

Gender Pay Gap



EDITORIAL by Katharina Wrohlich

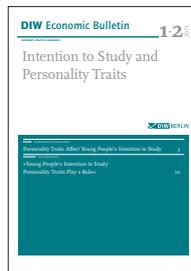
There is a lot left to do to reach gender equality in Germany 427

REPORT by Katharina Wrohlich and Aline Zucco

Gender pay gap varies greatly by occupation 429

REPORT by Peter Haan, Anna Hammerschmid and Carla Rowold

Gender gaps in pensions and health: Germany, France, and Denmark 436



The DIW Economic Bulletin contains English-language versions of selected articles and interviews from the DIW Wochenbericht in English. As the institute's flagship publication, the DIW Wochenbericht provides an independent view on the economic development in Germany and the world, addressing the media as well as leaders in politics, business, and society.

The DIW Economic Bulletin is published weekly and is available as a free download from DIW Berlin's website.

THE NEWSLETTER FROM THE INSTITUTE



DIW's English-language newsletter offers a summary of the Institute's latest news, publications, and events on a bi-weekly basis. "New Issue Alerts" for the DIW Economic Bulletin and the DIW Roundup are also available.

>> Subscribe to DIW Newsletter in English at: www.diw.de/newsletter_en

Publishers

Prof. Dr. Tomaso Duso
Dr. Ferdinand Fichtner
Prof. Marcel Fratzscher, Ph.D.
Prof. Dr. Peter Haan
Prof. Dr. Claudia Kemfert
Prof. Dr. Lukas Menkhoff
Prof. Johanna Mollerstrom, Ph.D.
Prof. Karsten Neuhoff, Ph.D.
Prof. Dr. Jürgen Schupp
Prof. Dr. C. Katharina Spieß
Prof. Dr. Gert G. Wagner

Reviewer

Prof. Dr. Martin Kroh

Editors in chief

Dr. Gritje Hartmann
Dr. Wolf-Peter Schill

Editorial staff

Renate Bogdanovic
Dr. Franziska Bremus
Claudia Cohnen-Beck
Prof. Dr. Christian Dreger
Dr. Daniel Kemptner
Sebastian Kollmann
Markus Reiniger
Mathilde Richter
Dr. Alexander Zerrahn

Layout and Composition

Satz-Rechen-Zentrum, Berlin

Sale and distribution

DIW Berlin
ISSN 2192-7219

Reprint and further distribution—including excerpts—with complete reference and consignment of a specimen copy to DIW Berlin's Communications Department (kundenservice@diw.berlin) only. Printed on 100% recycled paper.

There is a lot left to do to reach gender equality in Germany

By Katharina Wrohlich

In Germany, four political parties are currently struggling to forge a mutual platform of government. In the wake of the last election, the share of female MPs in the German parliament, the Bundestag, declined significantly. Gender equality nevertheless needs to play a central role in the new government program. On the labor market, gender equality is still a faraway goal. The same is also true for care work, which includes day care for children and nursing care for relatives. There are still major differences between men and women when it comes to opportunities for participation, promotion, and higher pay in professional life.

The lack of equal opportunity is a defining characteristic of the labor market in Germany. This has extensive consequences for both women and German society as a whole. This issue of the *DIW Economic Bulletin* takes a closer look at some of them.

The gender pay gap—the average difference in pay between men and women—has hovered around 21 percent in recent years, putting Germany far above the OECD member states' average of 15 percent.¹ In this issue, Katharina Wrohlich and Aline Zucco show the magnitude of the gap between the average wages in typical “women’s professions” and “men’s professions.” Their contribution also demonstrates that very large gender pay gaps exist *within* many individual professions.

A consequence of unequal wage distribution is an even more unequal income distribution, as Stefan Bach’s contribution to this issue shows. Taking into account all types of income, women earn only half of the gross income

that men earn—a value that remained virtually the same between 2007 and 2010, the year of the most current analysis.

Lower earnings were the key reason for women’s lower incomes. Gender differences for other forms of income are significantly lower. In addition to the gender pay gap, women often work fewer hours per week—an often involuntary factor that itself results from the unequal distribution of care work.²

The large differences between the career paths and pay of men and women lead to large differences in lifelong income and as a result, to large gaps in retirement income. In Germany, the gender pension gap is approximately 53 percent. Peter Haan, Anna Hammerschmid, and Carla Rowold document this in the issue’s third article. In comparison, at 24 percent the value in neighboring Denmark is significantly lower. The authors also examined gender-specific differences in the frequency of depression. Women are more prone to depression than men, and the likelihood is higher in countries where the gender pension gap is higher. This finding suggests a correlation between the two facts, that the cumulative, lifetime inequality of men and women in the labor market could have very long-term effects far beyond their material livelihoods.

Closing the gender pay gap is key to providing equal chances to women and men. This is where policy can and should intervene. Among the reasons for the large gender pay gap are career interruptions for family-related reasons and number of hours worked, that both hamper women’s

¹ OECD, “The Pursuit of Gender Equality. An Uphill Battle,” OECD Publishing, Paris, 2017 (available online).

² See Elke Holst and Anna Wieber, “Eastern Germany Ahead in Employment of Women,” *DIW Economic Bulletin* no. 11 (2014): 33–41 (available online).

careers.³ Much-needed policy measures would be more and better childcare, more and better all-day schools, both allowing for better work-life-balance. Policy can also influence the division of tasks between men and women. We need stronger incentives for a fair sharing of professional activity and care work. Here we would favor changes in the tax and social benefits system—for instance reforming income tax splitting for married spouses. Combined with the subsidizing of marginal employment (“Minijobs”), the current system generates the wrong incentives for married women. In addition, extending the length of the fathers’ quota in parental leave could lead men to more commitment for their family and a more equal division of care work.

3 See also Christina Boll and Julian Lepin, “Die geschlechtsspezifische Lohnlücke in Deutschland. Umfang, Ursachen und Interpretation,” *Wirtschaftsdienst* 2015/4 (2015): 249–254.

Katharina Wrohlich is a Research Associate in the research group Gender Studies at DIW Berlin | kwrohlich@diw.de

It is up to all of society, and not just policy-makers, to create equal chances for women and men. Companies should review their structures. As employers compete for the best talents, those that can offer their employees—male and female—better opportunities to manage their working time flexibly will be at an advantage.

It is also crucial that organizations be transparent, with regard to both earnings and career opportunities. Policy can initiate and accompany the cultural change needed at the workplace. The quota for women in advisory boards and the Remuneration Transparency Act (*Entgelttransparenzgesetz*), both already in force, are first steps in the right direction.

Gender pay gap varies greatly by occupation

By Katharina Wrohlich and Aline Zucco

The German labor market is characterized by marked occupational segregation between women and men. The median earnings in female dominated occupations are lower than those in male dominated professions. This is one of the reasons for the gender pay gap. However, there are also large differences in earnings between men and women within occupations. These profession-specific gender pay gaps are smaller in professions with a high proportion of employees in the public sector. This finding indicates that more transparency with respect to earnings could reduce the gender pay gap in the private economy.

The discrepancy in pay between men and women has become a hotly debated topic in the political arena. The German Federal Statistical Office (*Statistische Bundesamt*) documented the extent of the “unadjusted” pay gap, which has hovered around 21 to 23 percent in the years 2006 to 2016.¹ The gender pay gap widens considerably over the course of professional careers, and for income over a lifetime the *gender lifetime earnings gap* is just under 50 percent.² After people retire, the difference in pay continues in the form of the *gender pension gap*, which measures the gender-specific difference in pension levels. Current calculations document that the gender pension gap is a major problem—particularly in Germany. In 2014, it was 42 percent in western Germany and 23 percent in eastern Germany.³

The “adjusted” pay gap is often a topic of discussion.⁴ This term describes the unexplained portion of the gender pay gap and accounts for differences in characteristics in the earning estimate such as: professional experience, education, sector, profession, company size, number of hours worked, tasks, hierarchy level, and type of employment contract. According to the German Federal Statistical Office, the adjusted pay gap equals six percent.⁵

1 German Federal Statistical Office, “Drei Viertel des Gender Pay Gaps lassen sich mit Strukturunterschieden erklären,” (press release, German Statistical Office, Wiesbaden, March 14, 2017) (available online, accessed October 5, 2017. This also applies to all other online sources in this study, if not stated otherwise); and Christina Boll and Julian S. Leppin, “Die geschlechtsspezifische Lohnlücke in Deutschland: Umfang, Ursachen und Interpretation,” *ZBW Wirtschaftsdienst* 2015/4 (2015): 249–254.

