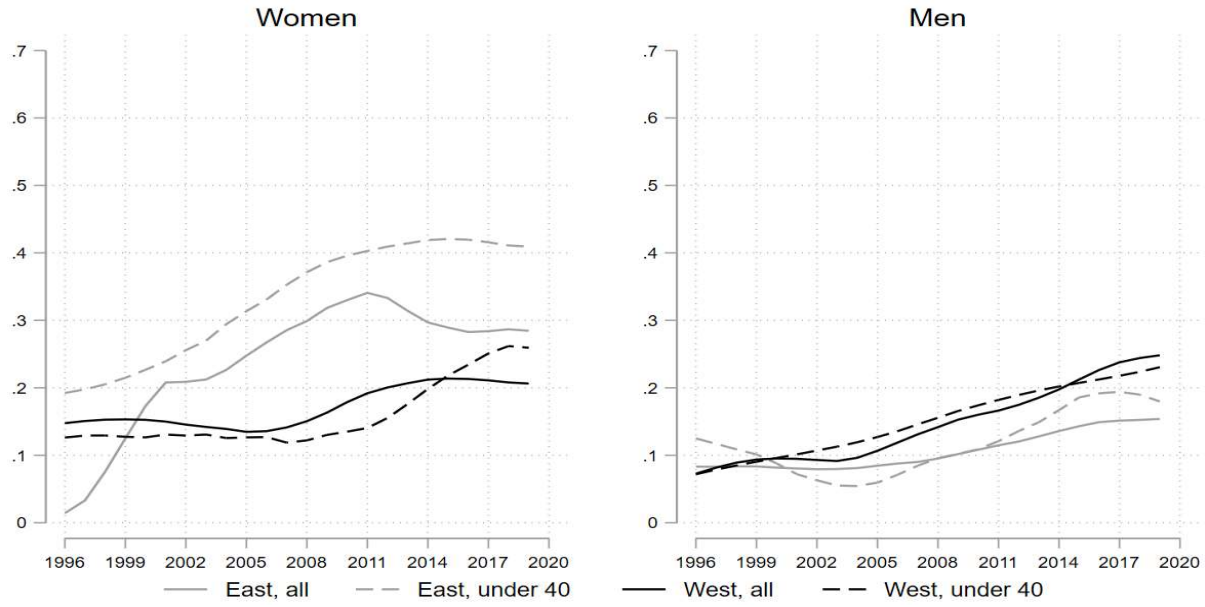



Source: SOEP v36; own calculations.

Compared to the previous graph, we find a stratification of the wage differentials for U graduates compared to VET. The wage differentials in the sample of East German workers exceed the ones for the West German workers most of the observation period. However, since the inversed u-shaped

pattern in East Germany reaches a maximum around 2010, the estimates are converging because the decrease of wage differentials in the samples of West German workers started later (around 2015) and is not so strong. Younger men with this degree experienced similar wage differentials from 2008 onward, with even higher wage differentials until 2015. Figure 8.3 displays the findings for MC graduates compared to VET.

**Figure 8.3:** Estimated Smoothed Wage Differentials, MC/VET, 1996 to 2019 (Women/Men; in ln)




Source: SOEP v36, own calculations.

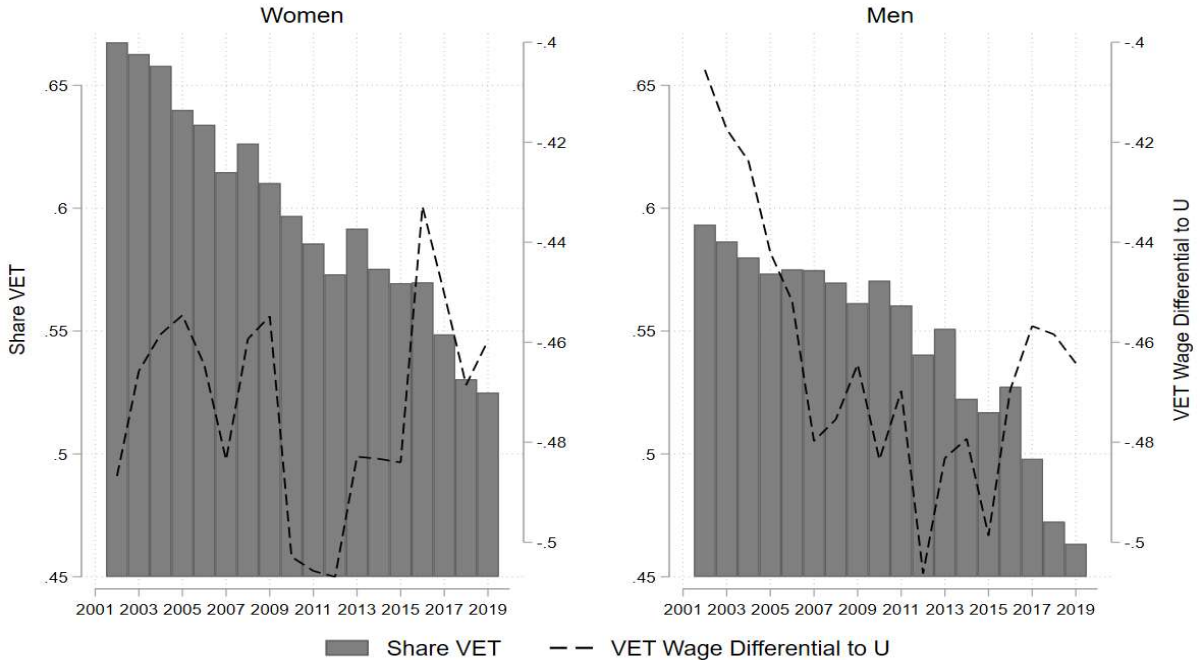
Their wage differentials are below the ones for U and UAS graduates. The findings for men are similar between East and West Germany, although the differentials are higher for West German workers. The wage differentials steadily increase after 2005, and there is not much distinction for younger male MC. Wage differentials for women exceed the ones for men in West Germany in the first half of the observation period. However, after 2015 these wage differentials are rather similar in magnitude. Finally, the figure indicates high wage differentials for the samples of East German women, which may result from the relatively low availability of female workers from this educational category. After 2011, these differentials start to decrease, albeit slowly.

## *6 The Educational Composition of the Population and Subjects in Higher Education*

### *6.1 The Educational Composition of the Population*

The relative shares of educational degrees in the population of people aged 30 to 55 changed significantly during the observation period. For illustrative purposes, we focus on the share of VET, which significantly decreased from 2002 to 2019, as presented in Figure 2 above. Nevertheless, despite this steady decrease men with VET experienced a significant decline in their relative wages. Figure 9 shows a u-shaped pattern of the wage differential between VET and U.

**Figure 9:** The share of workers with VET and the estimated wage differential relative to U Women/Men; in %/ln)




Source: SOEP v36, own calculations.

The wage differential was -.40 in 1996, and -.46 in 2019. Women also experienced a u-shaped pattern, although their relative wages compared to U are similar at the beginning and the end of the 24-year period. The findings hint at an indirect wage effect of the decreasing share of less-skilled labour. Digitalisation and steadily declining prices for computers (see Gregory et al., forthcoming; Körner, 2021, among others) may have allowed highly educated workers to take on part of the workload of

less-educated colleagues who retired. Thus, their wage advantage increased relative to the remaining workers with VET. However, as more university-educated individuals entered the workforce, this advantage seems to be slowly fading away again.

### *6.2 Heterogeneous Returns and Changes in the Composition of Subjects Studied*

Returns to university education are heterogeneous and vary between subjects. Subjects differ in their content, their prestige, and their expected wages. There is evidence that the effort students need to be successful in a given program of study, measured by average hours of study per week, differs between the subjects. While students in Germany report an average of 35 study hours per week, medicine students report 46 hours, whereas students in the social sciences report 30 hours (Middendorff et al., 2013). Together with individual emotional costs, the average costs invested in acquiring a degree seem to vary significantly between subjects; costs, which may depend on socio-economic background (see Becker et al., 2009; Reimer and Pollak, 2010).

**Table 1:** Share of First Degrees in Study Mayors from UAS and U 1993 and 2011 (in %)

| **Type** | **UAS** | | | | **U** | | | |
|---|---|---|---|---|---|---|---|---|
| **Sex** | **Women** | | **Men** | | **Women** | | **Men** | |
| **Year** | **1993** | **2011** | **1993** | **2011** | **1993** | **2011** | **1993** | **2011** |
| Arts | --- | --- | --- | --- | 20.7 | 26.5 | 7.6 | 11.7 |
| Law | --- | --- | --- | --- | 7.6 | 4.4 | 7.5 | 4.6 |
| Economics | 40.9 | 41.5 | 25.3 | 27.6 | 11.3 | 11.0 | 15.1 | 15.9 |
| Social Sciences | 21.5 | 24.5 | 4.1 | 5.5 | 15.3 | 21.8 | 5.9 | 12.5 |
| Medicine | --- | --- | --- | --- | 12.0 | 6.6 | 11.9 | 5.2 |
| Natural Sciences | --- | --- | --- | --- | 15.9 | 15.5 | 16.8 | 18.6 |
| Engineering | 20.5 | 19.1 | 64.1 | 58.6 | 6.4 | 6.1 | 28.4 | 27.0 |

Note: The numbers in columns do not add to 100% because not all mayors have been included; teachers are included in the group of social sciences.

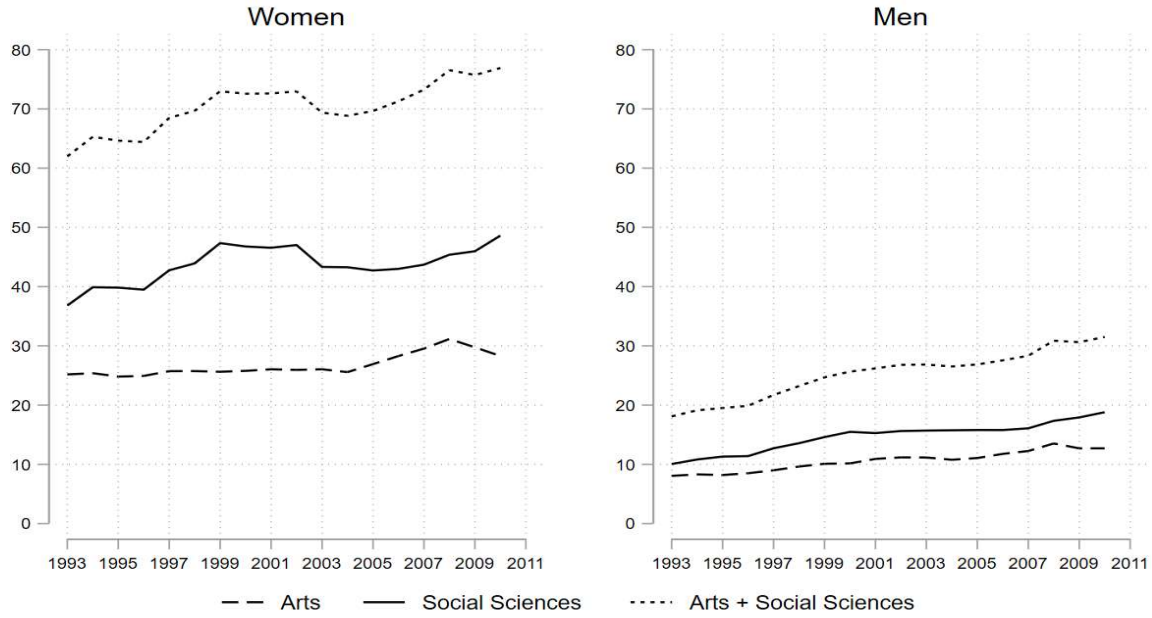
Source: DZHW ICE (Federal Statistical Office, Main Reports); own calculations.

These investment costs may cause specific patterns of self-selection into subjects and translate into permanent subject-specific wage differentials while working. As long as students care about wages, there should be a relationship between investment costs during the educational period and wages during the returns period. Otherwise, if the wages for all graduates were equal, some of the subjects with higher investment costs would disappear. Following this argumentation, changing wage differentials for U and UAS graduates may result from changes in the composition of subject-choice. Table 1 groups the distribution of subjects in the seven most prominent academic majors (arts, law, economics, social sciences, medicine, natural science, and engineering) separately for women and men and for U and UAS, comparing the years 1993 and 2011. Aside from these rather time-persistent patterns, the table also hints at some significant changes over time. For all graduates, there is an increase of 12.3 percentage points in the share of arts and social sciences among women and of 10.7 percentage points among men (see Figure 10). In comparison, the shares of students graduating in law and medicine (entry to medicine is highly restrictive in Germany), both high-wage subjects, decreased. The shares for natural sciences, engineering, and economics remained almost constant.

To assess the role these changes may exert on educational wage differentials, our analysis proceeds in two steps. The first step examines subject-specific wage differentials. Table A14 in the Appendix contains the estimated educational wage differentials by major for females (part a) and males (part b). Graduates in medicine, law, economics, engineering, and natural sciences experience higher wage differentials relative to employees with a VET degree, and compared to graduates in arts and social sciences. Although there are some further differences in these two groups, a straightforward calculation reveals an average difference of around 0.18 log points in 2012 for women and 0.28 for men. The findings documented in Table A14 also reveal that U graduates earn higher wages compared to UAS graduates in general and in particular when they studied the same major. This difference mirrors the higher investment costs since time-to-graduation at a university lasts 5 to 6 years, on average,

whereas graduation at a university of applied sciences lasts 3 to 4 years for most students (Authoring Group NRoE, 2020). For example, the estimated wage differential for economists with a U degree was .60 (0.49) for women (men) in 2012 and .43 (0.42) for women (men) with a UAS degree.

**Figure 10:** Share of Arts and Social Sciences Graduates 1993 to 2011 (Women/Men; in %)




Source: DZHW ICE 2020 (Federal Statistical Office, Main Reports), own calculations.

The estimated subject-specific wage differentials are relatively stable over time, especially among engineering, economics, and law. For medicine graduates, they even increased. However, the wage differential for arts, social and natural sciences decreased, although not univocally among women and men. As a result, the differences between the estimated study-specific wage differentials for arts and social sciences and the other subjects are increasing. A straightforward calculation illustrates the possible magnitude of this factor. Between 2012 and 2019, the average estimated wage differential for U graduates declined 0.05 log point (section 5). The share of arts and social sciences increased by 12.4 percentage points among women and 10.7 among men (Table 1). Taking these two numbers together and disregarding other determinants, the wage differential would have decreased approximately by 0.02 log points among women and 0.03 among men.

Table 2 summarizes the strength of the relationship between the expansion in study majors and subject-specific educational wage differentials. Separately for U and UAS graduates, the table documents the increase in graduates (absolute numbers) in the seven majors between 2008 and 2002. There is a lengthy time lag between entry into higher education and final graduation. In Germany, most students with a bachelor's degree enter a master's program (Authoring Group NRoE, 2018). Since the study assesses wage differentials in samples of workers between the age of 30 and 55, we choose the period after 2011 for studying the wage consequences of the graduation growth rates 2008/2002.

