Women's likelihood of holding a senior management position is considerably lower than men's—especially in the financial sector

By Elke Holst and Martin Friedrich

Women remain grossly underrepresented in management positions in Germany. However, what has been dubbed the gender leadership gap, i.e., the difference between the share of all employees who are women and the share of women in senior management positions, varies considerably across different industries. The present report shows that the largest gender gap in the likelihood of holding a senior management position is to be found in the financial sector. Possible explanations include an exceptionally masculine culture and the specific legal requirements of CEOs in the financial sector that are implicitly biased toward men. Furthermore part-time work generally has an adverse effect on women's career prospects: for many management positions, being able to work full-time is a prerequisite that often excludes women from taking on these positions due to the traditional division of household and family labor. Policy-makers and the business community should therefore adopt measures to increase gender equality when it comes to working hours. The "family working-time benefits model" and improvements in the quality of child day care proposed by DIW Berlin would be steps in the right direction.

Germany's low ratio of women to men in management positions[1] is a major contributor to the gender pay gap,[2] which currently stands at 21 percent.[3] The average gender pay gap across the 28 EU member states is 16 percent—and thus Germany ranks very low compared to the rest of the EU.[4] The gender pay gap in the financial sector is particularly high,[5] which suggests that there is also inequality of opportunity between men and women in well-paid positions.

The present report examines factors that determine the odds of women holding *senior management positions*. In contrast to previous articles published by DIW Berlin in which "manager" was defined more broadly and included individuals in highly skilled occupations,[6] this study focuses on senior managers as defined by the 1988 version of the International Standard Classification of Occupations (ISCO-88, major group 1) (see Box 1). This group includes chief executives, production department managers, and personnel department managers, among others. The present analysis examines both the private as well as the public sector.

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1 See E. Holst, A. Busch, and A. Wieber, "Führungskräfte-Monitor 2015: Update 2001–2013," *DIW Berlin – Politikberatung kompakt*, no. 100 (2015); and also E. Holst and A. Kirsch, "Women Executive Barometer 2015," *DIW Economic Bulletin*, no. 3 (2016): 13–38.

2 C. Finke, "Verdienstunterschiede zwischen Männern und Frauen: Eine Ursachenanalyse auf Grundlage der Verdienststrukturerhebung 2006," *Wirtschaft und Statistik (WISTA)* (German Federal Statistical Office, 2011): 36–48.

3 Federal Statistical Office, "Gender pay gap in Germany at 21% – Effects of minimum wage are especially noticeable in eastern Germany," press release, no. 097, March 16, 2016, accessed August 9, 2016, http://bit.ly/2cpv9L0

4 Eurostat, Gender pay gap in unadjusted form 2014 (2016), accessed August 22, 2016, http://bit.ly/2bQ0ouS

5 See Eurostat, The unadjusted GPG by economic activity (%) 2014 (2016), accessed August 26, 2016, http://bit.ly/2cdc5Bs. Also in other EU countries, the gender pay gap in the financial sector is particularly high.

6 See, for example, Holst et al., "Führungskräfte-Monitor 2015": 47 and E. Holst and A. Busch, "Geschlechtsspezifische Verdienstunterschiede bei Führungskräften und sonstigen Angestellten in Deutschland: Welche Relevanz hat der Frauenanteil im Beruf?," *Zeitschrift für Soziologie* 42(4) (2013): 315–336.

Box 1

Data, definitions, and key variables

The calculations for the present study are based on data from the longitudinal Socio-Economic Panel (SOEP) study.[1] The SOEP is a representative panel survey of households and individuals in Germany that has been being conducted with the same people and families in the Federal Republic of Germany on an annual basis since 1984. The present analysis includes data from 2001 to 2014.

The study includes employees in both the private and public sectors (blue-collar workers, white-collar employees, and civil servants) aged 18 to 64. People are considered "gainfully employed" according to ILO standards.[2] Hence employees are comprised of those who work full-time, part-time, or in marginal employment, and work at least one hour per week.

Those excluded from the analysis include individuals who are self-employed, apprentices, undergoing training, pensioners, in voluntary military service, taking a gap year (voluntary social or ecological service), in the Federal Voluntary Service, or in sheltered workshops.