2 Christina Boll, et al., “Dauerhaft ungleich – berufsspezifische Lebenserwerbseinkommen von Frauen und Männern in Deutschland,” *HWWI Policy Paper* 98 (2016).

3 Markus M. Grabka et al., “Der Gender Pension Gap verstärkt die Einkommensungleichheit von Männern und Frauen im Rentenalter,” *DIW Wochenbericht* no. 5 (2016): 87–96 (available online). See also the article by Anna Hammerschmid, Peter Haan and Carla Rowold in this issue.

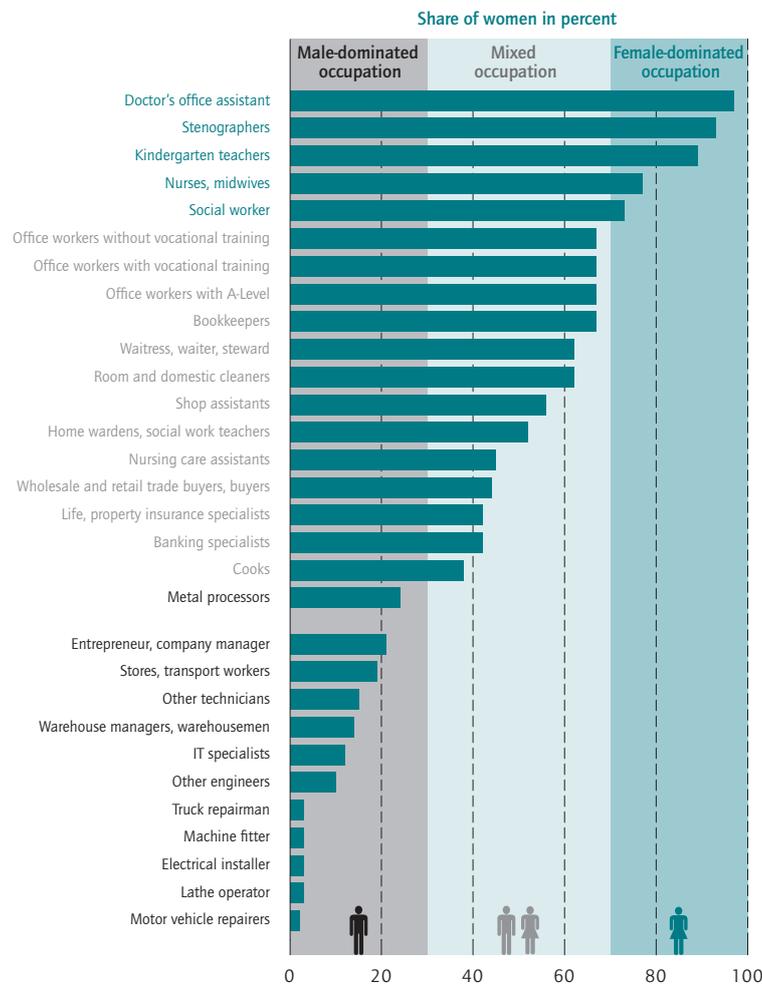
4 For a discussion of the terms “adjusted pay gap” and “unadjusted pay gap,” see the term “gender pay gap” in the DIW Glossary (available online).

5 The adjusted gender pay gap of six percent refers to 2014, the last year in which the Pay Structure Survey was conducted. The survey was the basis for calculating the adjusted gender pay gap. See German Federal Statistical Office, “Drei Viertel des Gender Pay Gaps”; and Claudia Finke, “Verdienstunterschiede zwischen Männern und Frauen. Eine Ursachenanalyse auf Grundlage der Verdienststrukturerhebung 2006,” *Wirtschaft und Statistik* 1 (2011): 36–48.

Figure 1

Share of women in occupations

Distribution of the 30 most frequent occupations in male dominated, mixed and female dominated occupations (share of women in percent)



Note: The calculations are solely based on full-time employed persons. The assignment to the respective occupations is based on the KldB 88. The translation of the German professional titles refers to the BiBB.

Source: Authors' own calculations based on the SIAB data for 2014.

© DIW Berlin 2017

The labor market in Germany is very sex segregated. Only 13 of the most frequent occupations are mixed occupations.

The characteristics of number of hours worked, profession, and vertical segregation explain the pay gap to a large extent. This fact is often used to argue that the pay gap between men and women stems from different sets of decisions and is therefore possibly driven by different preferences. However, choice of profession and number of hours worked are not only expressions of preference. They are also the consequences of societal and institutional norms and restrictions.⁶

German labor market shows marked professional segregation between men and women

The German labor market is heavily segregated by gender. As a study of the Institute for Employment Research (IAB) of the Federal Employment Agency documented,⁷ in 2010 a total of 60 percent of women worked in female dominated, 29 percent in mixed gender, and 11 percent in male dominated occupations. “Female dominated occupations” refer to those in which the proportion of women is over 70 percent, and “male dominated occupations” refer to those with a proportion of women of less than 30 percent. All other occupations are defined as mixed gender professions.

In total, 69 percent of men work in male dominated occupations, 20 percent in mixed gender occupations, and 11 percent in female dominated occupations. The IAB study also showed that there was virtually no change in the distribution of women and men among female dominated, male dominated and gender mixed professions between 1976 and 2010 in western Germany. Further studies document a similar relationship nationwide between 1993 and 2010.⁸

A current evaluation of the sample of the 2014 IAB data, Sample of Integrated Labour Market Biographies (SIAB) (Box), showed that not even half (13) of the 30 most frequently cited professions⁹ are mixed gender professions (Figure 1). With a proportion of women of more than 80 percent, stenographers, kindergarten teachers, and doctor's office assistants are among the typical women's professions. Lathe operator, electrical installer, and truck repairman are all professions with an average proportion

6 See for example Christina Klenner, "Gender Pay Gap - die geschlechtsspezifische Lohnlücke und ihre Ursachen," *Policy Brief WSI 07/2016* (2016).
 7 Ann-Christin Hausmann and Corinna Kleinert, "Männer- und Frauen-domänen kaum verändert," *IAB Kurzbericht* no. 9 (2014).
 8 See for example Anne Busch, *Die berufliche Geschlechtersegregation in Deutschland*, (Wiesbaden: VS Verlag für Sozialwissenschaften, 2013); German Federal Statistical Office, "Frauen arbeiten selten in Männerberufen - und umgekehrt," (press release, German Federal Statistical Office, Wiesbaden, December 22, 2010) (available online).
 9 Civil servants and the self-employed were excluded from our analyses.

of women of less than three percent, making them men's professions. Nursing care assistants, shop assistants, and office workers¹⁰ are all typical mixed gender professions.

Gross wages in male dominated occupations are significantly higher than in female dominated occupations

Based on the SIAB data, we were able to calculate the median wages paid within individual professions. The median wage is the wage in the 50th percentile of the wage distribution: it is the value with the same number of people with a higher and a lower wage. There is a difference between median wage and average wage, the former being more robust against outliers. Since wages at the upper end of the distribution have to be estimated,¹¹ the median wage is preferable to the average wage. In order to compare the difference in earnings among and within occupations, we use the median wage in our analyses.¹²

In general, professions with a higher proportion of women have lower median wages than professions with a lower proportion of women (Figure 2).¹³ The five professions with the highest median wages are all men's professions: entrepreneur, company manager, engineer, IT specialists, and banking and insurance specialists. Ranking the 30 most common professions according to median earnings, the best-paid women's profession is number 14 (nurse, midwife), followed by stenographer

10 A problem with KldB 88, the official classification of all professions, is that the industrial professions are intricately subdivided, while many different service and administrative professions are grouped into one three-digit level. See Britta Matthes, Carola Burkert, and Wolfgang Biersack, "Berufssegmente – eine empirisch fundierte Neuabgrenzung vergleichbarer beruflicher Einheiten," *IAB Discussion Paper* 35 (2008). To counteract the problem, the profession of office assistant has been subdivided according to educational level (as per Ann-Christin Hausmann et al., "Männer- und Frauendomänen."). However, based on the data at hand, the proportion of women can only be calculated for the overall profession.

11 The SIAB data are based on reports from employers that report wages only up to the contribution assessment ceiling. See Manfred Antoni, Andreas Ganzner, and Philipp vom Berge, "Sample of Integrated Labour Market Biographies (SIAB) 1975–2014," *FDZ-Datenreport* 04/2016 (2016). We imputed the wages above the ceiling.

12 Each of the median wages refers to a daily wage. The SIAB data used here do not provide information about hours worked. They only indicate whether the person worked full- or parttime. For this reason, we could only calculate daily wages and not hourly ones. To be able to ensure that the wages are nevertheless comparable, people who work part-time were excluded from the analysis (see box).