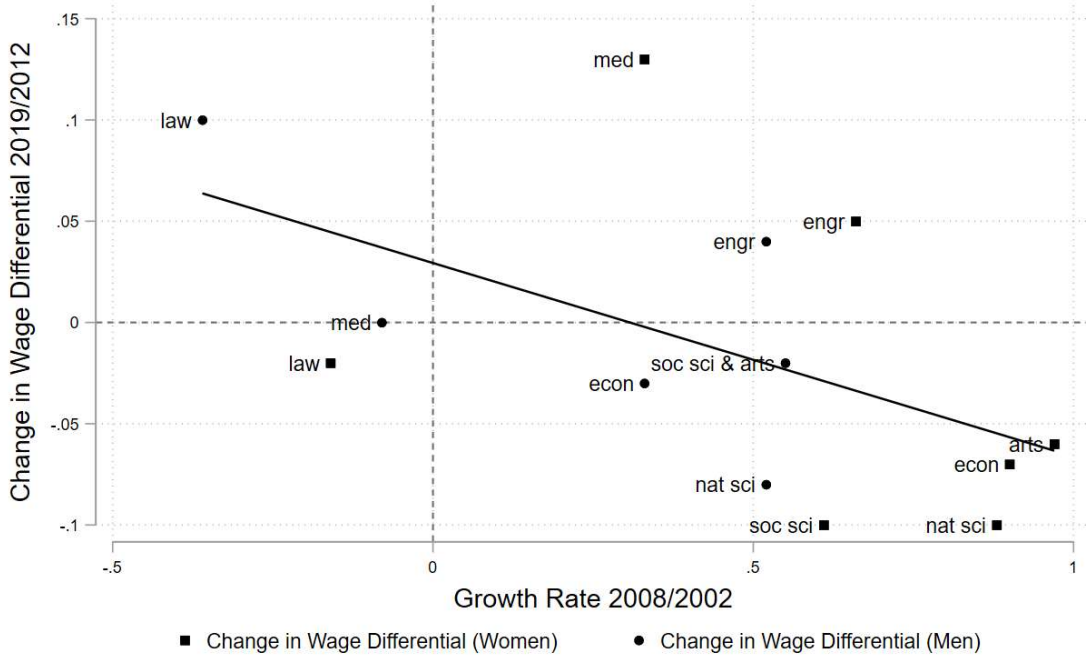
**Table 2:** Dynamics of Degrees and Degree-Specific Wage Differentials (in Thousands/in %)

| **a) Women** | **UAS** | | | | **U** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Graduates** | | **Δ Wage** | | **Graduates** | | **Δ Wage** | |
| **Year** | **2008**[a)] | **08/02**[b] | **2019**[c] | **19/12**[d] | **2008**[a] | **08/02**[b] | **2019**[c] | **19/12**[d] |
| Arts | --- | --- | --- | --- | 25.800 | .97 | .36 | -.06 |
| Law | --- | --- | --- | --- | 4.300 | -.16 | .57 | -.02 |
| Econ. | 16.000 | .53 | .38 | -.05 | 9.100 | .90 | .53 | -.07 |
| Soc. Sci. | 10.000 | .55 | .21 | -.06 | 20.340 | .61 | .36 | -.10 |
| Medicine | --- | --- | --- | --- | 7.100 | .33 | .96 | .13 |
| Nat. Sci. | --- | --- | --- | --- | 14.500 | .88 | .52 | -.10 |
| Engr. | 8.700 | .66 | .31 | -.08 | 4.900 | .66 | .53 | .05 |
| **b) Men** | **UAS** | | | | **U** | | | |
| | **Graduates** | | **Δ Wage** | | **Graduates** | | **Δ Wage** | |
| **Year** | **2008**[a)] | **08/02**[b] | **2019**[c] | **19/12**[d] | **2008**[a] | **08/02**[b] | **2019**[c] | **19/12**[d] |
| Arts | --- | --- | --- | --- | 8.400 | .54 | .26 | -.02 |
| Law | --- | ---- | --- | --- | 3.600 | -.36 | .74 | .10 |
| Econ. | 14.000 | .21 | .41 | -.01 | 10.900 | .33 | .52 | -.03 |
| Soc. Sci. | 2.700 | .44 | .10 | -.11 | 8.600 | .55 | .35 | -.02 |
| Med | --- | --- | --- | --- | 4.500 | -.08 | .71 | .00 |
| Nat. Sci. | --- | --- | --- | --- | 11.300 | .52 | .48 | -.08 |
| Engr. | 34.000 | .57 | .51 | .03 | 17.900 | .52 | .58 | -.04 |

Note: Numbers are taken from DZHW ICE (Federal Statistical Office, Main Reports) and wage estimations based on Table A14 in the Appendix, own calculations. [a)] Number of graduates in 2008, [b)] Difference in the number of graduates between 2002 and 2008, [c)] subject-specific wage differential 2019, and [d)] difference in wage differentials between 2012 and 2019.

The graduation growth rates are proxies for the expansionary effect graduation may have had on wages. They vary between 0.97 for arts among women and -0.36 for law among men. The growth rates in subject-specific wage differentials range from -0.10 for the social sciences to 0.13 for medicine. There seems to be a negative relationship between the two growth rates, as illustrated in Figure 11 for university graduates. A ten percent increase in graduates from a specific subject is associated roughly with a 0.01 log point reduction in the estimated subject-specific wage differential relative to VET. For instance, the graduate growth rate in economics was .90 for women, and .33 for men, whereas the growth in wage differentials was -0.07 for women and -0.03 for men. The relationship illustrated in Figure 11 is not a "law". It is not irrespective of time, subject choice, and economic conditions. It depends on the specific conditions and socio-economic circumstances at the time when the educational expansion started, i.e., the existing stock of graduates and the strength of the expansion, the rate of retirement among lower-skilled workers, as well as the economic circumstances when the graduates begin their careers (see Goldin and Katz, 2008; among others).

**Figure 11:** The Change of Subject-Specific Wage Differentials and Graduates Growth Rate




Source: Table 2.

# *7 Critical Discussion and Further Findings*

## *7.1 Critical Discussion*

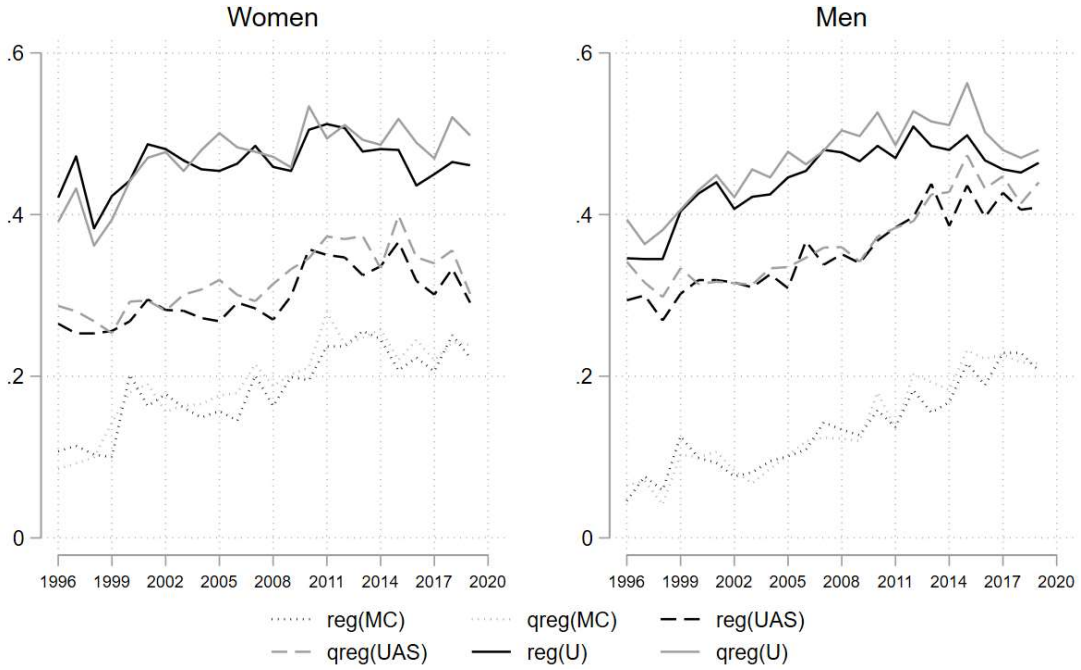
The starting point of the present study was the question of whether relative wages of higher-skilled individuals increased or decreased during and after the recent expansion of university education in Germany. Based on regression methods and samples from the SOEP the study finds that increases in the higher educational wage differentials have come to a halt in Germany. Since 2015, stagnation or even a decrease has occurred, with the exception of men with an MC certificate, for whom wage differentials continued to increase after 2015. Based on our findings, we think there is some initial evidence that the decrease, the expansion of university education, and changes in the composition of subjects studied during this expansion are related. A number of open questions remain.

First, the findings may depend on the methods used, i.e. OLS. However, we performed median regression in addition to the OLS estimates (Figure 12) and the comparison indicates that the two estimates – OLS and median regression – do not differ much. The median estimates are higher than the OLS estimates for U graduates, especially after 2014, although the gap is not large. The mass of the wage distribution became lower than the median, and the OLS estimates declined since 2015. While the wage differentials based on median estimates are higher, it is nevertheless also decreasing such that both methods, OLS and median regression, indicate a decrease in the U wage differentials.

Second, wage differentials may also be determined by individual competencies and personality traits acquired outside of the education system, such as altruism, charisma, sociability, friendliness, or persistence. These characteristics, among other attributes, can influence not only wages but also educational investments leading to selection on unobserved characteristics or preferences. Such unobserved determinants may bias educational wage differentials estimated with OLS techniques up- or downward, even if one controls for observables such as age, gender, or region. Downward biases may occur when an educational qualification promotes the development of characteristics such as

persistence, courage, or openness that are not part of the qualification itself, but that develop during the educational process, and determine wages. So far, we have no indication of the relevance of these biases and their evolution for the period 1996 to 2019. Future research could examine whether self-selection into higher education by socio-economic background or individual competencies and personality traits changed during the expansion of university education and how this affected wages.

**Figure 12:** Estimates from OLS (reg) and Median Regressions (qreg) (Women/Men; in ln)




Source: SOEP v36, own calculations.

Third, changes in the labour market regulations, such as the introduction of a minimum wage in 2016, could result in an increase of low wages that might indirectly affect the wages above the minimum wage negatively, as demonstrated by Gregory and Zierahn (2020). Therefore, the introduction of the minimum wage may explain part of the reduction in educational wage differentials after 2015. Whereas lower wages increased, higher wages may have decreased, and the estimated educational wage differentials may have declined. We cannot exclude such a possibility, although we do not think that the minimum wage contributed to the decline of the educational wage differentials for university

graduates. Our reasoning for this is that the decline of these wage differentials had already started some years prior to the introduction of the minimum wage.

Fourth, factors such as changes in the curricula of educational institutions and categories can influence the evolution of the estimated educational wage differentials (Ordemann, 2021). The recent decline in wage differentials for graduates from U may go back to the dissemination of the new Bachelor and Master degrees. While we reported findings in the change of the educational distribution of the first degree and type of educational institution, the differentiation in degrees has become more dynamic since 2008.

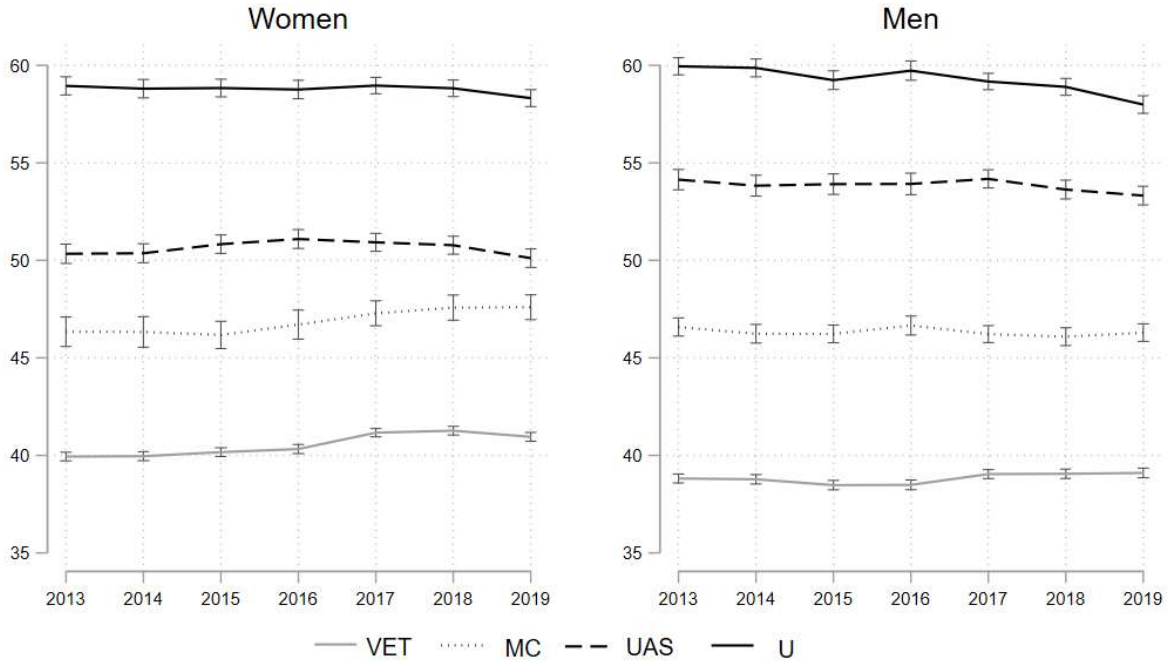
It remains an open question whether relatively more graduates with a bachelor's degree entered the workforce with the potential to reduce the wage differentials (given that they earn lower wages, Authoring Group NRoE, 2018). Furthermore, the VET curricula may also have changed. For instance, they may contain some more academic learning contents in recent times, while the curricula of U and UAS may have integrated in addition practical learning. Due to data restrictions, we only investigated the evolution of wage differentials by type of higher education institution without honouring the differences between bachelor and master degrees and without examining changes the curriculum. Therefore, we do not account for the impact of the Bologna Process or other education reforms in our analysis.

### *7.2 Further Findings from Occupational Prestige Scores*

Outside of its relation to our findings, we find it remarkable that the occupational prestige for U and UAS started to moderately decline after 2013 (see Figure 13), in a time when wage differentials for U and UAS stagnated. While sociological reasoning sees the position as a prerequisite to wage, one could have expected that a decline in wage would come with a time lag after the decline in prestige. Testing for the effects of changes in the educational composition, we confirm known results; that

workers belonging to a higher educational category enjoy significantly higher prestige scores, with a clear hierarchy for both women and men (similar to Manzoni et al., 2014). However, a (moderate) decline is visible for U as well as for UAS graduates, which appears to be larger in magnitude for men compared to women. Compared to this decline, the prestige of master craftswomen increased after 2014. From these findings, one cannot preclude that the prestige value of graduating at U and UAS declined, which might go hand in hand with changes in wage differentials. Future studies should try to understand the causes for this decline and its relation to wages.

**Figure 13:** The Evolution of the Occupational Prestige, 2013 to 2019 (Women/Men; in SIOPS points)




Source: SOEP v36, own calculations.

## *8 Concluding Remarks*

This study investigated the evolution of educational wage differentials for three categories of higher education compared to a VET degree in Germany in times of the expansion of university education. Despite upskilling, the estimated university wage differentials display an inversed u-shape pattern, and that working hours moderately decreased. The findings suggest that wage differentials for U and

UAS graduates increased until 2012. This increase may have been the fuel for the expansion of university education starting ten years earlier. After 2012, wage differentials stagnated and started to (moderately) decline after 2015. Notably there was no decrease for men with an MC certificate. The share of men with this certificate declined between 1996 and 2019.

Although the estimated wage differentials for U and UAS are still higher in 2019 compared to 1996, one may ask whether and when the decrease for university graduates comes to a halt again. Our empirical approach should be useful for thinking about this question, though we do not claim to deliver any causal interpretations. For West Germany, earlier findings by Gebel and Pfeiffer (2010) suggest that average returns to education between 1984 and 2006 reached a minimum in 1996. The current study suggests that the educational wage differential for university graduates in 2019 was still above the differential in 1996. With the macro-societal changes described, there may be room for a further decline, which should reduce student's incentives to invest and thus the economic fuels for the university expansion, presumably with a time lag. Future research will have to examine the causes and economic consequences of the ongoing change in the educational composition of the workforce and its relation to educational wage differentials.