Definition and operationalization of management

Managers are defined in the present report as all employees categorized in major group 1 (*legislators, senior officials, and managers*) of the 1988 version of the International Standard Classification of Occupations (ISCO-88).[3] Managers plan, direct, and coordinate the policies and activities of enterprises, organizations, or their internal departments where these departments require a total of three or more managers.[4] The present issue of *DIW Economic Bulletin* thus refers specifically to senior and top management positions (hereafter: *senior management positions*).[5]

It should also be noted that according to ISCO-88, some employees in lesser senior management positions also fall under major group 1. This is partly due to ISCO-88 allowing staff with management functions (*supervisors*) to be classified as part of this group. This is also as a result of the breadth of sub-major group 13, *General Managers*. It is intended to include managers who run small businesses on their own (usually self-employed). Since the self-employed were excluded from this

1 G. G. Wagner, J. R. Frick, and J. Schupp, "The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements," *Schmollers Jahrbuch*, no. 127(1) (2007): 139–169.

2 ILO, "Resolution concerning statistics of work, employment and labour underutilization," 19th International Conference of Labour Statisticians (2013).

3 ILO, *International Standard Classification of Occupations: ISCO-88* (1990).

4 ILO, *ISCO-88. Structure & Definitions. Alphabetical Index* (2004), accessed August 9, 2016, http://www.ilo.org/public/english/bureau/stat/isco/isco88/1.htm .

5 In previous articles published by DIW Berlin, individuals in highly skilled occupations were also considered "senior management." The term management is therefore more narrowly defined in the present *DIW Economic Bulletin*. In addition, the sample was limited to employees in the private sector. Consequently, the findings here can only be compared to previous studies to a limited extent. See, for example, E. Holst, A. Busch-Heinzmann, and A. Wieber, "Führungskräfte-Monitor 2015: Update 2001–2013," *DIW Berlin: Politikberatung kompakt* 100 (2015); E. Holst and A. Busch, "Geschlechtsspezifische Verdienstunterschiede bei Führungskräften und sonstigen Angestellten in Deutschland: Welche Relevanz hat der Frauenanteil im Beruf?," *Zeitschrift für Soziologie* 42(4) (2013): 315–336.

The data used for the empirical analysis are taken from the Socio-Economic Panel (SOEP) study.[7] The analysis draws on data from 2001 to 2014, thus beginning with the year in which the German federal government and leading German business associations signed a voluntary agreement on the promotion of equal opportunities for men and women in the private sector.[8]

Gender leadership gap varies considerably across industries

The starting point for the present study is an indicator provided by DIW Berlin to determine the gender leadership gap (See Box 2). This indicator measures the difference between the share of all employees who are women and the share of women in senior management positions.

Between 2001 and 2014, 48 percent of all employees were women (see Figure 1), yet women accounted for only 31 percent of senior management positions. Accordingly, the

7 G. G. Wagner, J. R. Frick, and J. Schupp, "The German Socio-Economic Panel Study (SOEP) – Scope, Evolution and Enhancements," Schmollers Jahrbuch 127(1) (2007): 139–168, accessed September 7, 2016, http://bit.ly/2cxOw5f

8 Agreement between the German government and leading Germany business associations on the promotion of equal opportunities for men and women in the private sector (*Vereinbarung zwischen der Bundesregierung und den Spitzenverbänden der deutschen Wirtschaft zur Förderung der Chancengleichheit von Frauen und Männern in der Privatwirtschaft*), July 2, 2001, Berlin.

evaluation, the present analysis focuses mainly on senior management positions.[6]

Key variables

The classifications used here for the various industries are based on the Statistical classification of economic activities in the European Community (*Nomenclature statistique des activités économiques dans la Communauté européenne*, NACE). The ten aggregate measures for the national accounts are given as a starting point.[7] These aggregate measures are then grouped together into eight categories due to the limited sample size, particularly for women in senior management positions. In the present report, the "agriculture, manufacturing, and processing" industry includes the NACE sectors of agriculture, forestry, fishing and manufacturing, mining and quarrying, and other industries. In addition, real estate activities and other services are grouped together in one sector.

Full-time employment means working 35 hours or more each week. All other employees are categorized as non-full-time.

6 For a more detailed discussion on the definition and operationalization of management positions, see T. Körner and L. Günther, "Frauen in Führungspositionen. Ansatzpunkte zur Analyse von Führungskräften in Mikrozensus und Arbeitskräfteerhebung," *Wirtschaft und Statistik (WISTA) Mai 2011* (2011): 434–451.