13 Also see previous evaluations by the German Institute for Economic Research (DIW Berlin) based on data from the Socio-Economic Panel (SOEP). DIW Berlin, "Brutto-Stundenverdienste in typischen Frauenberufen 2014 im Schnitt um acht Euro – oder 39 Prozent – niedriger als in typischen Männerberufen," (Press release, German Institute for Economic Research, Berlin, March 11, 2016) (available online). The increase in the proportion of women in a profession leads to a drop in the wage level. Above all, this is based on the increase in women who receive lower pay than men. See Ann-Christin Hausmann, Corinna Kleinert, and Kathrin Leuze, "Entwertung von Frauenberufen oder Entwertung von Frauen im Beruf?" *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 67 (2) (2015): 217–242.

Box

Sample of Integrated Labour Market Biographies (SIAB)

The SIAB sample is an administrative data set provided by the Institute for Employment Research (IAB) of the Federal Employment Agency. It is a two-percent sample drawn from the Integrated Employment Biographies population, which contains the complete employment history of more than 1.75 million individuals.

The size of the SIAB sample gives it a key advantage in comparison to other data sets: for 2014 alone, the data set contained more than 764,000 observations. As a result of the administrative data collection process, the data set has no missing values, and its information on gross pay is accurate to the day. However, the SIAB does not record working hours, which means that part-time employees must be excluded from the comparison of daily pay in order to avoid distorting the results. And due to the administrative data collection process, the data set does not contain any information outside employer reports (no family status, number of children, or partner's pay, for example).

Definition: Profession

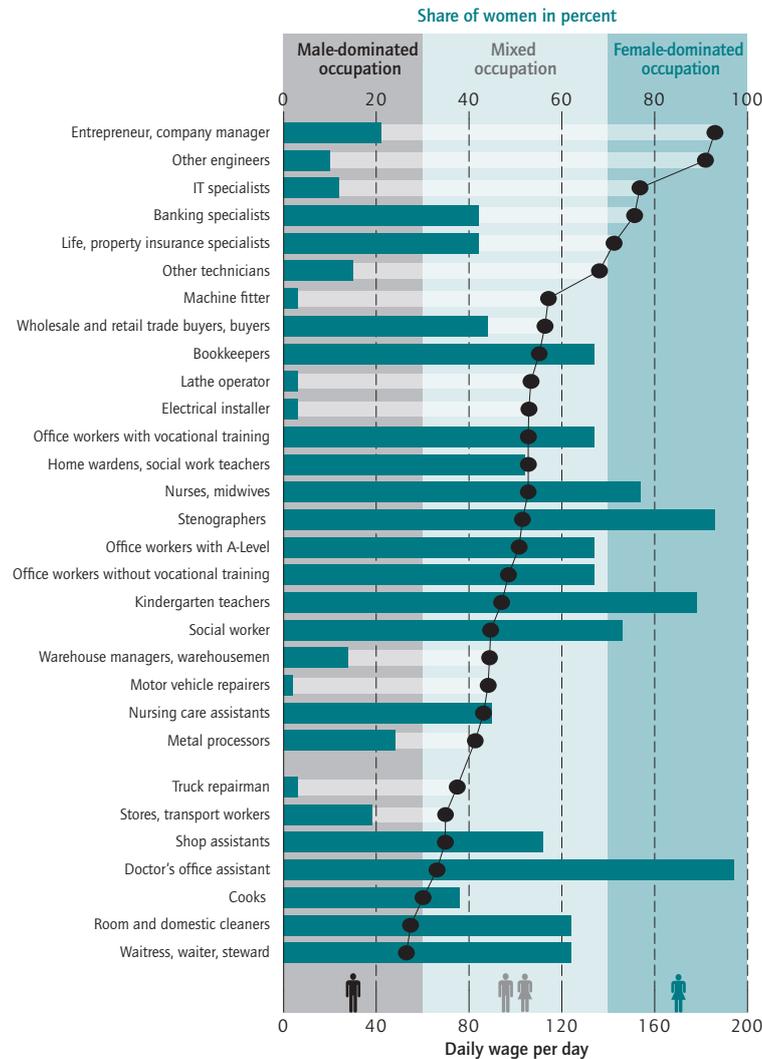
We based our definition of "profession" on the 3-digit level of *Klassifikation der Berufe 1988* (KldB 88), a scheme for classifying professions in which they are allocated to groups based on the knowledge, skills, and experience required. For example, the system differentiates between human and veterinary medicine but not between surgeons and pediatricians. In effect, the classification makes it possible to differentiate between professions requiring different skill levels. This is important when comparing the pay in heterogeneous professions.

On the other hand, the classification cannot be used to examine how genders are divided into subgroups of professions. This means, for example, that within the profession of human medicine, we could not observe whether men and women segregate themselves into different areas of specialization. That means the gender pay gap within a profession can be traced to two factors, but differentiation is not possible. Men and women may work in subgroups of a profession that are paid differently; then again this could involve discrimination.

Figure 2

Share of women and median wage in the 30 most frequent occupations

Share of women in percent, daily wage (median) in euro per day



Note: The calculations are solely based on full-time employed persons. The assignment to the respective occupations is based on the KlDB 88. The translation of the German professional titles refers to the BiBB.

Source: Authors' own calculations based on the SIAB data for 2014.

© DIW Berlin 2017

Median wages are in general higher in male-dominated than in female dominated occupations.

at number 15. The other women's professions are numbers 18 (kindergarten teacher), 19 (social worker), and 27 (doctor's office assistant).

In summary, we can state that in the upper part of the pay distribution, male dominated professions predominate while female dominated professions are found in the lower half of the distribution. The professions with the lowest wages (waitress, waiter, steward, room and domestic cleaners, and cooks) are mixed gender professions.

Many studies have examined the causes of the systematically lower pay observed in women's professions in comparison to men's. The devaluation hypothesis rests on the assumption that society attributes different competencies to women and men. According to this hypothesis, women are ascribed to have strengths in housework and family duties, while men are ascribed to be more productive in gainful employment. For this reason, women and the professions in which most of them work have a lower status and are thus poorly paid.¹⁴ Further, inequality of pay between men's and women's professions can arise as a result of differences in human resources requirements. For example, the theory of compensating differentials claims that lower wages compensate for better possibilities to reconcile work and family duties in female dominated professions.¹⁵ The theory also suggests that fewer specific human resources are required in female dominated occupations professions than in those that are male dominated. This specialization leads to higher pay in the latter occupations.¹⁶

¹⁴ Anne Busch and Elke Holst, "Geschlechtsspezifische Verdienstunterschiede bei Führungskräften und sonstigen Angestellten in Deutschland: Welche Relevanz hat der Frauenanteil im Beruf?" *Zeitschrift für Soziologie* 42 (4) (2013): 315-336; Paula England, *Comparable Worth. Theories and Evidence*, (Hawthorne: Aldine de Gruyter, 1992). However, the theory could not be confirmed for Germany. See Ann-Christin Hausmann et al., "Entwertung von Frauenberufen."

¹⁵ Anne Busch and Elke Holst, "Geschlechtsspezifische Verdienstunterschiede."; and Solomon W. Polachek, "Occupational Self-Selection: A Human Capital Approach to Sex Differences in Occupational Structure," *Review of Income and Statistics* 63 (1) (1981): 60-69. However, this theory could neither be confirmed in Germany nor the US. See Paula England, "The Failure of Human Capital Theory to Explain Occupational Sex Segregation," *The Journal of Human Resources* 17 (3) (1982): 358-370; and Juliane Achatz, Hermann Gartner, and Timea Glück, "Bonus oder Bias? Mechanismen geschlechtsspezifischer Entlohnung," *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 57 (3) (2005): 466-493.

¹⁶ Tony Tam, "Sex Segregation and Occupational Gender Inequality in the United States: Devaluation or Specialized Training?" *American Journal of Sociology* 102 (6) (1977): 1652-1692; and Anne Busch and Elke Holst "Geschlechtsspezifische Verdienstunterschiede."