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## *Appendix*

The empirical analysis uses samples from the German Socio-Economic Panel Study, SOEP (Goebel et al., 2019). The SOEP is a representative longitudinal panel study of German households and concentrates on multiple topics ranging from employment, well-being, working hours and earnings to daily life, health, and other topics. The study began in 1984 and currently includes 36 waves. We used individual-level data spanning 24 years from the years 1996 to 2019. Our estimation sample is unbalanced and restricted to 259,555 observations of 35,890 employed individuals aged 30 to 55, 18,455 of whom are women.

*Variables*

The dependent variable is the natural logarithm of gross earnings per hour worked. It is obtained separately for each year by the trimmed (1 percent) real (basis 2015) gross monthly income (without additional payments), reported in the previous month. The reported income is divided by the factor 4.33 times the trimmed (1 percent) actual working hours at the end of the sample selection. In addition, the obtained wage was trimmed at the one percent level before transforming it into the natural logarithm. Trimming shall be helpful for reducing measurement errors from extreme values.

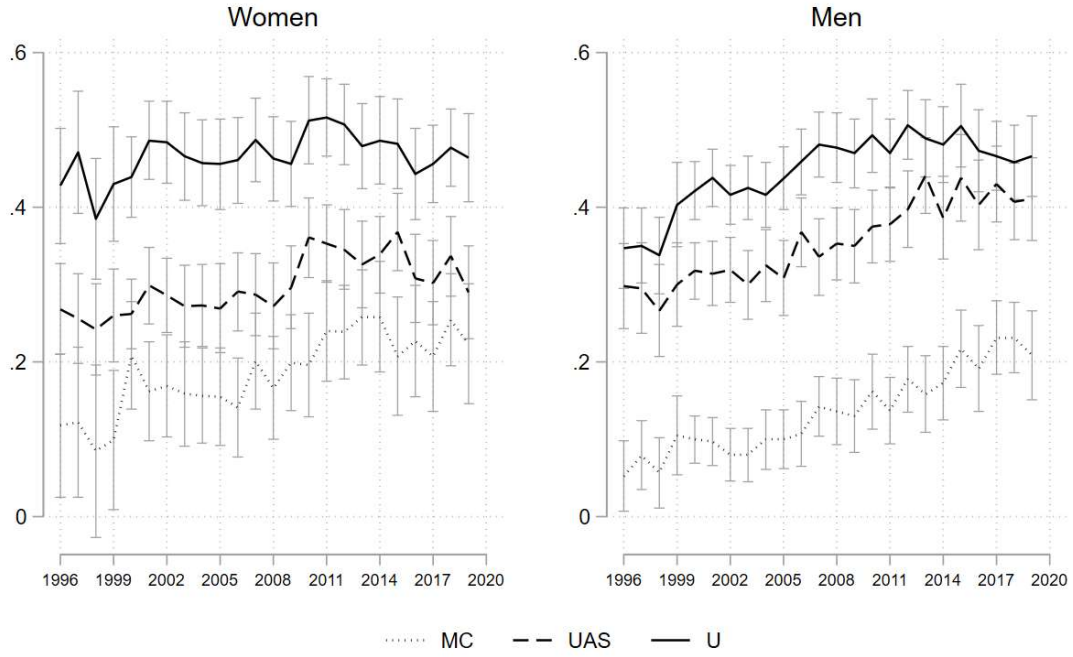
The explanatory variable in focus is the highest educational degree. We use the degrees provided by the SOEP, which reflect the special characteristics of the German education system (but which lack some information on degree-type, such as Diploma, bachelor or master) no educational degree (or not yet completed), apprenticeship or vocational training, master craftsmanship, and (applied) university. Several adjustments to the variables provided by the SOEP are made. First, we add cooperative education to the category of master craftsmanship and civil servant training. Cooperative education combines vocational training with academic studies but is still bound to the firm with which students have a work contract and who shape the curricula of the cooperative education institution. Sec-

ond, higher education degrees obtained in a foreign country have been added to the category of universities of applied sciences to reflect the diversity of higher education from all over the world behind this educational category.

For the multivariate analysis, we use individuals with an apprenticeship degree as a reference, as they still represent the majority of all degree holders in samples of workers aged 30 to 55, or 25 to 65. We control for the individual potential work experience subdivided into percentiles, sex, migration background, partner, employment of the partner, children in the household, city vs. country living, and West vs. East Germany. Furthermore, we control for the sample the respondent initially belonged to. In the following, we present a description of the sample and its main variables, as well as the sample of the coefficients of the estimations of interest. More information about the whole model is available on request from the first author.

*Figures*

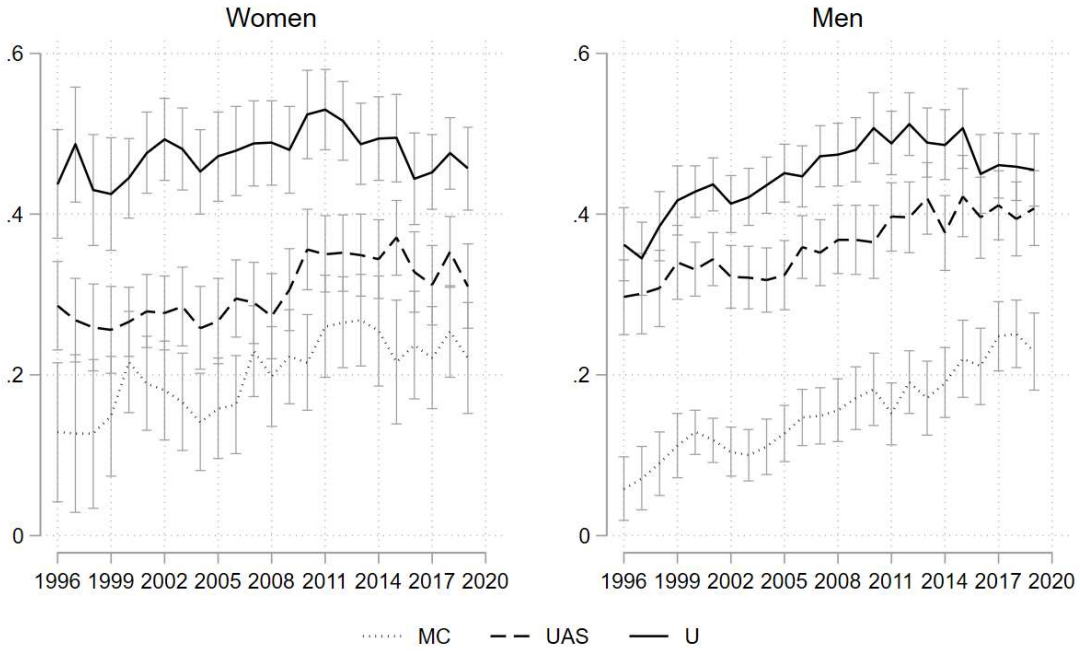
**Figure A1:** Educational Wage Differentials, Age Group 25–65 (Women/Men; in ln)




Note: Workers aged 25–65; OLS estimates with ln real wages, 95 %-confidence interval based on robust errors. For estimation results, see A10 in the appendix.

Source: SOEP v36, own calculations.

**Figure A2:** Educational Wage Differentials for Employees, 1996 to 2019 (Women/Men; in ln)




Note: Employees aged 30–55; OLS estimates with ln real wages, 95 %-confidence interval based on robust errors. For estimation results, see A11 in the appendix.

Source: SOEP v36, own calculations.

*Tables*

**Table A1:** Descriptive Statistics from the (pooled) Estimation Samples 1996–2019 (Total/Women/Men)

| | Total | Women | Men |
|---|---|---|---|
| Variables | Mean (SD)/rel. freq. | Mean (SD)/rel. freq. | Mean (SD) /rel. freq. |
| Age | 45.6 (11.4) | 45.8 (11.4) | 45.4 (11.3) |
| Educational Degree | | | |
| No Degree | .12 | .15 | .10 |
| VET | .58 | .61 | .56 |
| MC | .09 | .05 | .12 |
| UAS | .09 | .09 | .10 |
| U | .11 | .10 | .12 |
| Work Experience | 25.9 (11.6) | 26.4 (11.8) | 25.5 (11.4) |
| Household | | | |
| Partner | .63 | .62 | .64 |
| Employment Status Partner | .41 | .46 | .37 |
| Children | | | |
| Under 6 Years | .11 | .11 | .11 |
| Between 6 and 14 Years | .14 | .15 | .13 |
| Migration Status | | | |
| Direct | .09 | .10 | .09 |
| Indirect | .02 | .02 | .02 |
| Rural Area | .38 | .37 | .39 |
| Eastern Germany | .20 | .20 | .21 |
| N | 259,555 | 136,388 | 123,523 |

Note: Further controls whose distributions are not included are the net income of the spousal partner.

Source: SOEP v36, own calculations, weighted.

**Table A2**: First Degrees in University Education and Sex Composition 1993—2011 (in Thousands (in %))

| Type of Degree | All (U in %) | UAS | | U | |
|---|---|---|---|---|---|
| **Sex** | | **Women / Men** | **Overall** | **Women / Men** | **Overall** |
| 2011 | 307.3 (62.1%) | 51.6 / 64.9 | 116.7 | 106.4 / 84.4 | 190.8 |
| 2001 | 171.7 (63.4%) | 24.8 / 38.1 | 62.9 | 53.0 / 55.8 | 108.8 |
| 1993 | 173.8 (65.2%) | 19.9 / 40.5 | 60.5 | 49.2 / 64.1 | 113.3 |

Source: DZHW ICE 2020 (Federal Statistical Office, Main Reports), own calculations.

**Table A3:** Educational Composition in the Population Aged 30-55 in Selected Years 1996, 2000, 2006, 2019 (Women/Men (Total); in %)

| Year | VET | MC | UAS | U |
|---|---|---|---|---|
| 2019 | 52.5 / 46.3 (49.3) | 6.2 / 10.7 (8.5) | 11.6 / 10.9 (11.3) | 17.4 / 18.1 (17.8) |
| 2006 | 63.4 / 57.5 (60.4) | 5.5 / 13.1 (9.4) | 9.6 / 10.2 (9.9) | 10.3 / 11.8 (11.1) |
| 2000 | 64.6 / 56.4 (60.5) | 5.1 / 13.4 (9.3) | 8.6 / 10.8 (9.7) | 9.9 / 12.5 (11.2) |
| 1996 | 63.2 / 56.8 (60.0) | 4.4 / 13.2 (8.9) | 7.3 / 9.4 (8.4) | 9.7 / 12.2 (11.0) |

Note: Individuals without a degree (residual category) are not included in the table. Their average shares (total) for 1996 are 11.8% and for 2019 13.1%.

Source: SOEP v36, own calculations, weighted.

**Table A4:** Average Working Hours 1996–2019, Age Group 30–55, by Educational Degree (Women/Men (Total); Mean (SD))

| | Average Working Hours | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Women | | | | | Men | | | | |
| Year | No degree | VET | MC | UAS | U | no degree | VET | MC | AUS | U |
| 2019 | 29.0 (12.5) | 31.3 (10.9) | 34.3 (10.4) | 34.0 (10.7) | 34.5 (11.0) | 41.0 (10.8) | 41.9 (7.8) | 43.5 (7.6) | 42.2 (7.2) | 42.7 (9.4) |
| 2018 | 28.8 (12.4) | 30.9 (11.1) | 34.1 (10.1) | 34.0 (11.2) | 34.3 (10.7) | 41.0 (9.9) | 41.8 (8.0) | 43.5 (6.5) | 43.2 (6.3) | 42.9 (8.9) |
| 2017 | 28.7 (12.7) | 30.8 (11.2) | 33.7 (10.6) | 33.7 (11.4) | 34.0 (11.3) | 40.3 (11.0) | 42.2 (8.3) | 43.7 (6.6) | 43.9 (5.8) | 43.0 (9.2) |
| 2016 | 28.1 (12.7) | 30.8 (11.6) | 32.1 (12.0) | 35.2 (10.8) | 35.4 (11.2) | 40.3 (11.7) | 42.3 (8.3) | 44.3 (8.0) | 43.5 (6.3) | 43.7 (9.5) |
| 2015 | 28.0 (12.5) | 30.3 (11.6) | 32.0 (12.1) | 34.9 (10.3) | 34.9 (11.5) | 41.0 (12.1) | 42.3 (8.4) | 45.0 (7.5) | 43.8 (7.0) | 43.6 (9.2) |
| 2014 | 27.7 (12.5) | 30.5 (11.7) | 32.1 (12.5) | 35.4 (10.5) | 34.5 (12.0) | 41.0 (11.8) | 42.4 (8.2) | 44.9 (7.8) | 43.4 (7.6) | 44.3 (9.0) |
| 2013 | 27.9 (12.8) | 30.5 (11.7) | 33.5 (11.8) | 35.1 (11.0) | 35.1 (11.7) | 40.0 (12.9) | 42.8 (8.4) | 44.9 (7.9) | 43.1 (8.3) | 44.9 (9.0) |
| 2012 | 27.9 (12.7) | 30.3 (12.1) | 33.4 (11.4) | 35.6 (10.8) | 35.0 (12.2) | 41.0 (11.6) | 43.0 (8.7) | 45.2 (7.9) | 44.1 (8.3) | 44.9 (9.2) |
| 2011 | 28.0 (12.8) | 30.6 (12.1) | 32.8 (12.2) | 34.9 (11.0) | 36.3 (11.7) | 40.0 (12.1) | 43.5 (8.4) | 44.7 (7.9) | 44.2 (8.7) | 45.8 (9.5) |
| 2010 | 25.9 (12.4) | 29.5 (12.2) | 32.4 (11.8) | 35.1 (10.6) | 35.4 (12.2) | 41.6 (11.7) | 42.5 (8.7) | 44.6 (7.8) | 44.3 (7.6) | 45.3 (8.9) |
| 2009 | 27.3 (13.2) | 30.1 (12.2) | 32.5 (12.5) | 34.8 (11.6) | 35.7 (12.4) | 41.7 (12.2) | 43.8 (8.8) | 44.9 (9.1) | 44.8 (9.0) | 46.7 (10.0) |
| 2008 | 26.1 (12.8) | 30.0 (12.2) | 31.7 (11.6) | 34.8 (11.1) | 35.9 (12.0) | 42.1 (11.1) | 43.6 (8.0) | 44.6 (7.9) | 44.6 (8.0) | 46.1 (8.6) |
| 2007 | 27.0 (12.9) | 29.9 (12.3) | 31.5 (12.0) | 35.2 (11.2) | 35.5 (12.7) | 42.2 (11.9) | 43.9 (8.6) | 45.2 (8.7) | 45.1 (8.6) | 46.8 (9.5) |
| 2006 | 26.7 (12.9) | 29.5 (12.2) | 32.7 (11.9) | 35.9 (11.0) | 35.5 (12.8) | 41.6 (11.4) | 43.7 (8.6) | 45.4 (9.0) | 45.4 (8.9) | 46.8 (9.3) |
| 2005 | 26.4 (12.2) | 29.4 (12.4) | 32.7 (12.2) | 35.5 (10.6) | 35.6 (11.8) | 41.0 (10.0) | 43.2 (7.7) | 44.8 (7.4) | 44.9 (7.9) | 46.0 (8.5) |
| 2004 | 26.1 (12.7) | 29.5 (12.2) | 32.5 (12.1) | 36.2 (10.3) | 35.1 (12.3) | 41.2 (10.6) | 43.4 (8.7) | 45.2 (8.5) | 45.1 (8.9) | 45.6 (8.9) |
| 2003 | 26.2 (12.8) | 29.8 (12.3) | 32.2 (11.3) | 36.3 (10.5) | 35.0 (12.1) | 41.6 (10.6) | 43.5 (8.3) | 44.9 (8.6) | 45.5 (9.4) | 46.3 (8.9) |
| 2002 | 26.2 (12.4) | 29.7 (12.4) | 32.1 (11.4) | 35.9 (11.2) | 36.0 (12.0) | 40.4 (10.2) | 43.5 (7.9) | 44.6 (7.6) | 45.0 (8.7) | 45.8 (8.8) |
| 2001 | 27.8 (12.8) | 30.3 (12.6) | 31.2 (12.3) | 36.1 (10.3) | 35.5 (12.0) | 41.4 (10.2) | 44.1 (8.4) | 45.3 (8.9) | 45.9 (9.0) | 46.1 (10.2) |
| 2000 | 28.1 (13.6) | 30.5 (12.8) | 32.5 (11.3) | 36.7 (10.9) | 36.2 (12.9) | 41.7 (9.3) | 44.3 (8.8) | 44.8 (8.7) | 46.1 (8.9) | 46.5 (9.6) |
| 1999 | 28.8 (14.1) | 31.7 (12.7) | 32.3 (11.4) | 38.1 (10.4) | 36.2 (12.5) | 42.3 (11.3) | 43.6 (9.2) | 44.3 (9.8) | 45.2 (8.5) | 46.1 (10.2) |
| 1998 | 30.0 (13.6) | 32.4 (12.4) | 34.5 (11.4) | 38.9 (9.3) | 36.9 (11.8) | 43.5 (8.8) | 44.1 (9.1) | 44.9 (8.4) | 46.3 (8.9) | 45.8 (9.6) |
| 1997 | 31.1 (13.3) | 32.7 (12.6) | 34.5 (11.9) | 40.1 (8.9) | 37.1 (11.3) | 42.3 (9.2) | 44.4 (8.6) | 45.1 (9.1) | 46.1 (8.3) | 46.5 (9.9) |
| 1996 | 28.4 (14.2) | 32.4 (12.0) | 33.5 (11.2) | 38.8 (9.1) | 37.1 (12.0) | 42.2 (10.1) | 44.0 (8.5) | 44.6 (8.8) | 46.0 (9.4) | 46.3 (9.5) |

Source: SOEP v36, own calculations, weighted.