7 Eurostat NACE Rev. 2, *Statistical classification of economic activities in the European Community* (2008), 43–44.

Box 2

Gender leadership gap (GLG)

The *gender leadership gap* represents the difference between the share of women among all employees and the share of women in senior management positions. If women had exactly the same likelihood of accessing senior management positions as men, this difference would not exist and women would be represented in senior management positions according to their share of all employees. The following formula is used to calculate the gender leadership gap:

$$GLG = \frac{1}{T}\sum_{t=2001}^{2014}\left[\frac{E_{w_t}}{(E_{w_t}+E_{m_t})} - \frac{smp_{w_t}}{(smp_{w_t}+smp_{m_t})}\right],$$

where E_w represents the number of women employed, E_m the number of men employed, smp_w the number of women in senior management positions, smp_m the number of men in senior management positions, and T the number of years covered by the estimation.

In the method used here, the difference between the share of women among all employees and the share of women in senior management positions was calculated for each year of the observation period to provide an annual rate for the gap. The SOEP's[1] cross-sectional weighting was used to accommodate the different sample sizes in each year and variations in the sociodemographic structure of the SOEP survey waves. Finally, the gender leadership gap was calculated as the arithmetic average of the annual rates from 2001 to 2014.

1 M. Kroh, "Documentation of Sample Sizes and Panel Attrition in the German Socio-Economic Panel (SOEP) (1984 until 2014)," *SOEP Survey Papers*, Series C, no. 297 (2015).

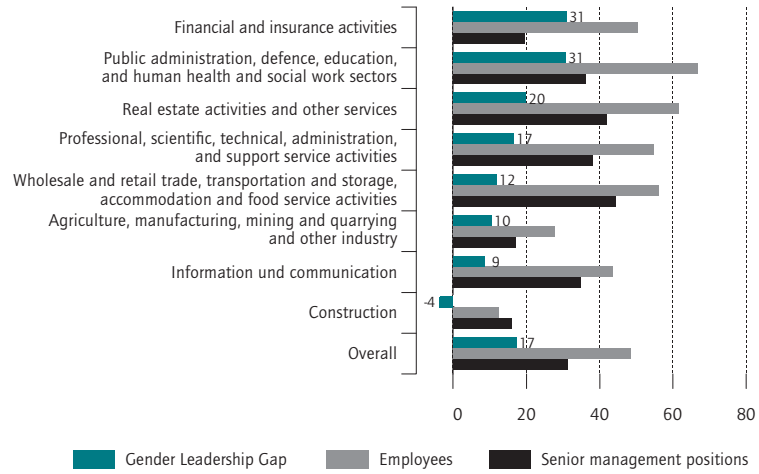
gender leadership gap was 17 percent during the observation period. In the base year 2001, it was 11 percent; at the end of the observation period in 2014, it was 16 percent (see Figure 2). In the interim, the gender leadership gap fluctuated. However, since the sample size was very small in certain years—particularly for women in senior management positions—this should not be overinterpreted.

In agriculture, manufacturing and processing, information and communication, wholesale and retail trade, transportation and storage, and accommodation and food service activities the average gender leadership gap between 2001 and 2014 was comparatively moderate, amounting to approximately ten percent. The highest gender leadership gap (31 percent) was observed in the financial sector and public administration, defence, social security, education, and human health and social work (hereafter: public administration et al.). During the observation period, half of all employees in the financial sector were women, yet the share of women among senior management in this sector was only 19 percent.[9] Women accounted for more than two-thirds of all employees in public administration et al., and held just over one-third of senior management positions.

9 A recent study conducted by the Institute for Employment Research (IAB) has similar findings. This study also highlights the financial sector as the industry where women, relative to their share of all employees, are least well represented in management positions. See S. Kohaut and M. Möller, "Im Osten sind Frauen öfter an der Spitze," *IAB-Kurzbericht* 2 (2016): 3.