Gender pay gap also evident within professions

The previous analyses showed that in general, the pay in typical male dominated occupations is higher than that in female dominated occupations: part of the gender pay gap is due to the gender differences in occupational “choice”. However, we also find that gender pay gaps exist within occupations (Figure 3).¹⁷

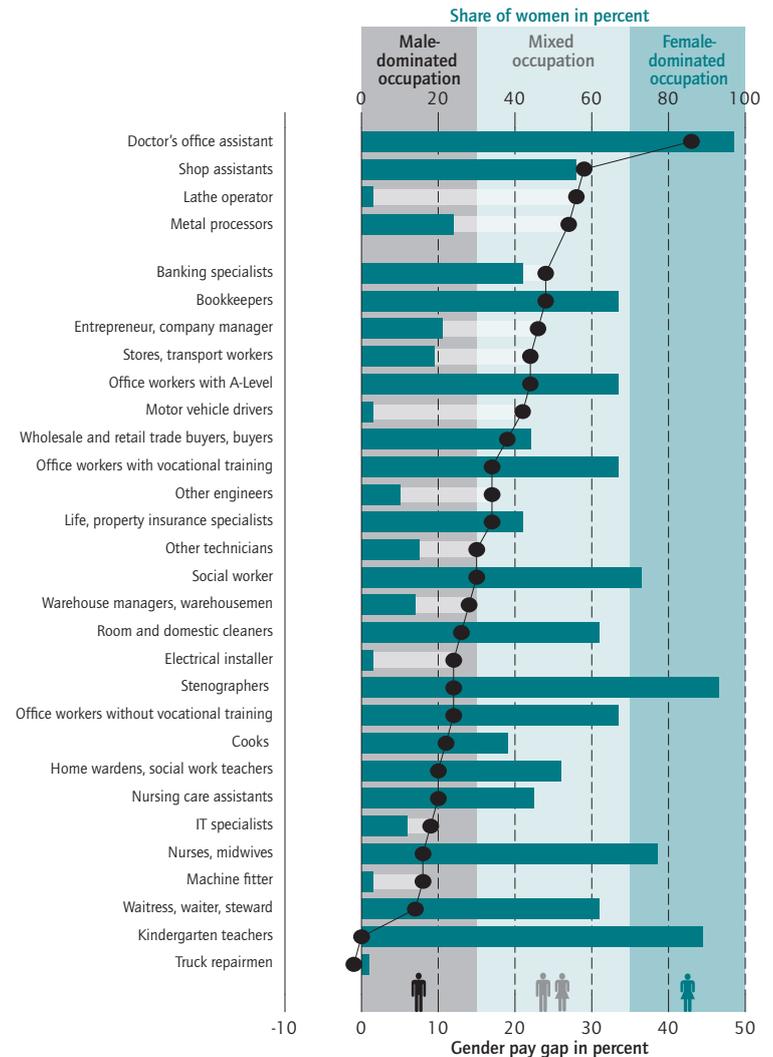
Indeed, nine professions show a pay gap that is greater than the average unadjusted pay gap of 22 percent. These nine professions include male and female dominated as well as gender mixed occupations. For example, at 43 percent, the profession with the highest proportion of women (doctor’s office assistant) has the highest gender pay gap among the 30 most common professions. But even some male dominated professions show a very wide gender pay gap, for example, lathe operators and metal processors (28 percent each). The same applies to mixed professions. The pay structures of some also exhibit above-average gender pay gaps: salesperson (29 percent), banking specialists (25 percent), and bookkeepers (24 percent). The gender pay gap in the best-paid profession (entrepreneur, company manager) is 23 percent, which is also slightly above the average. This confirms the findings of current studies showing that overall the gender pay gap is significantly larger in the upper part of the income distribution than in the middle and lower parts.¹⁸ Further, earlier studies have found that the unexplained portion of the gender pay gap is increasing in the upper income range, which can be interpreted as a greater level of discrimination (glass ceiling).¹⁹

Some professions have a very low gender pay gap or none at all. This is the case in the male dominated occupation truck repairman, and in the female dominated occupation kindergarten teacher. In the mixed gender profession waitress, waiter, steward, the female dominated occupation nurse or midwife, and the male dominated occupations machine fitter and IT specialist, the gender pay gap is below ten percent.

Figure 3

Gender Pay Gap and share of women in the 30 most frequent occupations

In percent



Note: The calculations are solely based on full-time employed persons. The assignment to the respective occupations is based on the KlDB 88. The translation of the German professional titles refers to the BiBB. The Gender Pay Gap corresponds to the difference between the median wages of men and women in relation to the median wage of men.

Source: Authors' own calculations based on the SIAB data for 2014.

The Gender Pay Gap varies strongly between occupations.

¹⁷ Previous Analysis of the Federal Statistical Office on the basis of data from the quarterly earnings survey 2006 has shown similar results, see Claudia Finke (2010): Verdienstunterschiede zwischen Männer und Frauen. Wiesbaden: Statistisches Bundesamt.

¹⁸ Francine D. Blau and Lawrence M. Kahn, "The Gender Wage Gap: Extent, Trends, and Explanations," *Journal of Economic Literature* 2017 55 (3) (2017): 789-865; and Wiji Arulampalam, Alison L. Booth, and Mark L. Bryan, "Is there a glass ceiling over Europe? Exploring the gender pay gap across the wage distribution," *ILR Review* 60.2 (2007): 163-186.

¹⁹ For example Francine D. Blau and Lawrence M. Kahn, "The Gender Wage Gap."

Table

Linear regression of occupational characteristics on the Gender Pay Gap within occupations

	regression coefficient
Daily wage (Median)	-0.00
Average age	0.018*
Average firm size	0.000
Education (Reference: Share with vocational training and without A-Level)	
Share without vocational training and without A-Level	0.027
Share with A-Level	0.418
Share with higher education	0.029
Industry (Reference: Share of manufacturing)	
Share of agriculture/mining	0.192
Share of construction	0.125
Share of trade/traffic/storage/hotel and restaurants/communication	0.038
Share of economical service	0.117
Share of administration/education/social services/entertainment	-0.026
Share of personalized service	-0.021
Share without assignment to an industry	0.668
Share of parttime employed	0.018
Share of women	-0.064
Constant	-0.436
Number of occupations	90
R ²	0.181

Note: The calculations are solely based on full-time employed persons. Levels of significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$. The assignment to the respective occupations is based on the KldB 88. The Gender Pay Gap corresponds to the difference between the median wages of men and women in relation to the median wage of men. Reading aid: A positive coefficient indicates an increase of the Gender Pay Gap within occupations if the respective characteristic rises. Thus, this occupational property has a positive effect on the Gender Pay Gap if it is statically significant.

Source: Authors' own calculations based on the Occupational Panel (OccPan) 2010.

© DIW Berlin 2017

Only the average age within an occupation correlates with the Gender Pay Gap within an occupation. The higher the average age within an occupation, the higher is the Gender Pay Gap.

Gender pay gap level unrelated to proportion of women in professions

Overall, we found that median pay has a negative correlation with the proportion of women in a profession but the gender pay gap does not. We ran a simple linear regression²⁰ to relate the gender pay gap within a profession to factors such as the proportion of women in the profession, the proportion of employees in various

²⁰ The regression refers to employees with an obligation to pay social security contributions in western Germany in 2010. See Ann-Christin Hausmann, Aline Zucco, and Corinna Kleinert, "Berufspanel für Westdeutschland 1976-2010 (OccPan)," *FDZ-Methodenreport* 09/2015 (2015).

sectors, and qualification levels, which confirmed the finding (Table). It reveals that neither the proportion of women among the employees in a profession, nor the proportion of part-time employees, nor median pay had a statistically significant relationship to the gender pay gap within a profession.²¹ We were unable to confirm a statistically significant relationship between this variable and the formal education of employees within a profession, the proportion of employees in a profession in various industries, or the average size of the company. Only the average age of the employees in a profession was correlated with the gender pay gap: The higher the average age of the employees, the wider the gender pay gap within a profession. This matches the empirical finding that in general the gender pay gap increases with age.²²

We were not able to include some of the factors of influence that seem to cause differences in the gender pay gap in individual professions due to a lack of information. For example, previous analyses of the German Federal Statistical Office have shown that in occupations in which the proportion of employees in the public sector is very high, the gender pay gap is much lower than in professions that are primarily practiced in the private sector.²³ This could explain the large difference in gender pay gaps between doctor's office assistants (43 percent) and kindergarten teachers (0 percent). The proportion of kindergarten teachers who are civil servants was around 63 percent in 2014, while only nine percent of doctor's office assistants were civil servants.²⁴

The *gender leadership gap* is the difference in the proportion of women among total employees and the proportion of women in high management positions in a specific profession. The relationship can also be used to establish the existence of a gender pay gap within a profession. The present analysis based on the SIAB data was able to show that the profession of banking specialist has an above-average gender pay gap of 24 percent, for example (Figure 3). Earlier analyses conducted by DIW Berlin documented the existence of a particularly wide gender leadership gap in the financial sector.²⁵ This can be an explanation of why the pay gap between men and women among banking specialists is higher than average.