**Table A5:** Average Real Wages 1996–2019 in the Age Group 30–55 by Educational Degrees (Women/Men; Mean/Median)

| Year | Average Wages | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Women | | | | | | | | | | Men | | | | | | | | | |
| | no degree | | VET | | MC | | UAS | | U | | no degree | | VET | | MC | | UAS | | U | |
| | mean | med | mean | med | mean | med | mean | med | mean | med | mean | med | mean | med | mean | med | mean | med | mean | med |
| 2019 | 14.0 | 13.0 | 16.2 | 15.6 | 20.1 | 19.8 | 21.1 | 21.1 | 25.8 | 26.3 | 17.8 | 16.2 | 19.8 | 18.2 | 24.7 | 23.7 | 29.7 | 29.7 | 32.8 | 31.8 |
| 2018 | 13.0 | 11.6 | 15.4 | 14.4 | 18.6 | 18.4 | 20.5 | 20.4 | 25.4 | 25.4 | 18.3 | 15.5 | 18.9 | 17.7 | 23.2 | 21.4 | 28.1 | 28.0 | 30.9 | 30.8 |
| 2017 | 13.0 | 10.6 | 14.7 | 14.1 | 17.8 | 17.5 | 19.0 | 18.5 | 23.7 | 22.7 | 15.7 | 13.8 | 17.8 | 16.5 | 22.4 | 21.3 | 27.1 | 26.2 | 29.6 | 28.9 |
| 2016 | 12.0 | 10.4 | 13.9 | 13.1 | 16.8 | 16.3 | 18.1 | 17.6 | 22.5 | 22.1 | 15.7 | 13.9 | 17.3 | 15.9 | 21.3 | 19.8 | 26.0 | 25.5 | 28.5 | 27.9 |
| 2015 | 11.0 | 10.2 | 13.7 | 13.1 | 16.5 | 15.6 | 18.0 | 17.7 | 22.6 | 22.3 | 16.5 | 13.9 | 16.9 | 15.4 | 20.9 | 19.7 | 26.1 | 25.4 | 27.9 | 27.7 |
| 2014 | 11.0 | 9.0 | 13.0 | 12.3 | 16.8 | 16.8 | 17.0 | 16.3 | 21.8 | 20.7 | 15.4 | 13.8 | 16.6 | 15.3 | 19.6 | 19.1 | 24.7 | 24.8 | 27.0 | 25.8 |
| 2013 | 9.9 | 9.1 | 12.6 | 11.8 | 15.9 | 15.4 | 16.2 | 15.9 | 20.9 | 19.8 | 14.7 | 13.1 | 16.1 | 14.9 | 19.0 | 18.4 | 25.0 | 24.1 | 26.1 | 24.9 |
| 2012 | 9.4 | 8.6 | 12.3 | 11.4 | 14.9 | 14.9 | 16.0 | 15.3 | 20.3 | 19.6 | 13.7 | 12.5 | 15.5 | 14.3 | 18.8 | 17.9 | 23.1 | 21.6 | 26.0 | 24.2 |
| 2011 | 9.4 | 8.7 | 11.6 | 11.0 | 14.0 | 14.0 | 14.9 | 14.5 | 19.7 | 18.1 | 13.4 | 12.5 | 14.9 | 13.9 | 17.5 | 16.7 | 22.3 | 21.5 | 24.4 | 23.1 |
| 2010 | 9.7 | 8.6 | 11.3 | 10.8 | 13.5 | 13.4 | 14.7 | 14.5 | 19.5 | 18.9 | 12.6 | 11.7 | 14.3 | 13.5 | 17.6 | 17.2 | 20.5 | 20.1 | 23.9 | 22.6 |
| 2009 | 9.3 | 8.4 | 11.2 | 10.6 | 13.3 | 12.8 | 13.7 | 13.3 | 18.2 | 17.0 | 12.5 | 11.5 | 14.1 | 13.1 | 16.8 | 16.0 | 19.9 | 18.9 | 22.7 | 21.6 |
| 2008 | 9.8 | 8.5 | 11.0 | 10.6 | 12.8 | 13.0 | 12.9 | 12.7 | 18.0 | 17.5 | 12.6 | 11.7 | 13.7 | 13.0 | 16.4 | 15.7 | 19.8 | 19.1 | 23.0 | 22.1 |
| 2007 | 9.1 | 8.1 | 10.7 | 10.3 | 12.8 | 12.4 | 12.5 | 12.4 | 17.5 | 16.6 | 12.1 | 11.0 | 13.4 | 12.6 | 15.6 | 14.9 | 18.6 | 18.2 | 22.0 | 20.7 |
| 2006 | 8.8 | 7.7 | 10.4 | 10.1 | 11.5 | 11.4 | 12.3 | 12.3 | 17.1 | 16.7 | 11.8 | 11.1 | 12.8 | 12.1 | 14.5 | 14.0 | 19.1 | 17.8 | 21.1 | 19.8 |
| 2005 | 8.6 | 8.0 | 10.3 | 10.0 | 11.5 | 11.4 | 12.5 | 12.2 | 16.8 | 15.5 | 11.5 | 11.2 | 13.0 | 12.4 | 14.4 | 14.2 | 17.9 | 17.1 | 19.9 | 18.7 |
| 2004 | 8.5 | 7.8 | 10.2 | 9.8 | 11.7 | 11.8 | 11.8 | 11.4 | 16.1 | 15.7 | 11.8 | 11.0 | 12.8 | 12.0 | 14.3 | 13.7 | 18.2 | 16.9 | 20.1 | 19.2 |
| 2003 | 8.1 | 7.4 | 9.9 | 9.6 | 11.2 | 11.2 | 11.8 | 11.6 | 16.2 | 14.9 | 11.5 | 11.0 | 12.6 | 11.8 | 13.8 | 13.2 | 16.7 | 15.9 | 19.7 | 18.0 |
| 2002 | 7.9 | 7.2 | 9.4 | 9.0 | 11.0 | 10.6 | 11.4 | 10.9 | 15.0 | 14.7 | 10.7 | 10.0 | 12.0 | 11.1 | 12.9 | 12.7 | 16.3 | 15.3 | 18.4 | 17.2 |
| 2001 | 7.1 | 6.6 | 8.9 | 8.5 | 10.1 | 10.4 | 11.1 | 10.5 | 14.3 | 13.9 | 10.0 | 9.6 | 11.2 | 10.6 | 12.6 | 12.5 | 15.5 | 14.8 | 17.6 | 16.4 |
| 2000 | 7.6 | 6.8 | 8.5 | 8.2 | 10.5 | 10.4 | 10.1 | 9.5 | 14.1 | 13.8 | 9.4 | 9.0 | 10.9 | 10.1 | 12.3 | 11.8 | 15.2 | 14.5 | 17.2 | 16.1 |
| 1999 | 8.4 | 7.3 | 8.2 | 7.8 | 9.5 | 9.6 | 9.4 | 9.0 | 14.1 | 12.9 | 9.7 | 8.9 | 10.5 | 9.7 | 11.9 | 11.6 | 13.3 | 12.4 | 16.1 | 15.1 |
| 1998 | 8.4 | 7.6 | 8.2 | 7.8 | 9.3 | 9.3 | 9.6 | 9.0 | 12.7 | 12.4 | 9.9 | 9.2 | 10.1 | 9.2 | 11.2 | 10.9 | 12.8 | 12.0 | 14.8 | 14.3 |
| 1997 | 7.3 | 6.6 | 7.8 | 7.6 | 9.3 | 9.2 | 8.7 | 8.2 | 13.7 | 13.2 | 9.9 | 9.2 | 9.8 | 9.2 | 11.1 | 10.6 | 12.3 | 11.4 | 14.1 | 13.8 |
| 1996 | 7.6 | 6.7 | 7.5 | 7.2 | 8.3 | 8.2 | 8.8 | 8.2 | 12.3 | 11.9 | 10.1 | 9.0 | 9.7 | 9.0 | 10.7 | 10.3 | 12.0 | 10.9 | 13.8 | 13.5 |

Source: SOEP v36, own calculations, weighted.

**Table A6: Average** Real Wages and Annual Wage Growth by Degrees (Women/Men; in EUR and in %)

| | **All** | | **VET** | | **MC** | | **UAS** | | **U** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **W** | **M** | **W** | **M** | **W** | **M** | **W** | **M** | **W** | **M** |
| 18/19 (EUR) | 18.0 | 21.9 | 16.0 | 18.7 | 19.2 | 22.7 | 21.0 | 28.1 | 24.5 | 28.1 |
| Shares (%) | 100 | 100 | 55.1 | 48.6 | 5.7 | 11.2 | 10.4 | 10.3 | 15.1 | 16.5 |
| 96/97 (EUR) | 8.9 | 11.1 | 8.2 | 10.2 | 9.6 | 10.8 | 9.0 | 13.6 | 13.3 | 14.4 |
| Shares (%) | 100 | 100 | 61.1 | 58.3 | 4.5 | 12.0 | 6.6 | 8.9 | 7.3 | 11.1 |
| Wage growth | 3.12 | 2.98 | 2.94 | 2.70 | 3.05 | 3.30 | 3.78 | 3.20 | 2.70 | 2.95 |
| W. growth a) | 3.33 | 2.87 | 2.94 | 2.67 | 2.92 | 3.25 | 3.92 | 3.01 | 3.23 | 2.60 |
| W. growth b) | 2.97 | 2.93 | 2.89 | 2.63 | 3.17 | 3.22 | 3.67 | 3.26 | 2.45 | 3.17 |

Note: Estimation samples of workers aged 30 to 55; Real (gross) wages (basis 2015) and shares two-year averages from 2018/2019 and from 1996/1997, and the table displays annualized wage growth values (*100). The share for women (men) with no degree for 1996/1997 has been 7.9 (10.1) and for 2018/2019 13.7 (17.8). Growth rates of real wages for women (men) with no degree 2.43 (2.48). a) Estimation sample workers aged 30–39: growth rates of real wages for women (men) with no degree 2.11 (2.16). b) Estimation sample of workers aged 40–55; growth rates of real wages for women (men) with no degree 2.61 (2.60).

Source: SOEP v36, own calculations, weighted.

**Table A7:** Selected Statistics from the Regressions 1996–2019 (Women/Men)

| | Women | | | Men | | |
|---|---|---|---|---|---|---|
| Year | N | Adj. $R^2$ (Fig. 5) | Adj. $R^2$ (Fig. 6) | N | Adj. $R^2$ (Fig. 5) | Adj. $R^2$ (Fig. 6) |
| 2019 | 2,120 | 0.177 | 0.191 | 1,960 | 0.273 | 0.294 |
| 2018 | 2,571 | 0.206 | 0.217 | 2,367 | 0.271 | 0.286 |
| 2017 | 2,823 | 0.178 | 0.190 | 2,621 | 0.277 | 0.294 |
| 2016 | 2,219 | 0.197 | 0.206 | 2,070 | 0.244 | 0.269 |
| 2015 | 2,411 | 0.207 | 0.219 | 2,260 | 0.257 | 0.281 |
| 2014 | 2,641 | 0.207 | 0.216 | 2,537 | 0.270 | 0.300 |
| 2013 | 2,914 | 0.198 | 0.206 | 2,735 | 0.256 | 0.290 |
| 2012 | 3,186 | 0.199 | 0.210 | 3,069 | 0.268 | 0.301 |
| 2011 | 3,182 | 0.190 | 0.203 | 3,138 | 0.267 | 0.300 |
| 2010 | 2,811 | 0.186 | 0.202 | 2,819 | 0.260 | 0.290 |
| 2009 | 3,080 | 0.164 | 0.175 | 3,190 | 0.247 | 0.279 |
| 2008 | 2,854 | 0.156 | 0.173 | 3,015 | 0.287 | 0.323 |
| 2007 | 3,036 | 0.161 | 0.177 | 3,270 | 0.286 | 0.320 |
| 2006 | 3,119 | 0.152 | 0.169 | 3,450 | 0.253 | 0.290 |
| 2005 | 2,826 | 0.151 | 0.167 | 3,141 | 0.263 | 0.304 |
| 2004 | 2,935 | 0.143 | 0.160 | 3,429 | 0.244 | 0.282 |
| 2003 | 3,094 | 0.148 | 0.164 | 3,619 | 0.264 | 0.306 |
| 2002 | 3,199 | 0.153 | 0.170 | 3,710 | 0.278 | 0.320 |
| 2001 | 3,359 | 0.162 | 0.180 | 4,098 | 0.291 | 0.335 |
| 2000 | 3,576 | 0.166 | 0.176 | 4,515 | 0.299 | 0.336 |
| 1999 | 1,908 | 0.158 | 0.172 | 2,390 | 0.275 | 0.297 |
| 1998 | 1,848 | 0.137 | 0.147 | 2,386 | 0.301 | 0.328 |
| 1997 | 1,624 | 0.175 | 0.194 | 2,088 | 0.351 | 0.379 |
| 1996 | 1,620 | 0.187 | 0.201 | 2,102 | 0.364 | 0.396 |

Note: The statistics are a selection from the full model based on samples of employed individuals aged 30–55.
Source: SOEP v36, own calculations.