Figure 1

Gender leadership gap plus women's share of senior management positions and employees by industry
Means of weighted yearly quotas 2001–2014 in percent

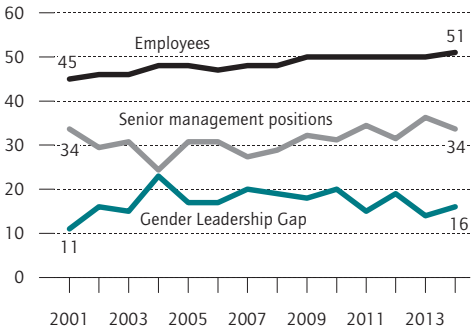


Source: SOEP V.31; calculation of DIW Berlin.

Compared to the total share of women employed, women are the most underrepresented in the financial sector and in public administration et al.

Figure 2

Development of Gender Leadership Gap plus women's share of senior management positions and employees
Yearly quotas 2001–2014 in percent



Source: SOEP V.31; calculation of DIW Berlin.

The gender leadership gap has increased since 2001.

Women in senior management less likely to be married and more likely to be childless than their male counterparts

A comparison of the socioeconomic profile of senior management with other employees provides us with some initial indications of the individual and professional characteristics of women and men in senior management (see Table 1).

First, it is striking that women who held senior management positions between 2001 and 2014 were far more likely to be working full-time (80 percent) than were other gainfully employed women (49 percent). These women were also a year younger and had an additional two years of education, on average. Evidently, careers are predominantly pursued outside of female-dominated professions,[10] since just under one-tenth of women in senior management positions worked in female-dominated occupations whereas almost six-tenths of all other women in gainful employment were in these professions. Women in senior management were most likely to be employed in mixed-gender occupations (almost 60 percent). Overall, the average share of women in professions where women occupy senior management positions was 43 percent. A good four out of ten women in senior management positions worked in wholesale and retail trade, transportation and storage, and accommodation and food services, and the female share of other employees in these industries was considerably lower, at just 22 percent. There was also a disproportionately high number of women in senior management at companies with 2,000 employees or more—presumably because large companies have more senior management positions to fill below the management board level than do small and medium-sized enterprises (SMEs).

Women in senior management positions were less likely to be married and have children than were other working women. This difference in structure is most likely linked to the fact that the professional expectations of senior managers are still more biased toward men, since the traditional division of household responsibilities frequently still enables men to completely devote themselves to their jobs.[11] Availability and flexibility in

10 A female-dominated occupation is defined as one where the share of women is 70 percent or more (e.g., administrative assistant, cleaner, educator). A male-dominated occupation is defined as one where the share of women is 30 percent or less (e.g., automobile mechanic, electrician, professional driver). Mixed-gender occupations have a percent share of women between 30 and 70 percent (e.g., doctor, bank clerk, industrial clerk). On this, see also A. Busch and E. 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.

11 H. Trappe, C. Schmitt, and A. Z. Wengler, "Alles wie gehabt? Zur Aufteilung von Hausarbeit und Elternaufgaben in Partnerschaften," *Zeitschrift für Bevölkerungswissenschaft* 34 (1) (2009): 57–87.