²¹ Previous analyses of the Federal Statistical Office did not find a significant correlation between the gender pay gap and the share of women working in an industry (see Claudia Finke (2010): a. a. O.).

²² Also see Walter Joachimiak, "Frauenverdienste – Männerverdienste: Wie groß ist der Abstand wirklich?" (Web page, German Federal Statistical Office, Wiesbaden, 2013) (available online).

²³ Claudia Finke (2010): a. a. O.

²⁴ These numbers are based on a weighted evaluation of the Socio-Economic Panel (SOEP) v32, 2014.

²⁵ See Elke Holst and Martin Friedrich, "Women's likelihood of holding a senior management position is considerably lower than men's—especially in the financial sector," *DIW Wochenbericht* no. 37 (2016): 827-838 (available online).

It has been shown previously for the US that occupations in which working hours can be flexibly designed have smaller gender pay gaps than less flexible professions in which compulsory presence plays a greater role.²⁶ However, when flexibility is mapped as the proportion of part-time employees, this relationship cannot be conclusively established for Germany (Table).

Conclusions

In the highly gender segregated German labor market, employees in female dominated occupations receive lower median pay than those in male dominated occupations. Therefore, choice of occupation is an important factor in explaining the gender pay gap. Based on the SIAB data of the IAB, DIW Berlin's analyses, however, also show that in some cases there are very wide gender gaps within professions. However, in our initial analyses, we were unable to find a correlation between the proportion of women in a profession and the gender pay gap. There are above-average gender pay gaps across the board: in male dominated, female dominated, and mixed professions.

The data also showed that in general, professions with a high proportion of employees in civil service have smaller gender pay gaps. This is probably due to the tariff-based contracts in civil service, which leave less leeway for negotiation than in the private sector. Numerous behavioral economics studies have shown that women make fewer demands during negotiations than men.²⁷ Social norms regarding the gendered expectations of men and women were identified as the cause of the discrepancy.²⁸

²⁶ Claudia Goldin, "A Grand Gender Convergence: Its Last Chapter," *American Economic Review* 104 (4) (2014): 1091-1119.

²⁷ For example, see Linda Babcock and Sara Laschever, *Women Don't Ask: The High Cost of Avoiding Negotiation—and Positive Strategies for Change*, (London: Bantam Press, 2003).

²⁸ For an overview, see Mario Macis and Mirco Tonin, "Gender Differences in Earnings and Leadership: Recent Evidence on Causes and Consequences," *ifo DICE Report* 2/2017 (2017): 18-21.

Based on data for the US, it has been shown that the gender pay gap is particularly low in professions in which flexible working hours are possible. Using the proportion of part-time employees as a measure of flexibility, we were unable to find a correlation with the gender pay gap in Germany. However, it must be noted that the proportion of part-time employment in a profession is not necessarily an indication of employees' time sovereignty or the extent to which management positions can be held without compulsory presence. For example, earlier studies in the US identified the financial sector as one with a very large gender pay gap and at the same time, a lower likelihood of women holding management positions. With regard to that sector, the same holds true for Germany.

Our findings indicate a need for more research into the causes of the different levels of the gender pay gap within individual professions in Germany. Although many studies have analyzed the causes of lower pay in female dominated in comparison to male dominated occupations, little research has been done to answer the question of why the gender pay gap is much higher in some professions than in others.

The results suggest that more transparency in wage negotiations would lead to lower differences in pay between men and women.²⁹ The Remuneration Transparency Act (*Entgelttransparenzgesetz*, EntgTranspG) can be viewed as a step in that direction.³⁰ And a change in corporate culture—away from overtime and compulsory presence to more employee control over working hours and flexible career models—could lead to more equal opportunity for men and women in the labor market, closing the gender pay gap in the process.

²⁹ Linda Babcock and Sara Laschever, *Women Don't Ask*.

³⁰ The German Women Lawyers Association initiated a series of proposals for improving the Remuneration Transparency Act with the goal of actually implementing a legal right to equal pay for women and men for the same or similar work. See German Women Lawyers Association, "Stellungnahme des Deutschen Juristinnenbundes," (Web page, German Women Lawyers Association, Berlin, March 6, 2017) (available online).

Katharina Wrohlich is a Research Associate in the research group Gender Studies at DIW Berlin | kwrohlich@diw.de

Aline Zucco is a Research Associate in the Department of Public Economics at DIW Berlin | azucco@diw.de

JEL: J31, J16

Keywords: Gender pay gap, occupational segregation

Gender gaps in pensions and health: Germany, France, and Denmark

By Peter Haan, Anna Hammerschmid and Carla Rowold

This study quantifies genderspecific differences in retirement income in Germany, Denmark, and France. We show that the “gender pension gap” in Germany is higher than in France and much higher than in Denmark. This ranking is similar to the ranking in the gender pay gap, where Germany has also the highest gender difference.

The authors also investigate genderspecific differences in health, i.e. the so-called “gender health gap”, in the same age group. Self-assessed general health in 2013 reveals no significant differences between men and women in the countries studied. However, gender-specific differences in depressive symptoms follow a similar pattern as the gender pension gap: Denmark has the lowest difference between the sexes.

Although the study does not measure causal relationships between income and health, the results indicate that measures to reduce the gender pay gap do not only reduce differences during the economically active phase; they may also lead to a reduction in the gender pension gap and in women’s susceptibility to depressive symptoms.

On average, women earn less in the labor market than men.¹ In 2015, the *gender pay gap*, which measures this difference, was 22 percent in Germany.² Pension claims under the German public pension fund depend directly on earnings. Thus, the difference in earnings translates into differences in pensions.³ The *gender pension gap*, which indicates the difference in pension claims between men and women, maps the lifelong inequality between the sexes. Alongside the difference in earnings, the gap is affected by factors such as career interruptions due to care for children or relatives, labor market segregation, differences in working hours, and general gender-specific social norms and stereotypes.⁴

The existence of a gender pension gap means that women have less financial resources from their own entitlements compared to men of the same age.⁵ A number of studies have shown that there is a relationship between socioeconomic status and health.⁶ Further, the literature doc-

1 See the definition of *gender pay gap* in the DIW glossary (in German only; available online, accessed September 27, 2017; this also applies to all other online sources in this report, unless stated otherwise). The literature explores numerous reasons for this gap, citing for example profession or training to explain part of the differences between men and women. However, discrimination against women in the labor market has been documented. See Anne Busch and Elke Holst, “Verdienstunterschiede zwischen Frauen und Männern nur teilweise durch Strukturmerkmale zu erklären,” *DIW Wochenbericht* no. 15 (2008): 184-190 (available online)

2 See Eurostat, “Gender pay gap in unadjusted form,” 2017 (available online)

3 See Markus M. Grabka et al., “Der Gender Pension Gap verstärkt die Einkommensungleichheit von Männern und Frauen im Rentenalter,” *DIW Wochenbericht* no. 5 (2017): 87-96 (available online).

4 See Francesca Bettio, Platon Tinios, and Gianni Betti, “The gender gap in pensions in the EU,” Publications Office of the European Union, Luxembourg, 2013 (available online); Judith Flory, “The Gender Pension Gap. Developing an Indicator Measuring Fair Income Opportunities for Women and Men,” study for the German Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (2011) (available online); Ilze Burkevica et al., “The gender gap in pensions in the EU, Research note to the Latvian Presidency,” Publications Office of the European Union, Luxembourg, 2015 (available online); Platon Tinios et al., “Men, women and pensions,” Publications Office of the European Union, Luxembourg, 2015 (available online); and Athina Vlachantoni, “Financial inequality and gender in older people,” *Maturitas* 72 (2) (2012): 104-107.

5 The gender pension gap can potentially be narrowed in the household context. This reduces the gender-specific differences in financial resources.

6 See Mauricio Avendano, Arja R. Aro, and Johan Mackenbach, “Socio-Economic Disparities in Physical Health in 10 European Countries.” In *Health, Ageing and Retirement in Europe*, edited by Axel Börsch-Supan et al., MEA Eigenverlag, Mannheim, 2005 (available online); Thomas Lampert and Lars Eric

uments a causal effect of income on both general and mental health.⁷ These findings indicate that countries with particularly high gender-specific pension gaps could also have large gender differences in health. We therefore examine whether there are similar cross-country patterns between gender-specific differences in health and retirement income.⁸

To better analyze and interpret the results, we compare Germany with other countries. Such a comparison allows us to capture the typical health differences between men and women and possible differences in the response behavior between the two groups. We compare the patterns in the gender health gap over time and between countries with different labor markets and gender pay gaps. Therefore, our study focuses on Germany, France, and Denmark.