**Table A8:** Wage Premium, 1996–2019 (Women/Men; in ln, [CI])

| Year | Estimated Wage Premium (OLS); Reference Category VET | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| | No Degree | | Wage Premium (MC, UAS & U) | | No Degree | | Wage Premium (MC, UAS & U) | |
| | Coef. | CI | Coef. | CI | Coef. | CI | Coef. | CI |
| 2019 | -0.196 | [-0.271,-0.121] | 0.353 | [0.311,0.395] | -0.134 | [-0.212,-0.056] | 0.363 | [0.323,0.403] |
| 2018 | -0.179 | [-0.248,-0.110] | 0.374 | [0.337,0.411] | -0.098 | [-0.170,-0.026] | 0.364 | [0.329,0.399] |
| 2017 | -0.177 | [-0.248,-0.107] | 0.343 | [0.304,0.382] | -0.163 | [-0.233,-0.093] | 0.372 | [0.339,0.406] |
| 2016 | -0.169 | [-0.240,-0.098] | 0.349 | [0.308,0.390] | -0.104 | [-0.180,-0.027] | 0.350 | [0.310,0.391] |
| 2015 | -0.211 | [-0.286,-0.137] | 0.383 | [0.343,0.424] | -0.059 | [-0.145,0.027] | 0.377 | [0.338,0.416] |
| 2014 | -0.275 | [-0.357,-0.193] | 0.377 | [0.337,0.417] | -0.071 | [-0.144,0.003] | 0.343 | [0.307,0.378] |
| 2013 | -0.261 | [-0.334,-0.188] | 0.370 | [0.331,0.409] | -0.111 | [-0.197,-0.025] | 0.351 | [0.315,0.387] |
| 2012 | -0.268 | [-0.336,-0.199] | 0.386 | [0.349,0.423] | -0.145 | [-0.220,-0.070] | 0.360 | [0.328,0.392] |
| 2011 | -0.234 | [-0.303,-0.165] | 0.390 | [0.352,0.427] | -0.131 | [-0.211,-0.051] | 0.325 | [0.294,0.357] |
| 2010 | -0.193 | [-0.271,-0.116] | 0.380 | [0.340,0.419] | -0.105 | [-0.186,-0.024] | 0.335 | [0.300,0.370] |
| 2009 | -0.195 | [-0.270,-0.121] | 0.336 | [0.297,0.375] | -0.115 | [-0.194,-0.035] | 0.312 | [0.280,0.344] |
| 2008 | -0.166 | [-0.247,-0.086] | 0.318 | [0.278,0.359] | -0.117 | [-0.196,-0.037] | 0.320 | [0.288,0.351] |
| 2007 | -0.194 | [-0.269,-0.120] | 0.339 | [0.300,0.379] | -0.130 | [-0.209,-0.051] | 0.315 | [0.285,0.345] |
| 2006 | -0.209 | [-0.282,-0.137] | 0.318 | [0.279,0.358] | -0.109 | [-0.188,-0.031] | 0.299 | [0.268,0.329] |
| 2005 | -0.188 | [-0.256,-0.119] | 0.316 | [0.274,0.359] | -0.135 | [-0.208,-0.061] | 0.271 | [0.241,0.300] |
| 2004 | -0.216 | [-0.292,-0.139] | 0.313 | [0.273,0.352] | -0.149 | [-0.226,-0.071] | 0.269 | [0.240,0.299] |
| 2003 | -0.236 | [-0.307,-0.164] | 0.328 | [0.288,0.368] | -0.102 | [-0.161,-0.043] | 0.254 | [0.226,0.282] |
| 2002 | -0.206 | [-0.269,-0.142] | 0.337 | [0.300,0.374] | -0.114 | [-0.170,-0.059] | 0.247 | [0.221,0.274] |
| 2001 | -0.253 | [-0.314,-0.193] | 0.338 | [0.300,0.375] | -0.128 | [-0.185,-0.071] | 0.268 | [0.243,0.293] |
| 2000 | -0.159 | [-0.216,-0.101] | 0.321 | [0.284,0.357] | -0.158 | [-0.211,-0.106] | 0.267 | [0.243,0.291] |
| 1999 | -0.060 | [-0.132,0.012] | 0.286 | [0.237,0.336] | -0.130 | [-0.193,-0.067] | 0.272 | [0.236,0.309] |
| 1998 | -0.085 | [-0.154,-0.017] | 0.273 | [0.224,0.323] | -0.088 | [-0.141,-0.035] | 0.214 | [0.180,0.248] |
| 1997 | -0.194 | [-0.275,-0.113] | 0.303 | [0.253,0.353] | -0.095 | [-0.164,-0.026] | 0.228 | [0.194,0.263] |
| 1996 | -0.144 | [-0.222,-0.067] | 0.295 | [0.247,0.344] | -0.087 | [-0.157,-0.016] | 0.219 | [0.185,0.254] |

Note: The coefficients presented are a selection from the full model based on samples of employed individuals aged 30–55.
–Source: SOEP v36, own calculations.

**Table A9:** Educational Wage Differentials, 1996–2019 (Women/Men; in ln, [CI])

| | Estimated Wage Differentials (OLS) Reference Category VET | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.197 | 0.222 | 0.291 | 0.461 | -0.133 | 0.207 | 0.409 | 0.464 |
| | [-0.273;-0.122] | [0.145;0.300] | [0.232;0.351] | [0.404;0.519] | [-0.211;-0.055] | [0.150;0.264] | [0.356;0.462] | [0.415;0.514] |
| 2018 | -0.18 | 0.251 | 0.334 | 0.466 | -0.096 | 0.229 | 0.405 | 0.451 |
| | [-0.249;-0.111] | [0.192;0.310] | [0.282;0.386] | [0.416;0.516] | [-0.168;-0.024] | [0.184;0.274] | [0.356;0.454] | [0.404;0.498] |
| 2017 | -0.178 | 0.206 | 0.3 | 0.449 | -0.163 | 0.23 | 0.427 | 0.457 |
| | [-0.249;-0.108] | [0.135;0.276] | [0.246;0.355] | [0.399;0.499] | [-0.233;-0.093] | [0.182;0.277] | [0.380;0.475] | [0.413;0.501] |
| 2016 | -0.171 | 0.223 | 0.319 | 0.435 | -0.101 | 0.189 | 0.4 | 0.468 |
| | [-0.242;-0.100] | [0.151;0.294] | [0.267;0.372] | [0.377;0.493] | [-0.178;-0.024] | [0.134;0.244] | [0.342;0.457] | [0.415;0.520] |
| 2015 | -0.213 | 0.207 | 0.366 | 0.48 | -0.056 | 0.215 | 0.436 | 0.499 |
| | [-0.287;-0.139] | [0.131;0.283] | [0.316;0.416] | [0.422;0.538] | [-0.142;0.030] | [0.165;0.265] | [0.380;0.492] | [0.446;0.552] |
| 2014 | -0.277 | 0.248 | 0.335 | 0.482 | -0.067 | 0.168 | 0.386 | 0.48 |
| | [-0.359;-0.195] | [0.178;0.317] | [0.286;0.385] | [0.425;0.538] | [-0.140;0.007] | [0.121;0.215] | [0.335;0.437] | [0.434;0.527] |
| 2013 | -0.263 | 0.252 | 0.323 | 0.474 | -0.109 | 0.155 | 0.437 | 0.485 |
| | [-0.336;-0.190] | [0.191;0.313] | [0.268;0.379] | [0.419;0.529] | [-0.195;-0.023] | [0.106;0.204] | [0.388;0.485] | [0.437;0.534] |
| 2012 | -0.271 | 0.236 | 0.346 | 0.506 | -0.145 | 0.183 | 0.397 | 0.51 |
| | [-0.340;-0.203] | [0.175;0.296] | [0.295;0.397] | [0.454;0.558] | [-0.219;-0.070] | [0.141;0.225] | [0.348;0.445] | [0.466;0.554] |
| 2011 | -0.237 | 0.237 | 0.35 | 0.512 | -0.13 | 0.137 | 0.385 | 0.47 |
| | [-0.306;-0.168] | [0.172;0.302] | [0.300;0.400] | [0.462;0.562] | [-0.209;-0.050] | [0.093;0.180] | [0.338;0.433] | [0.426;0.515] |
| 2010 | -0.196 | 0.194 | 0.358 | 0.506 | -0.104 | 0.157 | 0.368 | 0.481 |
| | [-0.274;-0.118] | [0.127;0.261] | [0.306;0.409] | [0.450;0.562] | [-0.185;-0.023] | [0.108;0.205] | [0.321;0.415] | [0.434;0.529] |
| 2009 | -0.197 | 0.198 | 0.297 | 0.453 | -0.114 | 0.129 | 0.341 | 0.466 |
| | [-0.272;-0.123] | [0.137;0.260] | [0.245;0.350] | [0.398;0.508] | [-0.193;-0.035] | [0.083;0.175] | [0.294;0.388] | [0.422;0.510] |
| 2008 | -0.169 | 0.163 | 0.27 | 0.46 | -0.117 | 0.135 | 0.352 | 0.477 |
| | [-0.250;-0.089] | [0.097;0.230] | [0.214;0.325] | [0.405;0.514] | [-0.197;-0.038] | [0.092;0.178] | [0.305;0.399] | [0.434;0.521] |
| 2007 | -0.196 | 0.199 | 0.282 | 0.481 | -0.131 | 0.142 | 0.338 | 0.48 |
| | [-0.271;-0.121] | [0.138;0.261] | [0.229;0.336] | [0.427;0.535] | [-0.211;-0.052] | [0.104;0.180] | [0.289;0.387] | [0.439;0.522] |
| 2006 | -0.211 | 0.143 | 0.287 | 0.459 | -0.113 | 0.108 | 0.366 | 0.453 |
| | [-0.284;-0.139] | [0.079;0.207] | [0.237;0.338] | [0.404;0.515] | [-0.192;-0.034] | [0.067;0.150] | [0.322;0.410] | [0.411;0.495] |
| 2005 | -0.188 | 0.158 | 0.27 | 0.455 | -0.14 | 0.099 | 0.308 | 0.445 |
| | [-0.257;-0.120] | [0.096;0.221] | [0.213;0.328] | [0.396;0.515] | [-0.214;-0.066] | [0.061;0.137] | [0.260;0.356] | [0.405;0.484] |
| 2004 | -0.218 | 0.147 | 0.272 | 0.456 | -0.154 | 0.096 | 0.326 | 0.426 |
| | [-0.294;-0.142] | [0.087;0.207] | [0.219;0.325] | [0.400;0.511] | [-0.232;-0.077] | [0.058;0.134] | [0.281;0.372] | [0.385;0.466] |
| 2003 | -0.236 | 0.159 | 0.281 | 0.468 | -0.11 | 0.081 | 0.309 | 0.422 |
| | [-0.308;-0.165] | [0.092;0.227] | [0.230;0.333] | [0.411;0.524] | [-0.169;-0.051] | [0.046;0.115] | [0.266;0.352] | [0.382;0.463] |
| 2002 | -0.208 | 0.178 | 0.282 | 0.482 | -0.123 | 0.076 | 0.316 | 0.407 |
| | [-0.272;-0.144] | [0.115;0.241] | [0.235;0.330] | [0.429;0.535] | [-0.178;-0.067] | [0.042;0.109] | [0.274;0.358] | [0.369;0.444] |
| 2001 | -0.256 | 0.161 | 0.295 | 0.486 | -0.135 | 0.092 | 0.319 | 0.439 |
| | [-0.317;-0.195] | [0.097;0.225] | [0.246;0.344] | [0.436;0.537] | [-0.192;-0.078] | [0.061;0.123] | [0.278;0.360] | [0.403;0.475] |
| 2000 | -0.159 | 0.2 | 0.268 | 0.441 | -0.164 | 0.099 | 0.319 | 0.426 |
| | [-0.217;-0.102] | [0.133;0.267] | [0.222;0.313] | [0.389;0.492] | [-0.217;-0.112] | [0.068;0.129] | [0.283;0.355] | [0.390;0.463] |
| 1999 | -0.062 | 0.098 | 0.253 | 0.421 | -0.136 | 0.127 | 0.302 | 0.405 |
| | [-0.135;0.010] | [0.007;0.188] | [0.193;0.314] | [0.347;0.496] | [-0.200;-0.073] | [0.080;0.174] | [0.248;0.356] | [0.351;0.460] |
| 1998 | -0.087 | 0.106 | 0.252 | 0.383 | -0.093 | 0.06 | 0.27 | 0.346 |
| | [-0.156;-0.019] | [0.005;0.206] | [0.196;0.307] | [0.305;0.460] | [-0.146;-0.040] | [0.016;0.104] | [0.212;0.328] | [0.299;0.393] |
| 1997 | -0.197 | 0.114 | 0.253 | 0.469 | -0.099 | 0.076 | 0.301 | 0.346 |
| | [-0.278;-0.116] | [0.017;0.211] | [0.195;0.310] | [0.390;0.548] | [-0.168;-0.030] | [0.032;0.121] | [0.243;0.358] | [0.297;0.394] |
| 1996 | -0.146 | 0.11 | 0.266 | 0.421 | -0.092 | 0.046 | 0.294 | 0.346 |
| | [-0.224;-0.069] | [0.016;0.204] | [0.206;0.325] | [0.348;0.495] | [-0.162;-0.021] | [0.001;0.092] | [0.240;0.349] | [0.295;0.397] |

Note: The coefficients presented are a selection from the full model based on samples of employed individuals aged 30–55.
–Source: SOEP v36, own calculations.