Table 1

Socioeconomic structure of senior managers and other employees by gender

Means of weighted yearly results 2001–2014

	Overall		Women		Men	
	Senior management positions					
	yes	no	yes	no	yes	no
Human Capital						
Years of education (mean)	14	12	14	12	14	12
Years of work experience (mean)	21	19	17	18	22	20
Years of job tenure (mean)	12	11	9	10	14	12
Hours worked						
Full-time employment (share in percent)	91	71	80	49	96	92
Vertical occupational segregation						
Share of women (percent)	31	49				
Horizontal occupational segregation						
Industry (share in percent)	100	100	100	100	100	100
Agriculture, manufacturing and processing	32	28	18	16	39	40
Construction	2	6	1	1	2	9
Wholesale and retail trade, transportation and storage, accommodation and food service activities	29	19	41	22	23	16
Information und communication	2	2	3	2	2	2
Financial and insurance activities	9	4	5	4	10	4
Professional, scientific, technical, administration and support service activities	8	7	10	8	8	6
Public administration, defence, education, human health and social work activities	11	29	13	39	10	18
Real estate activities and other services	7	5	9	7	6	4
Firm size (share in percent)	100	100	100	100	100	100
19 or fewer employees	15	25	20	30	13	20
20 to 199 employees	28	30	23	29	31	30
200 to 1999 employees	24	22	20	21	26	24
2000 employees or more	33	23	37	20	31	26
Share of women in occupation	35	48	43	68	32	28
Share of women in occupation categorized (share in percent)[1]	100	100	100	100	100	100
Male-dominated occupation	49	36	32	9	57	62
Mixed-gender occupation	45	31	59	34	39	29
Female-dominated occupation	6	33	9	57	4	9
Sector (share in percent)	100	100	100	100	100	100
Private	87	73	88	69	87	77
Public	13	27	12	31	13	23
Occupational status	100	100	100	100	100	100
Blue-collar worker	5	35	4	23	6	46
White-collar workers	89	59	91	71	88	46
Civil Servants	5	7	5	6	6	8
Sociodemographic characteristics						
Age in years (mean)	44	42	41	42	45	42
Age group (share in percent)	100	100	100	100	100	100
18 to 35 years	21	29	33	30	15	29
36 to 44 years	32	26	30	26	33	27
45 to 64 years	47	45	37	45	52	45
Marital status (share in percent)	100	100	100	100	100	100
Singles	17	22	25	22	14	21
Unmarried cohabitation	23	22	35	24	18	21
Married cohabitation	60	56	40	54	69	58
Children in household under 16 years old (share in percent)	100	100	100	100	100	100
No children	69	69	80	71	65	68
1 child	13	15	12	15	13	14
2 children	14	13	7	12	18	14
3 or more children	3	3	1	2	4	4
Region (share in percent)	100	100	100	100	100	100
West Germany	88	83	83	83	90	83
East Germany	12	17	17	17	10	17

1 Typical female-dominated occupations have a female share of 70 percent or more; typical male-dominated occupations have a female share of 30 percent or less. Typical mixed-gender occupations have a share of women including and between 31 and 69.

Source: SOEP V.31; calculated by DIW Berlin.

terms of working hours are highly valued by companies and are more likely to be a prerequisite for management posts. In light of this, it is simply not possible, in practice, to reconcile family and working life while holding down a senior management position.

Indeed, a look at the social structure also illustrates the different everyday realities: almost all men in senior management work full-time. Compared to their female counterparts, they are more likely to have children and are considerably more likely to be married.

Financial sector has a comparatively high number of senior management positions– a structure that primarily benefits men

If we examine the distribution of senior managers and other employees across the individual industries, it is striking that nine percent of all senior managers work in the financial sector, but only four percent of all other employees do. Compared to other industries, the financial sector therefore offers the highest odds of holding a senior management position.

Generally, the odds of being a senior management position are lower for women than for men, but even more so in the financial sector. Here, women's odds are 2.7 times (1 – (1 / 0.2669) = –2.7) lower than are men's (see Table 2), according to initial logistic regressions (see Box 3). By contrast, in the agriculture, manufacturing, and processing industry, for instance, the difference in odds between women and men is considerably smaller (1 – (1 / 0.5687) = –1.8).

Since these gender differences might also be attributed to differences in human capital (level of educational attainment and work experience) or other characteristics relevant for holding a senior management position, these variables are included in the model calculations. By taking industry affiliation into account, we can verify whether inequality of opportunity between women and men is, in fact, highest in the financial sector.

This analysis confirms the fundamentally lower odds of women occupying a senior management position: the coefficient of the variable *women* is less than one and statistically significant (see Table 3, Model 1). More specifically, if we control for other explanatory variables, women's odds averaged across all industries are 23 percent (1 – (1 / 0.8149) = –0.2271) lower than men's. For the purposes of our industry comparison, the financial sector was selected as the reference group. The majority of industry coefficients are less than one and statistically significant. This proves that, on average, the financial sector offers higher odds of holding a senior management position than do other industries, even when independent variables such as education or work experience are controlled for.