The labor markets in these three countries differ in several dimensions. Denmark had the lowest gender pay gap in 2015 (15.1 percent) and the highest rate of female employment (70.4 percent). Of women in employment, only 25.8 percent work part-time. In France the pay gap is 15.8 percent, and the rate of female employment is the lowest of the three countries (61.1 percent). However, the proportion of women in part-time work is also the lowest (22.3 percent of all women in employment). In comparison to Denmark and France, in 2015 Germany had both the highest gender pay gap and the highest part-time rate among women in employment (37.4 percent). At 69.9 percent, the overall rate of female employment in Germany comes close to that of Denmark.⁹ The three countries included in the present study therefore exhibit different degrees of gender inequality in the labor market. At the same time, the pension system in each country is different. In Germany and France, for example,

Kroll, "Einfluss der Einkommensposition auf die Gesundheit und Lebenserwartung," *DIW Discussion Paper* no. 527 (2005) (available online); Regina Jutz, "The role of income inequality and social policies on income-related health inequalities in Europe," *International journal for equity in health* 14 (1) (2015): 117. For the United Kingdom: Sara Arber and Jay Ginn, "Gender and inequalities in health in later life," *Social science & medicine*, 36(1) (1993): 33-46. This study shows that even after controlling for age and career level, the incomes of older men and women have an effect on the self-assessment of their health.

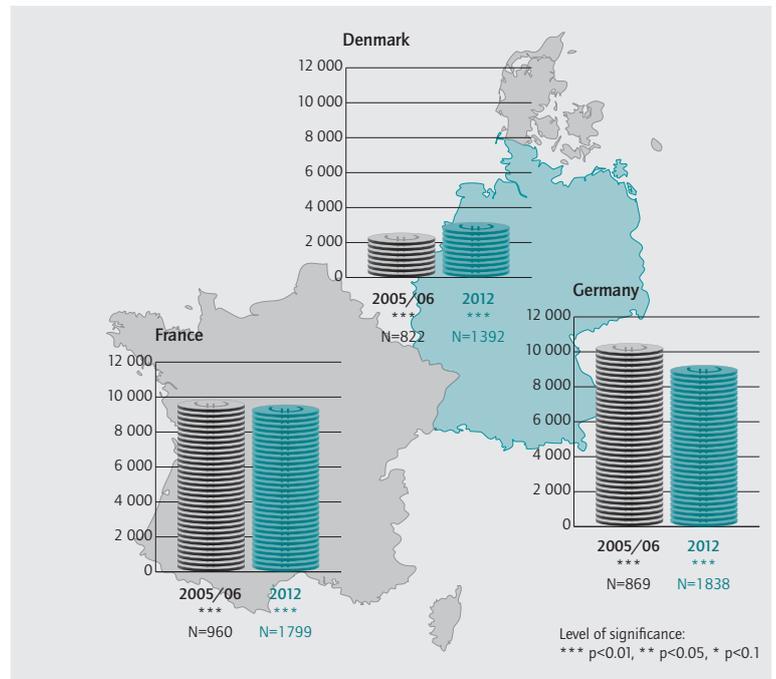
7 See Mikael Lindahl, "Estimating the Effect of Income on Health and Mortality Using Lottery Prizes as an Exogenous Source of Variation in Income," *The Journal of Human Resources* vol. XL no. 1 (2005): 144-168 and Marta Lachowska, "The Effect of Income on Subjective Well-Being: Evidence from the 2008 Economic Stimulus Tax Rebates," *The Journal of Human Resources* vol. 52 no. 2 (2017): 374-417.

8 Previous studies have documented that on average, women have poorer health than men. Even though women also have a higher average life expectancy than men, there is a gender health gap. See Deborah L. Wingard, "The sex differential in morbidity, mortality, and lifestyle," *Annual review of public health* 5(1) (1984): 433-458 and Johan Mackenbach et al., "Physical health." In *Health, Ageing and Retirement in Europe*, edited by Axel Börsch-Supan et al., MEA Eigenverlag, Mannheim, 2005 (available online).

9 See OECD, "Employment-population ratios," Paris, 2017 (available online); see Eurostat, "Gender pay gap in unadjusted form" and OECD, "Incidence of FPT employment - common definition," Paris, 2017 (available online).

Figure 1

Absolute gender pension gap in Denmark, Germany, and France
Controlled for age, in Euro



Source: SHARE; authors' own calculations, weighted. The numbers indicate the absolute value of the gaps between men and women.

© DIW Berlin 2017

In absolute terms, the gender pension gap is much narrower in Denmark than in Germany and France.

there is a comparatively stronger relationship between public pension and earned income before retirement.¹⁰

In the following section, we first show the gender pension gaps in all three countries. The pension claims include all three pillars of old age provision: public, private, and occupational pensions (see box). In the second section, we discuss the gender health gap and compare it to the gender-specific pension gaps in the three countries.

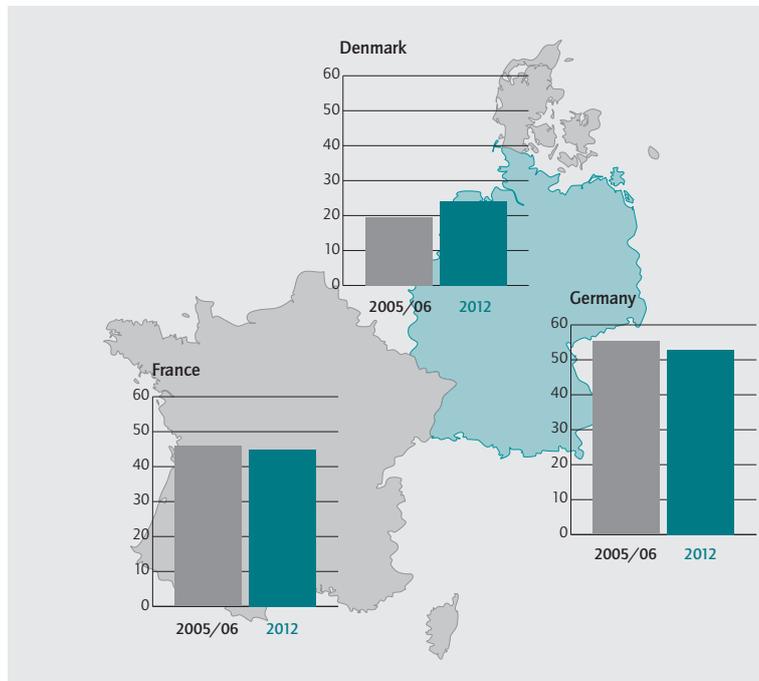
Gender pension gap in Germany above 50 percent

In 2005/2006, the age-adjusted pension gap between men and women is 55.2 percent in Germany. On average, the pensions that men between 65 and 85 receive

10 See OECD, "Pensions at a Glance 2007: Public Policies across OECD Countries," Paris, 2007 (available online, accessed September 12, 2017); and OECD, "Pensions at a Glance 2013: OECD and G20 Indicators," Paris, 2013 (available online, accessed September 12, 2017).

Figure 2

Relative gender pension gap in Denmark, Germany, and France
Controlled for age, in percent



Sources: SHARE; authors' own calculations, weighted. The numbers indicate the absolute value of the gaps between men and women.

© DIW Berlin 2017

Germany has the widest gender pension gap and Denmark the narrowest.

are over twice as high as those of women in the same age group (see Figure 2). This difference corresponds to an average absolute difference of 10,341 euros per year (see Figure 1). In 2012, the slightly lower gender pension gap is still at 52.9 percent, corresponding to on average 9,268 euros.^{11 12}

In both France and Denmark, the relative gender pension gap is lower. In France, it is almost ten percentage points lower than in Germany in 2005/2006, and closes

11 The gender pension gap calculated here is somewhat higher than the value for the public pension fund calculated in Grabka et al., "Gender Pension Gap." This discrepancy can potentially be explained by differences in the database or a different sample selection. Further, in this study we also include occupational and private pensions.

The pension gap at the median shows virtually no deviation from the average difference, remaining relatively constant at 52-53 percent over the entire period. In our case, the median is the value at which half of the population has a higher pension and the other half, a lower one. The calculation of the gender-specific pension gap at the median incorporates the pension values of men and women at the median instead of their average values.