**Table A10:** Educational Wage Differentials 1996–2019, Age group 25–65
(Women/Men; in ln, [CI])

| | Estimated Wage Differentials (OLS) Reference Category VET | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.197 | 0.223 | 0.291 | 0.463 | -0.172 | 0.21 | 0.412 | 0.467 |
| | [-0.272,-0.122] | [0.145,0.300] | [0.231,0.351] | [0.406,0.520] | [-0.259,-0.084] | [0.153,0.268] | [0.358,0.465] | [0.415,0.520] |
| 2018 | -0.178 | 0.253 | 0.337 | 0.475 | -0.087 | 0.231 | 0.407 | 0.458 |
| | [-0.247,-0.109] | [0.194,0.312] | [0.285,0.388] | [0.425,0.525] | [-0.160,-0.014] | [0.186,0.277] | [0.357,0.456] | [0.410,0.506] |
| 2017 | -0.182 | 0.207 | 0.301 | 0.454 | -0.169 | 0.232 | 0.43 | 0.467 |
| | [-0.253,-0.112] | [0.136,0.278] | [0.246,0.355] | [0.404,0.504] | [-0.240,-0.098] | [0.184,0.280] | [0.382,0.479] | [0.422,0.511] |
| 2016 | -0.18 | 0.227 | 0.309 | 0.444 | -0.132 | 0.192 | 0.405 | 0.474 |
| | [-0.257,-0.103] | [0.156,0.299] | [0.253,0.366] | [0.385,0.503] | [-0.217,-0.047] | [0.137,0.248] | [0.348,0.463] | [0.421,0.527] |
| 2015 | -0.228 | 0.208 | 0.368 | 0.482 | -0.055 | 0.217 | 0.438 | 0.506 |
| | [-0.304,-0.152] | [0.132,0.285] | [0.318,0.419] | [0.424,0.540] | [-0.140,0.031] | [0.167,0.267] | [0.382,0.494] | [0.452,0.560] |
| 2014 | -0.274 | 0.259 | 0.339 | 0.488 | -0.09 | 0.173 | 0.386 | 0.481 |
| | [-0.356,-0.193] | [0.188,0.331] | [0.290,0.389] | [0.431,0.544] | [-0.170,-0.010] | [0.125,0.220] | [0.333,0.439] | [0.432,0.530] |
| 2013 | -0.264 | 0.255 | 0.324 | 0.477 | -0.12 | 0.158 | 0.441 | 0.49 |
| | [-0.336,-0.191] | [0.194,0.316] | [0.268,0.379] | [0.422,0.532] | [-0.210,-0.031] | [0.109,0.208] | [0.392,0.490] | [0.440,0.540] |
| 2012 | -0.27 | 0.237 | 0.347 | 0.507 | -0.15 | 0.179 | 0.397 | 0.507 |
| | [-0.338,-0.201] | [0.177,0.297] | [0.296,0.399] | [0.455,0.559] | [-0.224,-0.075] | [0.136,0.222] | [0.348,0.447] | [0.462,0.551] |
| 2011 | -0.236 | 0.239 | 0.353 | 0.515 | -0.141 | 0.137 | 0.379 | 0.47 |
| | [-0.305,-0.167] | [0.174,0.304] | [0.303,0.403] | [0.465,0.565] | [-0.222,-0.060] | [0.094,0.180] | [0.331,0.427] | [0.425,0.515] |
| 2010 | -0.194 | 0.196 | 0.362 | 0.514 | -0.118 | 0.16 | 0.375 | 0.490 |
| | [-0.277,-0.111] | [0.129,0.263] | [0.310,0.413] | [0.457,0.570] | [-0.201,-0.035] | [0.111,0.209] | [0.327,0.422] | [0.442,0.537] |
| 2009 | -0.186 | 0.2 | 0.297 | 0.456 | -0.106 | 0.131 | 0.35 | 0.471 |
| | [-0.263,-0.110] | [0.138,0.262] | [0.243,0.350] | [0.401,0.511] | [-0.185,-0.027] | [0.084,0.178] | [0.303,0.397] | [0.426,0.516] |
| 2008 | -0.184 | 0.167 | 0.273 | 0.462 | -0.125 | 0.137 | 0.353 | 0.477 |
| | [-0.267,-0.101] | [0.100,0.234] | [0.217,0.328] | [0.408,0.517] | [-0.206,-0.045] | [0.094,0.179] | [0.306,0.400] | [0.432,0.522] |
| 2007 | -0.205 | 0.201 | 0.285 | 0.484 | -0.126 | 0.14 | 0.335 | 0.481 |
| | [-0.281,-0.128] | [0.139,0.263] | [0.231,0.338] | [0.430,0.538] | [-0.207,-0.046] | [0.102,0.179] | [0.286,0.384] | [0.439,0.523] |
| 2006 | -0.217 | 0.142 | 0.287 | 0.459 | -0.108 | 0.106 | 0.368 | 0.458 |
| | [-0.290,-0.144] | [0.078,0.206] | [0.237,0.337] | [0.403,0.515] | [-0.188,-0.029] | [0.064,0.147] | [0.324,0.412] | [0.415,0.500] |
| 2005 | -0.199 | 0.16 | 0.272 | 0.457 | -0.166 | 0.099 | 0.308 | 0.437 |
| | [-0.270,-0.127] | [0.097,0.222] | [0.214,0.329] | [0.398,0.516] | [-0.244,-0.088] | [0.061,0.137] | [0.259,0.356] | [0.396,0.478] |
| 2004 | -0.219 | 0.154 | 0.272 | 0.455 | -0.162 | 0.1 | 0.324 | 0.416 |
| | [-0.295,-0.143] | [0.093,0.216] | [0.219,0.325] | [0.400,0.511] | [-0.242,-0.083] | [0.062,0.138] | [0.277,0.370] | [0.374,0.458] |
| 2003 | -0.237 | 0.158 | 0.275 | 0.466 | -0.156 | 0.08 | 0.299 | 0.425 |
| | [-0.309,-0.166] | [0.091,0.226] | [0.222,0.327] | [0.410,0.523] | [-0.226,-0.087] | [0.045,0.115] | [0.254,0.344] | [0.384,0.466] |
| 2002 | -0.217 | 0.17 | 0.285 | 0.485 | -0.17 | 0.079 | 0.318 | 0.415 |
| | [-0.282,-0.152] | [0.105,0.236] | [0.237,0.333] | [0.431,0.538] | [-0.236,-0.104] | [0.045,0.113] | [0.276,0.360] | [0.377,0.453] |
| 2001 | -0.256 | 0.161 | 0.299 | 0.487 | -0.153 | 0.096 | 0.315 | 0.438 |
| | [-0.317,-0.196] | [0.097,0.225] | [0.250,0.349] | [0.436,0.537] | [-0.214,-0.092] | [0.065,0.127] | [0.273,0.356] | [0.401,0.474] |
| 2000 | -0.159 | 0.205 | 0.261 | 0.437 | -0.165 | 0.1 | 0.318 | 0.422 |
| | [-0.217,-0.101] | [0.136,0.274] | [0.217,0.306] | [0.385,0.489] | [-0.219,-0.112] | [0.069,0.130] | [0.281,0.355] | [0.384,0.459] |
| 1999 | -0.066 | 0.097 | 0.259 | 0.428 | -0.163 | 0.106 | 0.3 | 0.403 |
| | [-0.138,0.007] | [0.007,0.187] | [0.198,0.319] | [0.353,0.502] | [-0.232,-0.094] | [0.055,0.157] | [0.246,0.354] | [0.349,0.458] |
| 1998 | -0.089 | 0.087 | 0.241 | 0.382 | -0.088 | 0.058 | 0.266 | 0.339 |
| | [-0.158,-0.019] | [-0.025,0.199] | [0.182,0.300] | [0.304,0.461] | [-0.141,-0.034] | [0.013,0.104] | [0.207,0.325] | [0.290,0.388] |
| 1997 | -0.198 | 0.121 | 0.254 | 0.468 | -0.096 | 0.079 | 0.296 | 0.35 |
| | [-0.279,-0.116] | [0.024,0.218] | [0.197,0.312] | [0.389,0.547] | [-0.165,-0.027] | [0.035,0.124] | [0.238,0.355] | [0.301,0.398] |
| 1996 | -0.145 | 0.119 | 0.268 | 0.427 | -0.089 | 0.052 | 0.298 | 0.347 |
| | [-0.223,-0.068] | [0.027,0.212] | [0.209,0.327] | [0.352,0.502] | [-0.160,-0.019] | [0.007,0.098] | [0.243,0.353] | [0.295,0.399] |

Note: The coefficients presented are a selection from the full model.
Source: SOEP v36, own calculations.

**Table A11:** Educational Wage Differentials, Dependent Workers (Women/Men; in ln, [CI])

| | Estimated Wage Differentials (OLS); Reference Category VET | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.176 | 0.129 | 0.286 | 0.437 | -0.139 | 0.058 | 0.297 | 0.362 |
| | [-0.247,-0.104] | [0.042,0.215] | [0.231,0.341] | [0.370,0.505] | [-0.198,-0.081] | [0.019,0.098] | [0.250,0.343] | [0.317,0.408] |
| 2018 | -0.179 | 0.127 | 0.268 | 0.487 | -0.077 | 0.071 | 0.301 | 0.345 |
| | [-0.256,-0.102] | [0.029,0.225] | [0.216,0.320] | [0.415,0.558] | [-0.138,-0.016] | [0.032,0.111] | [0.251,0.351] | [0.299,0.390] |
| 2017 | -0.072 | 0.127 | 0.259 | 0.43 | -0.064 | 0.09 | 0.308 | 0.385 |
| | [-0.139,-0.006] | [0.034,0.219] | [0.205,0.313] | [0.361,0.499] | [-0.113,-0.016] | [0.050,0.129] | [0.260,0.355] | [0.342,0.428] |
| 2016 | -0.072 | 0.149 | 0.256 | 0.425 | -0.142 | 0.112 | 0.34 | 0.417 |
| | [-0.142,-0.002] | [0.074,0.223] | [0.202,0.310] | [0.355,0.495] | [-0.200,-0.084] | [0.072,0.152] | [0.294,0.386] | [0.374,0.460] |
| 2015 | -0.185 | 0.216 | 0.266 | 0.445 | -0.152 | 0.129 | 0.331 | 0.428 |
| | [-0.242,-0.128] | [0.153,0.279] | [0.223,0.309] | [0.395,0.494] | [-0.200,-0.104] | [0.101,0.156] | [0.298,0.365] | [0.396,0.460] |
| 2014 | -0.27 | 0.189 | 0.279 | 0.476 | -0.144 | 0.119 | 0.344 | 0.437 |
| | [-0.327,-0.213] | [0.131,0.248] | [0.234,0.325] | [0.426,0.527] | [-0.196,-0.093] | [0.091,0.146] | [0.311,0.377] | [0.404,0.470] |
| 2013 | -0.223 | 0.181 | 0.277 | 0.493 | -0.131 | 0.104 | 0.322 | 0.413 |
| | [-0.284,-0.163] | [0.119,0.242] | [0.231,0.323] | [0.442,0.544] | [-0.187,-0.074] | [0.074,0.135] | [0.283,0.361] | [0.377,0.448] |
| 2012 | -0.24 | 0.166 | 0.285 | 0.481 | -0.106 | 0.1 | 0.321 | 0.421 |
| | [-0.306,-0.173] | [0.106,0.227] | [0.236,0.334] | [0.430,0.532] | [-0.161,-0.052] | [0.068,0.132] | [0.282,0.360] | [0.386,0.457] |
| 2011 | -0.223 | 0.141 | 0.258 | 0.453 | -0.156 | 0.111 | 0.318 | 0.436 |
| | [-0.296,-0.150] | [0.081,0.202] | [0.207,0.310] | [0.400,0.505] | [-0.223,-0.088] | [0.076,0.145] | [0.278,0.358] | [0.401,0.471] |
| 2010 | -0.204 | 0.158 | 0.267 | 0.472 | -0.099 | 0.127 | 0.324 | 0.451 |
| | [-0.273,-0.135] | [0.096,0.221] | [0.214,0.320] | [0.416,0.527] | [-0.161,-0.038] | [0.092,0.162] | [0.281,0.367] | [0.415,0.487] |
| 2009 | -0.225 | 0.163 | 0.295 | 0.479 | -0.11 | 0.147 | 0.359 | 0.447 |
| | [-0.299,-0.151] | [0.102,0.224] | [0.247,0.343] | [0.423,0.534] | [-0.181,-0.040] | [0.112,0.182] | [0.320,0.398] | [0.409,0.485] |
| 2008 | -0.237 | 0.23 | 0.29 | 0.488 | -0.095 | 0.149 | 0.352 | 0.472 |
| | [-0.308,-0.167] | [0.173,0.286] | [0.239,0.340] | [0.435,0.541] | [-0.170,-0.020] | [0.114,0.184] | [0.311,0.393] | [0.434,0.510] |
| 2007 | -0.219 | 0.198 | 0.273 | 0.489 | -0.128 | 0.156 | 0.368 | 0.474 |
| | [-0.292,-0.147] | [0.136,0.260] | [0.220,0.326] | [0.436,0.541] | [-0.200,-0.056] | [0.117,0.195] | [0.326,0.411] | [0.435,0.513] |
| 2006 | -0.219 | 0.223 | 0.306 | 0.48 | -0.109 | 0.171 | 0.368 | 0.48 |
| | [-0.291,-0.147] | [0.164,0.281] | [0.255,0.357] | [0.426,0.534] | [-0.181,-0.036] | [0.132,0.210] | [0.325,0.411] | [0.440,0.520] |
| 2005 | -0.193 | 0.215 | 0.356 | 0.524 | -0.119 | 0.182 | 0.365 | 0.507 |
| | [-0.271,-0.116] | [0.156,0.275] | [0.306,0.406] | [0.469,0.579] | [-0.193,-0.044] | [0.137,0.227] | [0.320,0.411] | [0.463,0.551] |
| 2004 | -0.239 | 0.26 | 0.35 | 0.53 | -0.151 | 0.152 | 0.397 | 0.488 |
| | [-0.303,-0.174] | [0.197,0.324] | [0.303,0.398] | [0.480,0.580] | [-0.226,-0.075] | [0.113,0.190] | [0.354,0.439] | [0.449,0.528] |
| 2003 | -0.277 | 0.265 | 0.352 | 0.516 | -0.146 | 0.191 | 0.396 | 0.512 |
| | [-0.341,-0.213] | [0.209,0.322] | [0.304,0.399] | [0.467,0.565] | [-0.217,-0.076] | [0.152,0.230] | [0.352,0.440] | [0.473,0.551] |
| 2002 | -0.23 | 0.268 | 0.349 | 0.487 | -0.127 | 0.171 | 0.42 | 0.489 |
| | [-0.299,-0.161] | [0.211,0.325] | [0.298,0.400] | [0.437,0.538] | [-0.202,-0.052] | [0.125,0.217] | [0.375,0.464] | [0.446,0.532] |
| 2001 | -0.234 | 0.255 | 0.344 | 0.494 | -0.094 | 0.19 | 0.377 | 0.486 |
| | [-0.310,-0.158] | [0.186,0.323] | [0.295,0.393] | [0.442,0.546] | [-0.164,-0.025] | [0.147,0.234] | [0.330,0.423] | [0.443,0.530] |
| 2000 | -0.195 | 0.216 | 0.371 | 0.495 | -0.079 | 0.22 | 0.422 | 0.507 |
| | [-0.269,-0.122] | [0.139,0.293] | [0.324,0.417] | [0.440,0.549] | [-0.160,0.003] | [0.172,0.268] | [0.372,0.473] | [0.457,0.556] |
| 1999 | -0.189 | 0.237 | 0.328 | 0.444 | -0.087 | 0.211 | 0.396 | 0.45 |
| | [-0.261,-0.117] | [0.170,0.304] | [0.278,0.378] | [0.387,0.501] | [-0.158,-0.016] | [0.163,0.258] | [0.345,0.446] | [0.401,0.499] |
| 1998 | -0.183 | 0.221 | 0.312 | 0.452 | -0.103 | 0.248 | 0.411 | 0.461 |
| | [-0.245,-0.121] | [0.158,0.285] | [0.262,0.361] | [0.406,0.499] | [-0.161,-0.045] | [0.205,0.291] | [0.368,0.454] | [0.420,0.501] |
| 1997 | -0.152 | 0.254 | 0.353 | 0.476 | -0.093 | 0.251 | 0.394 | 0.459 |
| | [-0.213,-0.091] | [0.197,0.311] | [0.309,0.397] | [0.431,0.520] | [-0.154,-0.033] | [0.209,0.293] | [0.348,0.440] | [0.417,0.500] |
| 1996 | -0.168 | 0.221 | 0.31 | 0.457 | -0.107 | 0.229 | 0.407 | 0.455 |
| | [-0.240,-0.096] | [0.152,0.290] | [0.258,0.363] | [0.405,0.508] | [-0.177,-0.037] | [0.181,0.277] | [0.361,0.454] | [0.410,0.500] |

Note: The coefficients presented are a selection from the full model based on samples of employed individuals aged 30–55.
Source: SOEP v36, own calculations.