However, there is no statistically significant difference between the odds of women holding a senior management position in the financial sector and their odds in the information and communication and service industries (see Table 3, Model 2). It appears that in the trade, transportation, and storage industry as well as the accommodation and food service industry, women in fact have higher odds of occupying a senior management po-

Table 2

Odds ratios of women to men holding a senior management position by industry, 2001–2014

	Agriculture, manufacturing and processing	Construction	Wholesale and retail trade, transportation and storage, accomodation and food service activities	Information und communication	Financial and insurance activities	Professional, scientific, technical, administration and support service activities	Public administration, defence, education, and human health and social work activities	Real estate activities and other services
Women [reference=men]	0.5687***	1.3255	0.5215***	0.4886**	0.2669***	0.2969***	0.2726***	0.2868***
Dummyset for Years of observation period	✓	✓	✓	✓	✓	✓	✓	✓
Constant	0.0781***	0.0216***	0.0984***	0.0906***	0.2095***	0.1130***	0.0471***	0.1209***
Observations	42,987	8,163	28,215	2,626	6,329	11,369	45,764	8,732
Sample size	11,576	2,722	8,911	834	1,463	4,037	10,800	3,362
Pseudo R^2	0.0068	0.0011	0.0133	0.0142	0.0544	0.0423	0.0421	0.0469

Cluster robust estimation of standard error
**** p < 0.01, ** p < 0.05, * p < 0.10*

Source: SOEP V.31; calculation by DIW Berlin.

sition than they do in the financial sector (the result of the model calculation for this sector is greater than one).

The extent to which men's odds of holding a senior management position within the financial sector are higher than women's is evident from the interaction effects (see Table 3, Model 3). Here, the ratio between the coefficients for men and women is determined in each of the relevant industries and then compared with the situation in the financial sector. First, compared to men in agriculture, manufacturing, and processing, men in the financial sector have 1.8 times (1 / 0.5594 = 1.8) higher odds to hold a senior management position. For women, on the other hand, the odds of holding such a position in

Table 3

Determinants of holding a senior management position by gender
2001–2014 (odds ratios)

	Model 1: All employees without interaction effects	Model 2: Women	Model 3: Interaction effects for gender	
			Main effects conditioned to men	Interactions (odds women/odds men)
Women [reference=men]	0.8149**		0.2424***	
Industries [reference=Financial and insurance activities]				
Agriculture, manufacturing and processing	0.6435***	0.6952*	0.5594***	1.5021*
Construction	0.2804***	0.4053*	0.2354***	1.9641
Wholesale and retail trade, transportation and storage, accommodation and food service activities	1.1973	2.2902***	0.9184	2.0738***
Information und communication	0.7139*	0.89	0.5858**	1.9805*
Professional, scientific, technical, administration and support service activities	0.5376***	0.7163	0.4669***	1.5506
Public administration, defence, education, human health and social work activities	0.3564***	0.5125***	0.3526***	1.1376
Real estate activities and other services	0.8024	1.1078	0.7337*	1.3092
Human Capital				
Years of education	1.1714***	1.1567***	1.1497***	1.0580**
Years of work experience	1.0742***	1.0439***	1.0808***	0.9967
Years of job tenure	1.0028	0.9908	1.005	0.9916
Hours Worked Full-time employment	2.8689***	2.9439***	1.6066***	2.2052***
Sociodemographic characteristics				
Children in household under 16 years old [Reference: no children]				
1 child	1.1871**	1.22	1.2053**	0.9863
2 children	1.1567*	1.0986	1.1981**	0.8962
3 or more children	1.0703	1.3583	1.0426	1.3153
Controls				
Years of work experience squared	✓	✓	✓	
Occupational status (reference=white-collar workers)	✓	✓	✓	
Share of women in occupation	✓	✓	✓	
Public sector (reference=private sector)	✓	✓	✓	
Firm size	✓	✓	✓	
Martial status (reference=single)	✓	✓	✓	
Region (reference=West Germany)	✓	✓	✓	
Dummyset for years of observation period	✓	✓	✓	
Constant	0.0564***	0.1157***	0.1147***	
Observations	128,613	63,420	128,613	
Sample size	30,226	15,417	30,226	
Pseudo R^2	0.1872	0.2258	0.1903	

Cluster robust estimation of standard error
**** p < 0.01, ** p < 0.05, * p < 0.10*

Source: SOEP V.31; calculation by DIW Berlin.

Box 3

Statistical methods

The **logistic regression** is used to predict the probability of the presence of a characteristic, in this case, of an individual occupying a senior management position.[1]

For technical reasons, *odds are preferred* in logistic regression calculations. In statistics, an odd is defined as the ratio of the probability (P) of an event to its counter-probability. The estimated coefficients are represented as *odds ratios* (OR)[2], a measure that compares the odds of two groups being in a senior management position (smp) or not. This is demonstrated in a formula using the example of the odds ratio between men (index m) and women (index w):

$$OR(smp_w / smp_m) = \frac{R_w(smp)}{R_m(smp)} = \frac{\frac{P_w(smp)}{1-P_w(smp)}}{\frac{P_m(smp)}{1-P_m(smp)}}$$

It is important to note that odds are not the same as probabilities in this interpretation. In statistics, an OR describes the degree of association and therefore says something about the strength of the correlation between two variables (such as management position and gender).