12 All absolute differences are significantly different from zero.

only marginally over time. In Denmark, women received 19.6 percent less retirement income annually compared to men of the same age. The gender-specific difference in retirement income became slightly larger in Denmark between 2005/2006 and 2012.¹³

These results are comparable to those of earlier studies. The levels of the estimated gaps may differ for reasons related to data and sample selection – for example, earlier estimates of the gender pension gap in Germany ranged between 38 percent¹⁴ and 59 percent.¹⁵ But a range of publications report country-specific differences similarly: in Germany the gap is the widest and in Denmark, by far the narrowest.¹⁶

An explanation or decomposition of these differences in the gender pension gap by country exceeds the scope of this study. However, the above-mentioned country-specific differences in the gender pay gap, in the labor market participation of women, as well as other gender-specific inequalities surely play key roles.¹⁷ Pension system design is another possible reason for these differences. In Denmark, for example, a portion of the public pension, called the *Folkepension*, is not tied to the recipient's employment biography.¹⁸ Hence, differences between men's and women's labor market participation over the life cycle cannot feed directly into this portion of public pension payments.

No clear gender gap in self-assessed health

When asked about their general health status, elder women in Germany in 2006/2007 – the first period of observation – answered "average" or "poor" with a seven percentage points higher probability than men. This gap corresponds to a relative difference of around 16 percent.

In 2013, the difference between genders on this issue fell to three percentage points. However, the value is statistically uncertain and therefore, not significant. In Den-

13 In comparison to the average difference, the gap at the median decreases more obviously over time in France, falling to just under 40 percent in 2012. In Denmark the gap at the median is around ten percent in 2012, making it lower than the average gap.

14 See Francesca Bettio et al., "Gender gap in pensions, EU."

15 See Judith Flory, "The Gender Pension Gap."

16 See Ilze Burkevica et al., "Gender gap, note to Latvia"; Platon Tinios et al. "Men, women and pensions"; and Francesca Bettio et al., "Gender gap in pensions, EU."

17 The Gender Equality Index created by the European Institute for Gender Equality is intended to capture gender inequality as a whole. For 2010, for example, it reflects the country-specific pattern of the pension gaps calculated by us. France's value is six points higher, and on the scale from zero to 100, Denmark's score is almost 20 points higher than Germany's. See European Institute for Gender Equality, "Gender Equality Index 2010," Vilnius, 2017 (available online, accessed September 13, 2017).

18 See OECD, "Pensions at a Glance."

mark and France, we found no significant gender-specific differences in either 2006/2007 or 2013.¹⁹

Gender gaps in depressive symptoms and pensions follow similar pattern

There are substantial gender-specific differences in mental health in all three countries. Based on the EURO-D questionnaire, a higher proportion of women are classified as depressed (see Figure 3). In Germany, the difference for 2006/2007 is around 14 percentage points, and in 2013 it still amounts to 13 percentage points. In relative terms, women have a 110 percent (73 percent) higher probability of being classified as depressed compared to men in 2006/2007 (2013) (see Figure 4).

The gender-specific difference in depressive symptoms is considerably lower in Denmark. The share of women classified as depressed is only six percentage points (four percentage points) higher than that of men in 2006/2007 (2013).²⁰ In France the absolute difference is 20 percentage points in 2006/2007 and 17 percentage points in 2013, which is higher than in Germany at the respective times. Due to the higher rate of depression among men in France, the relative gender gap for depression there is slightly below the German value.

The country pattern in relative gender-specific differences in depressive symptoms is very similar to the pattern we found for the gender pension gap. The comparison between Germany and Denmark in particular reveals a considerably smaller gender gap in Denmark on both counts.

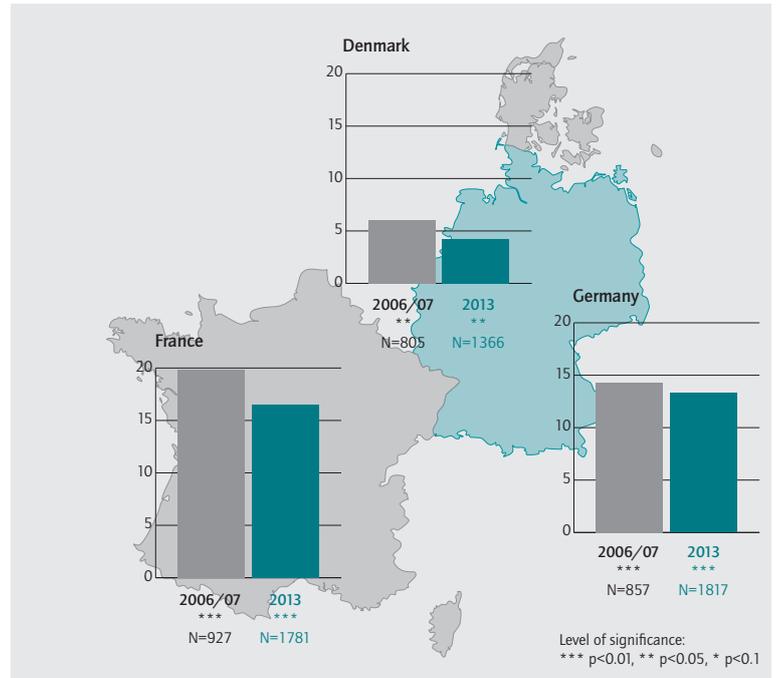
¹⁹ Earlier findings on the gender health gap as measured by self-assessed health are inconclusive. Some studies have found small gaps to the disadvantage of women; others have found none. See Anne-Laure Humbert et al., "Gender Equality Index. Measuring gender equality in the European Union 2005-2012," European Institute for Gender Equality, Vilnius, 2017 (available online); Anna Okszyan et al., "Cross-national comparison of sex differences in health and mortality in Denmark, Japan and the US," *European Journal of Epidemiology* 25 (2010): 471-480; and Eileen Crimmins, Jung Ki Kim, and Aida Solé-Auró, "Gender differences in health: results from SHARE, ELSA and HRS," *European Journal of Public Health* 21(1) (2010): 81-91.

²⁰ This finding concurs with the current findings on the gender gap in mental health in the international literature. Large differences to the disadvantage of women across countries have been found, and Denmark is often found to have lower differences. See Michael Dewey and Martin Prince, "Mental health," In *Health, Ageing and Retirement in Europe*, edited by Axel Börsch-Supan et al., MEA Eigenverlag, Mannheim, 2005 (available online); George B. Ploubidis and Emily Grundy, "Later-life mental health in Europe: A country-level comparison," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 64(5) (2009): 666-676; Eileen Crimmins et al., "Gender differences in health," and Anna Okszyan et al., "Cross-national comparison of sex differences."

Figure 3

Absolute gender gaps in depressive symptoms in Denmark, Germany, and France

Controlled for age, in percentage points



Note: Depressive symptoms based on EURO-D. The absolute differences refer to the respective shares of individuals with a EURO-D value of four or higher.

Sources: SHARE; authors' own calculations, weighted.

© DIW Berlin 2017

The absolute gender gap in depressive symptoms is much lower in Denmark than in Germany and France.

Ambiguous pattern in further health outcomes

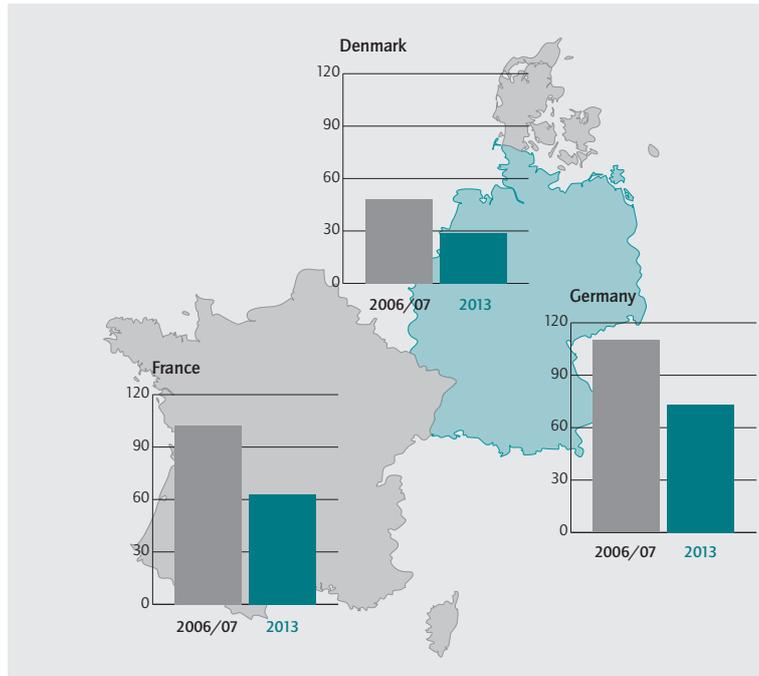
In addition to the self-assessed health status mentioned above, we analyzed other indicators for physical or general health for the three countries. Some of these indicators also show a significant gender health gap, although we cannot find a clear general pattern in country-specific differences. As an example, for the prevalence of chronic illnesses the relative gender gap is highest in Denmark. The indicator, "limitations in instrumental activities of daily living" is another example.²¹ Here, gender-specific

²¹ This indicator shows the number of limitations in instrumental activities of daily living. To derive it, respondents were asked about seven of these activities, for example preparing warm meals, making a telephone call, and taking medication. The answers were categorized into two groups for our analysis: "No limitations" and "One or more limitations."