**Table A12a:** Educational Wage Differentials, Age Group 30 – 55, West Germany (Women/Men; in ln, [CI])

| | Estimated Wage Differentials (West Germany) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.194 [-0.273,-0.115] | 0.186 [0.093,0.279] | 0.254 [0.187,0.321] | 0.430 [0.365,0.494] | -0.135 [-0.223,-0.047] | 0.251 [0.194,0.307] | 0.39 [0.325,0.456] | 0.469 [0.413,0.524] |
| 2018 | -0.166 [-0.237,-0.095] | 0.251 [0.184,0.319] | 0.305 [0.248,0.363] | 0.442 [0.385,0.499] | -0.047 [-0.124,0.030] | 0.252 [0.203,0.302] | 0.415 [0.364,0.467] | 0.447 [0.395,0.499] |
| 2017 | -0.183 [-0.259,-0.108] | 0.196 [0.118,0.273] | 0.273 [0.217,0.330] | 0.421 [0.364,0.478] | -0.152 [-0.226,-0.079] | 0.246 [0.193,0.300] | 0.400 [0.348,0.451] | 0.440 [0.389,0.492] |
| 2016 | -0.147 [-0.224,-0.069] | 0.187 [0.105,0.269] | 0.255 [0.187,0.323] | 0.374 [0.305,0.442] | -0.092 [-0.177,-0.008] | 0.232 [0.173,0.290] | 0.375 [0.312,0.439] | 0.446 [0.386,0.507] |
| 2015 | -0.198 [-0.279,-0.117] | 0.201 [0.114,0.288] | 0.283 [0.218,0.348] | 0.411 [0.343,0.480] | -0.086 [-0.178,0.007] | 0.219 [0.164,0.274] | 0.413 [0.351,0.476] | 0.48 [0.421,0.538] |
| 2014 | -0.260 [-0.348,-0.171] | 0.251 [0.172,0.330] | 0.299 [0.240,0.358] | 0.449 [0.383,0.514] | -0.087 [-0.163,-0.011] | 0.199 [0.151,0.247] | 0.370 [0.315,0.426] | 0.471 [0.418,0.523] |
| 2013 | -0.245 [-0.321,-0.168] | 0.241 [0.176,0.306] | 0.289 [0.220,0.358] | 0.425 [0.361,0.489] | -0.137 [-0.229,-0.045] | 0.154 [0.101,0.208] | 0.441 [0.389,0.492] | 0.479 [0.426,0.532] |
| 2012 | -0.245 [-0.315,-0.175] | 0.21 [0.140,0.281] | 0.302 [0.238,0.366] | 0.453 [0.391,0.514] | -0.178 [-0.257,-0.099] | 0.185 [0.141,0.228] | 0.366 [0.313,0.419] | 0.464 [0.414,0.514] |
| 2011 | -0.231 [-0.300,-0.162] | 0.189 [0.115,0.263] | 0.301 [0.239,0.362] | 0.437 [0.377,0.497] | -0.106 [-0.189,-0.023] | 0.159 [0.116,0.203] | 0.39 [0.340,0.441] | 0.449 [0.400,0.498] |
| 2010 | -0.205 [-0.284,-0.126] | 0.178 [0.108,0.247] | 0.332 [0.269,0.394] | 0.419 [0.351,0.487] | -0.102 [-0.192,-0.013] | 0.178 [0.128,0.229] | 0.351 [0.298,0.404] | 0.47 [0.417,0.524] |
| 2009 | -0.184 [-0.263,-0.105] | 0.158 [0.086,0.230] | 0.228 [0.161,0.295] | 0.359 [0.295,0.423] | -0.141 [-0.231,-0.051] | 0.142 [0.094,0.191] | 0.329 [0.276,0.381] | 0.435 [0.387,0.482] |
| 2008 | -0.168 [-0.251,-0.086] | 0.137 [0.060,0.213] | 0.186 [0.111,0.262] | 0.388 [0.322,0.455] | -0.152 [-0.235,-0.070] | 0.147 [0.102,0.191] | 0.344 [0.293,0.396] | 0.469 [0.420,0.518] |
| 2007 | -0.198 [-0.274,-0.122] | 0.16 [0.088,0.231] | 0.231 [0.157,0.304] | 0.419 [0.352,0.487] | -0.14 [-0.218,-0.063] | 0.142 [0.102,0.181] | 0.327 [0.275,0.378] | 0.453 [0.407,0.500] |
| 2006 | -0.205 [-0.279,-0.131] | 0.112 [0.036,0.188] | 0.27 [0.202,0.337] | 0.405 [0.336,0.474] | -0.112 [-0.188,-0.036] | 0.109 [0.065,0.153] | 0.335 [0.286,0.384] | 0.439 [0.392,0.487] |
| 2005 | -0.192 [-0.260,-0.123] | 0.111 [0.036,0.186] | 0.252 [0.178,0.327] | 0.424 [0.354,0.494] | -0.14 [-0.211,-0.069] | 0.099 [0.059,0.140] | 0.289 [0.234,0.343] | 0.431 [0.388,0.475] |
| 2004 | -0.211 [-0.289,-0.133] | 0.136 [0.060,0.211] | 0.224 [0.150,0.297] | 0.432 [0.367,0.497] | -0.16 [-0.237,-0.083] | 0.112 [0.072,0.152] | 0.323 [0.272,0.374] | 0.411 [0.366,0.457] |
| 2003 | -0.239 [-0.310,-0.168] | 0.135 [0.056,0.214] | 0.225 [0.152,0.297] | 0.425 [0.356,0.494] | -0.128 [-0.190,-0.066] | 0.07 [0.034,0.106] | 0.293 [0.246,0.341] | 0.408 [0.363,0.454] |
| 2002 | -0.213 [-0.279,-0.147] | 0.15 [0.072,0.229] | 0.284 [0.216,0.352] | 0.466 [0.403,0.528] | -0.134 [-0.191,-0.076] | 0.068 [0.032,0.104] | 0.298 [0.250,0.345] | 0.408 [0.366,0.449] |
| 2001 | -0.234 [-0.294,-0.174] | 0.172 [0.096,0.249] | 0.293 [0.220,0.366] | 0.454 [0.392,0.516] | -0.145 [-0.203,-0.086] | 0.099 [0.068,0.131] | 0.317 [0.274,0.360] | 0.443 [0.403,0.482] |
| 2000 | -0.178 [-0.236,-0.120] | 0.199 [0.116,0.283] | 0.258 [0.193,0.322] | 0.443 [0.381,0.505] | -0.182 [-0.238,-0.126] | 0.114 [0.081,0.146] | 0.338 [0.299,0.377] | 0.427 [0.387,0.468] |
| 1999 | -0.078 [-0.156,-0.000] | 0.1 [-0.005,0.205] | 0.288 [0.188,0.388] | 0.392 [0.302,0.482] | -0.155 [-0.228,-0.083] | 0.125 [0.073,0.177] | 0.355 [0.286,0.424] | 0.399 [0.341,0.456] |
| 1998 | -0.069 [-0.141,0.003] | 0.149 [0.037,0.260] | 0.248 [0.130,0.365] | 0.343 [0.244,0.443] | -0.11 [-0.166,-0.053] | 0.075 [0.029,0.122] | 0.307 [0.235,0.379] | 0.347 [0.292,0.402] |
| 1997 | -0.177 [-0.263,-0.090] | 0.149 [0.047,0.251] | 0.283 [0.180,0.386] | 0.481 [0.377,0.585] | -0.098 [-0.170,-0.026] | 0.074 [0.029,0.120] | 0.325 [0.256,0.394] | 0.364 [0.308,0.420] |
| 1996 | -0.134 [-0.218,-0.051] | 0.147 [0.050,0.244] | 0.202 [0.045,0.359] | 0.382 [0.281,0.482] | -0.093 [-0.169,-0.017] | 0.053 [0.005,0.101] | 0.332 [0.267,0.396] | 0.370 [0.313,0.427] |

Source: SOEP v36, own calculations.

**Table A12b:** Educational Wage Differentials, Age Group 30 – 55, East Germany (Women/Men; in ln, [CI])

| | Estimated Wage Differentials East Germany) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.179 [-0.396,0.038] | 0.303 [0.165,0.441] | 0.209 [0.081,0.338] | 0.529 [0.414,0.645] | -0.129 [-0.300,0.041] | 0.114 [-0.020,0.247] | 0.413 [0.304,0.521] | 0.467 [0.353,0.581] |
| 2018 | -0.249 [-0.477,-0.020] | 0.251 [0.125,0.377] | 0.369 [0.279,0.459] | 0.532 [0.435,0.630] | -0.147 [-0.324,0.031] | 0.174 [0.075,0.273] | 0.333 [0.197,0.470] | 0.498 [0.394,0.602] |
| 2017 | -0.14 [-0.296,0.017] | 0.296 [0.175,0.416] | 0.294 [0.180,0.408] | 0.525 [0.425,0.625] | -0.055 [-0.200,0.089] | 0.196 [0.093,0.299] | 0.426 [0.294,0.559] | 0.558 [0.470,0.646] |
| 2016 | -0.317 [-0.497,-0.136] | 0.303 [0.167,0.438] | 0.335 [0.235,0.435] | 0.588 [0.480,0.695] | -0.081 [-0.267,0.106] | 0.105 [-0.027,0.237] | 0.484 [0.353,0.615] | 0.502 [0.401,0.602] |
| 2015 | -0.232 [-0.407,-0.057] | 0.257 [0.094,0.419] | 0.415 [0.327,0.504] | 0.665 [0.565,0.765] | -0.004 [-0.222,0.214] | 0.201 [0.086,0.317] | 0.542 [0.413,0.671] | 0.566 [0.453,0.679] |
| 2014 | -0.167 [-0.353,0.018] | 0.284 [0.127,0.441] | 0.375 [0.280,0.469] | 0.599 [0.489,0.709] | -0.017 [-0.244,0.210] | 0.109 [-0.003,0.220] | 0.459 [0.318,0.600] | 0.544 [0.438,0.650] |
| 2013 | -0.307 [-0.524,-0.090] | 0.321 [0.166,0.475] | 0.341 [0.249,0.433] | 0.615 [0.518,0.712] | -0.079 [-0.317,0.159] | 0.139 [0.027,0.251] | 0.455 [0.321,0.590] | 0.545 [0.440,0.651] |
| 2012 | -0.324 [-0.540,-0.108] | 0.336 [0.225,0.446] | 0.363 [0.279,0.447] | 0.617 [0.511,0.722] | -0.095 [-0.328,0.138] | 0.167 [0.059,0.275] | 0.456 [0.325,0.587] | 0.581 [0.485,0.678] |
| 2011 | -0.150 [-0.439,0.140] | 0.369 [0.240,0.498] | 0.388 [0.305,0.471] | 0.679 [0.591,0.767] | -0.186 [-0.418,0.045] | 0.041 [-0.075,0.156] | 0.418 [0.297,0.539] | 0.544 [0.441,0.647] |
| 2010 | 0.121 [-0.570,0.813] | 0.344 [0.226,0.462] | 0.37 [0.283,0.457] | 0.696 [0.594,0.798] | -0.173 [-0.336,-0.009] | 0.08 [-0.039,0.199] | 0.398 [0.290,0.507] | 0.573 [0.471,0.675] |
| 2009 | -0.191 [-0.528,0.146] | 0.321 [0.209,0.433] | 0.282 [0.199,0.366] | 0.642 [0.545,0.738] | -0.088 [-0.264,0.088] | 0.12 [0.007,0.233] | 0.36 [0.263,0.458] | 0.542 [0.441,0.642] |
| 2008 | -0.433 [-1.087,0.220] | 0.253 [0.111,0.395] | 0.335 [0.253,0.416] | 0.625 [0.526,0.725] | -0.076 [-0.305,0.153] | 0.124 [0.016,0.231] | 0.400 [0.288,0.511] | 0.489 [0.382,0.596] |
| 2007 | -0.315 [-0.647,0.017] | 0.331 [0.216,0.445] | 0.296 [0.220,0.371] | 0.578 [0.475,0.682] | -0.103 [-0.348,0.141] | 0.109 [0.004,0.213] | 0.314 [0.180,0.449] | 0.555 [0.467,0.643] |
| 2006 | -0.662 [-1.085,-0.239] | 0.248 [0.135,0.361] | 0.318 [0.237,0.399] | 0.609 [0.521,0.698] | -0.14 [-0.391,0.111] | 0.076 [-0.033,0.184] | 0.453 [0.354,0.552] | 0.507 [0.420,0.594] |
| 2005 | -0.182 [-0.818,0.454] | 0.278 [0.157,0.399] | 0.28 [0.195,0.365] | 0.547 [0.438,0.657] | -0.241 [-0.496,0.015] | 0.081 [-0.019,0.181] | 0.382 [0.287,0.478] | 0.47 [0.377,0.562] |
| 2004 | -0.503 [-0.935,-0.071] | 0.191 [0.089,0.294] | 0.261 [0.187,0.336] | 0.493 [0.391,0.596] | -0.096 [-0.415,0.223] | 0.023 [-0.072,0.119] | 0.341 [0.247,0.434] | 0.423 [0.328,0.517] |
| 2003 | -0.453 [-1.136,0.231] | 0.202 [0.071,0.333] | 0.26 [0.186,0.334] | 0.514 [0.416,0.612] | -0.134 [-0.497,0.229] | 0.1 [0.003,0.196] | 0.346 [0.255,0.437] | 0.446 [0.361,0.530] |
| 2002 | -0.266 [-0.425,-0.107] | 0.23 [0.113,0.347] | 0.274 [0.203,0.344] | 0.521 [0.420,0.621] | -0.173 [-0.418,0.072] | 0.095 [0.005,0.185] | 0.354 [0.272,0.436] | 0.406 [0.328,0.485] |
| 2001 | -0.372 [-0.666,-0.078] | 0.175 [0.064,0.285] | 0.265 [0.198,0.333] | 0.514 [0.427,0.601] | -0.009 [-0.218,0.199] | 0.05 [-0.035,0.136] | 0.32 [0.236,0.403] | 0.413 [0.333,0.492] |
| 2000 | 0.201 [-0.195,0.598] | 0.257 [0.141,0.374] | 0.265 [0.201,0.329] | 0.435 [0.344,0.525] | -0.053 [-0.304,0.198] | 0.076 [-0.006,0.157] | 0.263 [0.176,0.350] | 0.384 [0.306,0.462] |
| 1999 | -0.103 [-0.306,0.099] | 0.155 [0.023,0.286] | 0.267 [0.191,0.344] | 0.472 [0.353,0.590] | -0.165 [-0.308,-0.022] | 0.145 [0.020,0.270] | 0.229 [0.143,0.314] | 0.401 [0.297,0.505] |
| 1998 | -0.298 [-0.488,-0.107] | -0.028 [-0.229,0.174] | 0.265 [0.193,0.337] | 0.427 [0.301,0.553] | 0.015 [-0.143,0.174] | 0.062 [-0.042,0.167] | 0.187 [0.091,0.283] | 0.326 [0.244,0.409] |
| 1997 | -0.283 [-0.518,-0.048] | 0.038 [-0.193,0.268] | 0.251 [0.181,0.322] | 0.462 [0.338,0.585] | 0.116 [-0.048,0.279] | 0.083 [-0.015,0.181] | 0.273 [0.170,0.377] | 0.334 [0.249,0.418] |
| 1996 | -0.310 [-0.465,-0.154] | 0.005 [-0.212,0.223] | 0.282 [0.217,0.347] | 0.431 [0.328,0.534] | -0.126 [-0.332,0.079] | 0.065 [-0.029,0.159] | 0.255 [0.163,0.346] | 0.317 [0.225,0.408] |

Source: SOEP v36, own calculations.