In addition to the regression model, the statistical inference of odds on probabilities was implemented by calculating **marginal effects**.[3]

In all the models, the long duration of the SOEP was used to obtain large samples for the estimation models. We used a *pooled model* to take into account robust standard errors in the estimated coefficients for the presence of the same persons in the individual survey waves of the SOEP.

1 S. J. Long and J. Freese, *Regressions Models for Categorical Dependent Variables Using Stata* (2001), 99.

2 Long and Freese, *Regression Models*, 103.

3 U. Kohler and F. Kreuter, *Data Analysis Using Stata* (2012), 360.

the financial sector are only 1.4 times (1 / 0.6952 = 1.4) higher than in agriculture, manufacturing, and processing. The interaction coefficient proves that men's advantage in the financial sector is around 1.5 times higher than women's. Men therefore benefit more than women do from the structural advantage—that is, the relatively high number of senior management positions—in the financial sector.

Since the interaction terms are greater than one for all industries, it can be assumed that in the financial sector, the odds of women holding senior management positions are lower than they are for men. Compared with the agriculture, manufacturing, and processing, trade, transportation, and storage, accommodation and food service, and information and communication industries, this assumption is statistically significant.

Alternatively, the relationship can also be illustrated graphically by calculating marginal effects. These enable us to predict the probability of women occupying a senior management position while controlling for independent variables such as education or work experience. In almost all industries, the predicted probability for men is statistically significantly higher than for women (see Figure 3). The biggest gap is in the financial sector. This confirms the study's initial assumption that the likelihood of women holding senior management positions in the financial sector is particularly low compared to men's.

Prerequisite for senior management positions is availability for full-time work

Almost all men in senior management positions between 2001 and 2014 (96 percent on average) were employed full-time, while the corresponding figure for women was 80 percent. How does the ability or decision to take on full-time work affect women's prospects for holding a senior management position? The model calculations show that compared with women who work part-time or in marginal employment, those who work full-time are 2.9 times more likely to hold a senior management position (see Table 3, Model 2). This correlation also applies to men, but it is weaker.

Having children reduces the likelihood of women to hold senior management positions when mothers do not or are unable to work full-time

Due to the persistence of the traditional division of household responsibilities, mothers generally have more limited availability to work than fathers do.[12] At first glance, it is perhaps surprising then that children in the household appear to have an initially positive—albeit not statistically significant—effect on the odds of women holding a senior management position (see Table 3, Model 2).

12 Even in households where both parents work full-time, women do more of the child care and housework than men. See DIW Berlin, "Germany: Even in two-income households, women who work full time are still doing considerably more housework than their male counterparts – and hardly any changes are in sight," news release, March 2, 2016, accessed September 7, 2016, http://bit.ly/2cCYtNf

Since a strong correlation between children in the household and the possibility of full-time employment seems likely, however, further models for women are estimated below.[13] These allow confounding effects to be identified, enabling us to draw conclusions about the interaction of the variables "children in household under 16 years old" and "full-time employment."

If we first consider only the impact of children in the household on the odds of women holding a senior management position, we observe significant negative effects (see Table 4, Model 1). If the number of hours worked, i.e., whether women work full- or part-time, is recorded as a second variable (see Model 2), the effects of children in the household lose their statistical significance and full-time employment emerges as a significant determinant. This effect persists even if all other determinants are controlled for in the estimation (see Model 3).

This indicates that the effect of children in the household on the likelihood of women occupying a senior management position should not be overestimated. Availability for full-time work is a much more decisive factor. Children therefore hinder career prospects under the given circumstances if long working hours are required for management positions but mothers only work part-time.[14] The difference in the probability of holding a senior management position between mothers and childless women can largely be attributed to a difference between women working part- and full-time.