Figure 4

Relative gender gaps in depressive symptoms in Denmark, Germany, and France

Controlled for age, in percent



Note: Depressive symptoms based on EURO-D. The relative differences refer to the respective shares of individuals with a EURO-D value of four or higher.

Sources: SHARE; authors' own calculations, weighted.

© DIW Berlin 2017

Germany has the widest relative gender gap in depressive symptoms and Denmark the narrowest.

differences are at comparable levels in Germany and France, but lower in Denmark.

Conclusions

Our comparative analysis of the gender gap in retirement income and health in three countries shows that there is a gender pension gap in Germany, and that it is substantial in comparison to Denmark in particular. Parallel to the gender pension gap, there is a more pronounced gender difference in depressive symptoms of retirees in Germany compared to Denmark.

This study does not allow to draw causal conclusions regarding gender-specific inequality in retirement income and depressive symptoms. However, the findings of other scientific studies indicate a causal relationship between individual economic situations and health. Applied to our case of retirement income, this

Box

Background on data, pensions and health measurement

Data and sample selection

This report is based on data from the Survey of Health, Ageing and Retirement in Europe (SHARE).¹ SHARE is a recurring multi-disciplinary survey that collects data on health and economic conditions of the population over age 50 across countries.²

To establish comparability, we use data from Waves 2 and 5 of the survey,³ which were collected in 2006/2007 and 2013 respectively. The monetary indicators relate to the respective prior year; therefore, the findings for Wave 2 are based on 2005 and 2006 and those for Wave 5 on 2012.

The sample is restricted to people between ages 65 and 85 who receive a pension (see definition below). Respondents who received part of their income from employment during the relevant year are excluded.

The resulting sample⁴ is the basis for the analyses of the health and pension gaps. All analyses use cross-sectional

1 The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

2 For details on the SHARE methodology, see Axel Börsch-Supan et al., "Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)," *International Journal of Epidemiology* (2013) and Frederic Malter and Axel Börsch-Supan, eds., "SHARE Wave 5: Innovations & Methodology," Munich Center for the Economics of Ageing (MEA) at the Max Planck Institute for Social Law and Social Policy, Munich, 2015 (available online).

3 Axel Börsch-Supan, "Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 2 and Wave 5, Release version 5.5.0," SHARE-ERIC (2016).

4 For the first period of observation (2005/2006 or 2006/2007), the unweighted sample post-selection contains 869 respondents in Germany, in France 960, and in Denmark 822. As a result of selecting respondents who did not receive income from employment in the respective year, three to 12 percent of observations per country were lost to the relevant sample. For 2012 or 2013, the sample contains 1,838 respondents in Germany, 1,799 in France, and 1,392 in Denmark. The selection process reduced the samples by four to 16 per-

weighting based on the calibrated weights provided by SHARE.⁵

Calculation of retirement income

We calculate the gender-specific gap in total pension. For this purpose, we calculate the annual net retirement income in euros for each observation. To make the results comparable across countries, we adjust income for purchasing power.

“Total pension” encompasses the three pillars of old age provision: public, private, and occupational pensions. For Germany, the first category is composed of public old age or civil service pensions, public early retirement pensions or early retirement benefits, disability pensions, or civil service pensions due to disability or sickness benefits. Denmark and France add a second public old age pension or public supplementary pension. Occupational pensions consist of occupational old age pensions from a last job, a second or third job, occupational early retirement benefits, and occupational disability pensions. Private pensions are regular life insurance payments and private annuity or private personal pension payments. The analysis only includes regular payments. Further payments and benefits from survivor pensions from a spouse or partner, a public war pension, unemployment, or long-term care insurance and alimony or lump payments are excluded. However, respondents who received such additional payments are nevertheless included in our analysis sample.

Measuring health

In order to analyze gender-specific differences in health, we rely on the self-assessment of general health often used in the literature, based on a scale of one (excellent) to five (poor). The scale is compressed into two categories: poor and good health. Poor health consists of respondents’ self-assessments, “fair” (4) and “poor” (5), while good health ranges from “good” (3) to “excellent” (1). The gap analyzed here refers to the average proportion of men and women who reported that they were in poor health.

cent. In order to prevent the results from being biased by outliers, respondents who received a total annual pension of over one million euros were excluded from the analysis.

⁵ See Frederic Malter and Axel Börsch-Supan, eds., “SHARE Wave 5.”

We use depression as an indicator of mental health. Our analysis is based on the EURO-D scale, which records 12 different depressive symptoms using yes-no questions.⁶ In line with the literature, we classify individuals as depressed from a EURO-D value of four or more.⁷ Based on that threshold, we divide respondents into a depressive and a non-depressive group and analyze the gender-specific difference in the proportions of those affected by depression.

Calculating the gender gap

We calculate the gender pension gap as the percentage difference in average retirement income between men and women. The gender health gap is calculated accordingly. Since age can have a considerable influence on a person’s health status,⁸ we control for age. To ensure better comparability, we also control for the age structure when calculating the pension gap. In the calculation, the average absolute difference in pension between men and women, adjusted for age, is divided by the average retirement income of all men.

To compare the results for Germany with other countries, we look at the nationwide gender-specific difference in retirement income. Differentiation by region is not part of this study. However, other studies have examined the differences in gender pension gaps between western and eastern Germany.⁹

⁶ See Martin Prince et al., “Development of the EURO-D scale—a European Union initiative to compare symptoms of depression in 14 European centres,” *The British Journal of Psychiatry* 174(4) (1999): 330-338; and George B. Ploubidis and Emily Grundy, “Later-life mental health in Europe.”

⁷ See e.g. Ingo W. Kolodziej and Pilar García-Gómez, “The causal effects of retirement on mental health: Looking beyond the mean effects,” *Ruhr Economic Papers* no. 668, (2017); and Michael Dewey and Martin Prince, “Mental health.”

⁸ See Johan Mackenbach et al., “Physical health.” In Axel Börsch-Supan, et al., *Health, ageing and retirement in Europe—first results from the survey of health, ageing and retirement in Europe*, MEA Eigenverlag, Mannheim, 2005, 89-94.

⁹ See Markus M. Grabka et al., “Der Gender Pension Gap verstärkt die Einkommensungleichheit von Männern und Frauen im Rentenalter” *DIW Wochenbericht* no. 5 (2017) (available online); and Annika Rasner, “Gender Pension Gap in Eastern and Western Germany,” *DIW Economic Bulletin* no. 11 (2014): 42-50 (available online).

could mean that a more egalitarian income distribution in retirement could lead to a more egalitarian distribution of mental health.

Measures aimed at reducing gender-specific inequality during the economically active phase currently under discussion in Germany include taxing married couples as individuals²² and fully implementing the Remu-

22 See Stefan Bach, "Frauen erzielen im Durchschnitt nur so halb hohe Einkommen wie Männer," *DIW Wochenbericht* no. 35 (2014): 803-813 (available online).

Peter Haan is Head of the Department of Public Economics at DIW Berlin | phaan@diw.de

Anna Hammerschmid is a Research Associate in the Department of Public Economics at DIW Berlin | ahammerschmid@diw.de

JEL: I10, I14, J14, J16, J26

Keywords: Gender Pension Gap, Gender Health Gap, Germany, Denmark, France

neration Transparency Act (*Entgelttransparenzgesetz*, EntgTranspG),²³ which is designed to promote more transparency regarding pay structures. Such policies could indeed contribute to closing the gender pension gap. Moreover, our findings suggest that such measures could potentially also reduce gender-specific differences in depressive symptoms in old age.

23 Federal Ministry for Family Affairs, Senior Citizens, Women and Youth, "Informationen zum Gesetz zur Förderung der Entgelttransparenz," Berlin, 2017 (available online).

Carla Rowold is a Student Assistant in the Department of Public Economics at DIW Berlin | crowold@diw.de