**Table A13a:** Educational Wage Differentials, Age Group 30–39, West Germany (Women/Men; in ln, [CI])

| | Estimated Wage Differentials (West Germany) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.247 [-0.424,-0.069] | 0.192 [0.030,0.354] | 0.231 [0.086,0.377] | 0.443 [0.340,0.546] | -0.225 [-0.385,-0.064] | 0.303 [0.194,0.412] | 0.461 [0.351,0.571] | 0.402 [0.293,0.511] |
| 2018 | -0.2 [-0.370,-0.030] | 0.34 [0.226,0.453] | 0.228 [0.095,0.361] | 0.353 [0.252,0.454] | -0.127 [-0.270,0.015] | 0.245 [0.150,0.341] | 0.432 [0.331,0.533] | 0.342 [0.258,0.426] |
| 2017 | -0.322 [-0.509,-0.135] | 0.242 [0.128,0.356] | 0.291 [0.179,0.403] | 0.428 [0.333,0.523] | -0.214 [-0.340,-0.088] | 0.288 [0.200,0.376] | 0.417 [0.322,0.513] | 0.363 [0.274,0.452] |
| 2016 | -0.112 [-0.274,0.050] | 0.283 [0.139,0.427] | 0.13 [-0.013,0.273] | 0.284 [0.162,0.407] | -0.186 [-0.357,-0.016] | 0.211 [0.099,0.323] | 0.352 [0.243,0.461] | 0.3 [0.181,0.420] |
| 2015 | -0.244 [-0.453,-0.034] | 0.264 [0.142,0.386] | 0.319 [0.188,0.450] | 0.443 [0.326,0.559] | -0.143 [-0.315,0.028] | 0.269 [0.163,0.375] | 0.479 [0.350,0.607] | 0.447 [0.327,0.567] |
| 2014 | -0.39 [-0.584,-0.196] | 0.145 [0.011,0.279] | 0.211 [0.097,0.324] | 0.385 [0.272,0.499] | -0.145 [-0.274,-0.017] | 0.212 [0.115,0.310] | 0.369 [0.262,0.476] | 0.474 [0.373,0.575] |
| 2013 | -0.313 [-0.477,-0.148] | 0.141 [0.023,0.259] | 0.248 [0.105,0.390] | 0.299 [0.195,0.403] | -0.197 [-0.361,-0.032] | 0.162 [0.052,0.272] | 0.389 [0.295,0.482] | 0.464 [0.362,0.566] |
| 2012 | -0.295 [-0.446,-0.144] | 0.211 [0.084,0.337] | 0.296 [0.171,0.421] | 0.457 [0.364,0.550] | -0.269 [-0.391,-0.147] | 0.189 [0.085,0.293] | 0.341 [0.244,0.438] | 0.39 [0.283,0.496] |
| 2011 | -0.321 [-0.463,-0.179] | 0.22 [0.081,0.358] | 0.272 [0.155,0.389] | 0.332 [0.226,0.437] | -0.26 [-0.410,-0.110] | 0.146 [0.050,0.243] | 0.352 [0.254,0.451] | 0.417 [0.321,0.513] |
| 2010 | -0.188 [-0.346,-0.029] | 0.04 [-0.196,0.277] | 0.281 [0.178,0.383] | 0.335 [0.222,0.447] | -0.181 [-0.318,-0.043] | 0.159 [0.053,0.265] | 0.355 [0.249,0.461] | 0.407 [0.306,0.508] |
| 2009 | -0.193 [-0.375,-0.011] | 0.132 [0.003,0.261] | 0.177 [0.075,0.280] | 0.295 [0.190,0.399] | -0.235 [-0.387,-0.083] | 0.144 [0.034,0.254] | 0.343 [0.235,0.451] | 0.447 [0.352,0.541] |
| 2008 | -0.267 [-0.434,-0.100] | 0.127 [0.036,0.217] | 0.198 [0.087,0.310] | 0.362 [0.259,0.466] | -0.256 [-0.400,-0.112] | 0.131 [0.029,0.234] | 0.344 [0.247,0.441] | 0.405 [0.313,0.496] |
| 2007 | -0.199 [-0.371,-0.027] | 0.112 [-0.003,0.227] | 0.257 [0.138,0.376] | 0.384 [0.272,0.496] | -0.182 [-0.313,-0.051] | 0.187 [0.116,0.259] | 0.329 [0.252,0.407] | 0.366 [0.285,0.446] |
| 2006 | -0.28 [-0.456,-0.104] | 0.159 [0.047,0.271] | 0.252 [0.145,0.359] | 0.313 [0.199,0.427] | -0.174 [-0.321,-0.026] | 0.165 [0.085,0.245] | 0.289 [0.212,0.365] | 0.349 [0.266,0.432] |
| 2005 | -0.259 [-0.396,-0.122] | 0.118 [0.007,0.230] | 0.175 [0.063,0.286] | 0.366 [0.265,0.467] | -0.142 [-0.263,-0.022] | 0.152 [0.086,0.218] | 0.238 [0.151,0.325] | 0.382 [0.303,0.460] |
| 2004 | -0.225 [-0.373,-0.076] | 0.118 [0.021,0.215] | 0.222 [0.121,0.323] | 0.369 [0.268,0.470] | -0.23 [-0.361,-0.100] | 0.141 [0.072,0.210] | 0.284 [0.211,0.356] | 0.317 [0.243,0.391] |
| 2003 | -0.214 [-0.352,-0.077] | 0.151 [0.045,0.258] | 0.182 [0.076,0.288] | 0.369 [0.248,0.490] | -0.126 [-0.232,-0.021] | 0.083 [0.028,0.138] | 0.271 [0.200,0.342] | 0.308 [0.232,0.384] |
| 2002 | -0.219 [-0.362,-0.077] | 0.109 [-0.011,0.230] | 0.242 [0.134,0.351] | 0.403 [0.288,0.518] | -0.125 [-0.226,-0.024] | 0.092 [0.038,0.146] | 0.242 [0.170,0.313] | 0.34 [0.269,0.411] |
| 2001 | -0.273 [-0.386,-0.159] | 0.114 [-0.015,0.243] | 0.168 [0.063,0.272] | 0.378 [0.272,0.483] | -0.092 [-0.182,-0.002] | 0.082 [0.036,0.128] | 0.288 [0.225,0.351] | 0.401 [0.335,0.467] |
| 2000 | -0.219 [-0.330,-0.107] | 0.205 [0.082,0.329] | 0.256 [0.159,0.354] | 0.303 [0.210,0.395] | -0.155 [-0.232,-0.078] | 0.095 [0.048,0.143] | 0.283 [0.222,0.343] | 0.323 [0.260,0.387] |
| 1999 | -0.11 [-0.240,0.020] | 0.071 [-0.083,0.224] | 0.238 [0.092,0.384] | 0.246 [0.128,0.363] | -0.138 [-0.237,-0.039] | 0.11 [0.032,0.187] | 0.366 [0.274,0.458] | 0.304 [0.214,0.394] |
| 1998 | -0.098 [-0.215,0.019] | 0.13 [-0.041,0.301] | 0.15 [0.009,0.290] | 0.191 [0.030,0.352] | -0.131 [-0.205,-0.056] | 0.015 [-0.057,0.088] | 0.245 [0.149,0.341] | 0.193 [0.096,0.290] |
| 1997 | -0.116 [-0.271,0.038] | 0.07 [-0.057,0.197] | 0.275 [0.162,0.389] | 0.296 [0.152,0.441] | -0.027 [-0.126,0.072] | 0.033 [-0.032,0.098] | 0.302 [0.208,0.397] | 0.211 [0.111,0.311] |
| 1996 | -0.097 [-0.243,0.049] | 0.191 [0.073,0.309] | 0.05 [-0.196,0.295] | 0.196 [0.026,0.367] | -0.052 [-0.147,0.042] | 0.006 [-0.064,0.076] | 0.298 [0.206,0.391] | 0.279 [0.190,0.369] |

Note: The coefficients presented are a selection from the full model.
Source: SOEP v36, own calculations.

**Table A13b:** Educational Wage Differentials, Age Group 30–39, East Germany (Women/Men; in ln, [CI])

| | Estimated Wage Differentials (East Germany) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Women | | | | Men | | | |
| Year | No Degree | MC | UAS | U | No Degree | MC | UAS | U |
| 2019 | -0.220 [-0.550,0.110] | 0.442 [0.133,0.750] | 0.065 [-0.358,0.487] | 0.406 [0.182,0.630] | -0.246 [-0.494,0.002] | 0.091 [-0.228,0.410] | 0.284 [0.095,0.473] | 0.387 [0.204,0.570] |
| 2018 | -0.344 [-0.708,0.020] | 0.45 [0.217,0.682] | 0.421 [0.193,0.649] | 0.506 [0.319,0.693] | -0.265 [-0.523,-0.007] | 0.238 [0.031,0.444] | 0.308 [0.130,0.485] | 0.348 [0.160,0.536] |
| 2017 | -0.182 [-0.481,0.116] | 0.383 [-0.000,0.766] | 0.385 [0.147,0.623] | 0.406 [0.219,0.593] | -0.238 [-0.470,-0.005] | 0.197 [0.017,0.378] | 0.242 [-0.086,0.570] | 0.46 [0.328,0.593] |
| 2016 | -0.409 [-0.627,-0.190] | 0.389 [0.089,0.688] | 0.563 [0.357,0.769] | 0.398 [0.180,0.616] | -0.074 [-0.255,0.107] | 0.239 [-0.011,0.488] | 0.581 [0.372,0.791] | 0.497 [0.338,0.656] |
| 2015 | -0.214 [-0.429,-0.000] | 0.282 [-0.122,0.685] | 0.37 [0.136,0.605] | 0.505 [0.338,0.672] | -0.079 [-0.358,0.201] | 0.23 [0.001,0.458] | 0.553 [0.301,0.806] | 0.58 [0.359,0.801] |
| 2014 | -0.114 [-0.345,0.118] | 0.358 [0.035,0.680] | 0.489 [0.322,0.656] | 0.358 [0.194,0.523] | -0.106 [-0.472,0.260] | 0.196 [-0.014,0.406] | 0.511 [0.072,0.950] | 0.587 [0.380,0.793] |
| 2013 | -0.206 [-0.478,0.067] | 0.487 [0.200,0.775] | 0.409 [0.204,0.614] | 0.459 [0.250,0.669] | -0.129 [-0.486,0.227] | 0.103 [-0.109,0.315] | 0.539 [0.320,0.758] | 0.445 [0.217,0.673] |
| 2012 | -0.214 [-0.476,0.048] | 0.509 [0.315,0.703] | 0.373 [0.174,0.573] | 0.435 [0.256,0.614] | -0.118 [-0.470,0.234] | 0.15 [-0.012,0.312] | 0.606 [0.420,0.792] | 0.52 [0.340,0.699] |
| 2011 | -0.051 [-0.387,0.284] | 0.458 [0.272,0.644] | 0.502 [0.326,0.677] | 0.652 [0.485,0.819] | -0.543 [-0.931,-0.155] | 0.012 [-0.200,0.223] | 0.442 [0.256,0.628] | 0.473 [0.280,0.666] |
| 2010 | -0.244 [-1.013,0.524] | 0.375 [0.201,0.550] | 0.466 [0.269,0.662] | 0.526 [0.274,0.777] | -0.135 [-0.377,0.107] | 0.122 [-0.091,0.334] | 0.37 [0.205,0.535] | 0.303 [0.098,0.508] |
| 2009 | -0.051 [-0.480,0.377] | 0.371 [0.195,0.546] | 0.345 [0.127,0.562] | 0.633 [0.441,0.825] | -0.261 [-0.549,0.028] | 0.195 [0.034,0.357] | 0.351 [0.203,0.500] | 0.474 [0.283,0.664] |
| 2008 | 0.267 [-0.027,0.560] | 0.29 [0.052,0.527] | 0.514 [0.341,0.688] | 0.532 [0.367,0.696] | -0.094 [-0.358,0.170] | 0.068 [-0.134,0.269] | 0.402 [0.178,0.626] | 0.478 [0.302,0.653] |
| 2007 | -0.147 [-0.495,0.201] | 0.397 [0.236,0.559] | 0.305 [0.137,0.472] | 0.572 [0.380,0.765] | 0.028 [-0.241,0.297] | 0.081 [-0.084,0.245] | 0.492 [0.267,0.718] | 0.479 [0.314,0.643] |
| 2006 | -0.541 [-1.173,0.091] | 0.28 [0.124,0.435] | 0.268 [0.076,0.460] | 0.544 [0.350,0.739] | -0.037 [-0.319,0.246] | 0.037 [-0.192,0.266] | 0.594 [0.406,0.781] | 0.428 [0.268,0.588] |
| 2005 | 0.207 [-0.611,1.024] | 0.365 [0.215,0.515] | 0.289 [0.158,0.419] | 0.519 [0.328,0.710] | -0.106 [-0.368,0.157] | 0.124 [-0.021,0.269] | 0.520 [0.338,0.702] | 0.504 [0.360,0.647] |
| 2004 | -0.608 [-0.795,-0.420] | 0.302 [0.137,0.466] | 0.244 [0.129,0.360] | 0.405 [0.218,0.592] | -0.162 [-0.511,0.187] | -0.035 [-0.205,0.135] | 0.335 [0.108,0.561] | 0.246 [0.013,0.479] |
| 2003 | -- -- | 0.287 [0.057,0.518] | 0.279 [0.134,0.425] | 0.458 [0.258,0.658] | -0.054 [-0.358,0.250] | 0.031 [-0.159,0.221] | 0.385 [0.194,0.575] | 0.404 [0.239,0.569] |
| 2002 | -- -- | 0.330 [0.084,0.576] | 0.263 [0.149,0.376] | 0.491 [0.296,0.685] | -0.172 [-0.455,0.111] | 0.106 [-0.060,0.272] | 0.371 [0.231,0.510] | 0.482 [0.358,0.605] |
| 2001 | -0.33 [-0.977,0.317] | 0.104 [-0.109,0.317] | 0.247 [0.132,0.363] | 0.419 [0.238,0.599] | 0.244 [-0.031,0.520] | 0.049 [-0.100,0.199] | 0.34 [0.191,0.489] | 0.344 [0.192,0.497] |
| 2000 | 0.456 [-0.135,1.048] | 0.298 [0.061,0.536] | 0.205 [0.087,0.324] | 0.412 [0.250,0.573] | 0.156 [-0.146,0.458] | 0.031 [-0.135,0.197] | 0.307 [0.153,0.460] | 0.449 [0.325,0.572] |
| 1999 | 0.08 [-0.281,0.441] | 0.181 [-0.030,0.393] | 0.253 [0.123,0.383] | 0.471 [0.301,0.642] | -0.167 [-0.411,0.078] | 0.176 [-0.027,0.379] | 0.383 [0.221,0.545] | 0.328 [0.176,0.479] |
| 1998 | -0.082 [-0.408,0.245] | -0.133 [-0.313,0.046] | 0.198 [0.090,0.306] | 0.439 [0.282,0.596] | 0.073 [-0.091,0.236] | 0.089 [-0.080,0.258] | 0.38 [0.187,0.572] | 0.18 [0.011,0.350] |
| 1997 | 0.808 [0.674,0.941] | 0.52 [0.105,0.934] | 0.254 [0.154,0.354] | 0.34 [0.114,0.566] | 0.13 [-0.122,0.383] | 0.141 [-0.015,0.297] | 0.455 [0.224,0.685] | 0.276 [0.128,0.423] |
| 1996 | -0.304 [-0.429,-0.179] | 0.124 [-0.325,0.572] | 0.206 [0.110,0.303] | 0.475 [0.344,0.607] | -0.421 [-0.625,-0.216] | 0.132 [0.005,0.259] | 0.327 [0.195,0.459] | 0.344 [0.172,0.517] |

Note: The coefficients presented are a selection from the full model.
Source: SOEP v36, own calculations.

**Table A14:** Educational Wage Differentials by Study Majors, four selected years (in ln)

| **a) Women** | **2012** | | **2014** | | **2016** | | **2019** | |
|---|---|---|---|---|---|---|---|---|
| | **UAS** | **U** | **UAS** | **U** | **UAS** | **U** | **UAS** | **U** |
| Arts | -- | .42*** | -- | .35*** | -- | .31*** | -- | .36*** |
| Law | -- | .59*** | -- | .56*** | -- | .58*** | -- | .57*** |
| Economics | .43*** | .60*** | .41*** | .59*** | .42*** | .61*** | .38*** | .53*** |
| Soc. Sciences | .27*** | .46*** | .34*** | .34*** | .25*** | .32*** | .21*** | .36*** |
| Medicine | -- | .83*** | -- | .82*** | -- | .78*** | -- | .96*** |
| Nat. Sciences | -- | .62*** | -- | .59*** | -- | .47*** | -- | .52*** |
| Engineering | .39*** | .48*** | .34*** | .46*** | .32*** | .44*** | .31*** | .53*** |
| # of obs./$R^2$ | 2,900 | .22 | 2,409 | .23 | 2,045 | .22 | 1,990 | .23 |
| **b) Men** | **2012** | | **2014** | | **2016** | | **2019** | |
| | **UAS** | **U** | **UAS** | **U** | **UAS** | **U** | **UAS** | **U** |
| Arts | -- | 0.24*** | | 0.33*** | | 0.19*[a)] | -- | .26*** |
| Law | -- | 0.64*** | | 0.68*** | | 0.66*** | -- | .74*** |
| Economics | 0.42*** | 0.49*** | 0.35*** | 0.41*** | 0.39*** | 0.42*** | .41*** | .52*** |
| Soc. Sciences | 0.21*** | 0.37*** | 0.07ns[a)] | 0.34*** | 0.28***[a)] | 0.34*** | .10 | .35*** |
| Medicine | -- | 0.71*** | -- | 0.71*** | -- | 0.78*** | -- | .71***[a)] |
| Nat. Sciences | -- | 0.56*** | -- | 0.57*** | -- | 0.55*** | -- | .48*** |
| Engineering | 0.48*** | 0.54*** | 0.48*** | 0.55*** | 0.46*** | 0.50*** | .51*** | .58*** |
| # obs./$R^2$ | 2,877 | 0.32 | 2,383 | 0.32 | 1,960 | 0.30 | 1,883 | 0.33 |

Note: OLS estimates (see Figure 6) based on samples of employed individuals aged 30–55. Findings for other subjects, such as agricultural studies and fine arts, are not included in the table. [a)] The estimated coefficient for the subject in the year was implausible. We therefore report the coefficient from the previous/following year's estimates.

Source: SOEP v36; own calculations.

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