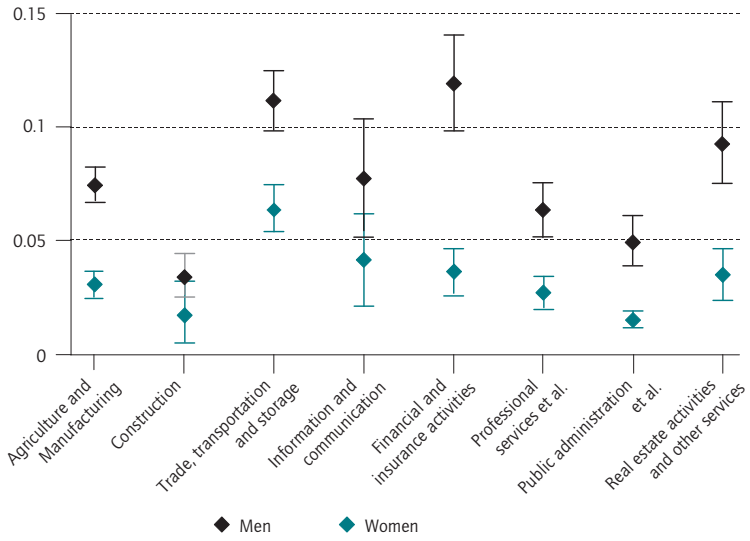
Men consistently have better odds of occupying senior management positions over time

Compared over time, up until 2013, the odds of men holding a senior management position were consistently statistically significantly higher than in the base year 2001 (see Table 5). In virtually every year, the odds of women occupying these positions did not differ statistically significantly from those observed in the base year. The interaction effects show how the odds ratio of women to men has developed compared with 2001. In 2002, 2004 to 2009, and 2012, women had statistically significantly lower odds than men of holding a senior management position than they did in 2001. It was not

Figure 3

Predicted probability of occupying a senior management position by industry and gender

2001–2014 (predictive margins[1])



How to read this figure: The probability that a male employee in the financial and insurance sectors occupied a senior managment position in the period between 2001 and 2014 was 12 percent, while the probability for a female employee was only 4 percent. Hence men were three times more likely to hold a senior leadership position in financial and insurance activities than were women. The 95%-confidence band, which represents statistical uncertainty, was 4 percentage points wide for men and 2 percentage points wide for women.

1 All variables listed in Table 3 were considered in the estimation.

Source: SOEP V.31; calculation by DIW Berlin.

The biggest gender difference in the predicted probability of holding a senior management position was observed in the financial sector.

Table 4

Impacts of having children and hours worked on women's probability of holding a senior management position

2001–2014 (average marginal effects)

Variables/Models	Model 1	Model 2	Model 3
Children in household under 16 years old [reference: no children]			
1 child	−0.0093***	0.0013	0.0055
2 children	−0.0159***	−0.0004	0.0025
3 or more children	−0.0151***	0.0030	0.0089
Full-time employment [reference=non-full-time employment]	×	0.0395***	0.0265***
Controls:			
Human Capital	×	×	✓
Horizontal occupational segregation	×	×	✓
Sociodemographic characteristics	×	×	✓
Dummyset for years of observation period	✓	✓	✓
Observations	63,420	63,420	63,420
Sample size	15,417	15,417	15,417
Pseudo R^2	0.01	0.05	0.23

Cluster robust estimation of standard error
**** p < 0.01, ** p < 0.05, * p < 0.10*

Source: SOEP V.31; calculation by DIW Berlin.

13 Unlike in the preceding regressions, calculations are now carried out for the step-by-step model design using average marginal effects. These express the effect of a variable on the probability (not the odds) of a characteristic being observed. This approach is to be recommended here since the comparison of odds ratios between models with a different number of independent variables is not technically feasible. For a discussion on the different methods, see H. Best and C. Wolf, "Modellvergleich und Ergebnisinterpretation in Logit- und Probit-Regressionen," *Kölner Zeitschrift für Soziologie* 64 (2012): 377–395.

14 In principle, this link probably applies to all persons with the responsibility of caring for dependents that forces them to reduce their working hours.

Table 5

Yearly change in the odds of holding a senior management position by gender
2001–2014 (odds ratios)

	Model 1: Women	Model 2: Men	Model 3: Interaction effect for gender
Dummyset for years of observation period (Reference=2001)			
2002	1,1707	1,4215***	0,8205*
2003	1,2149*	1,4112***	0,845
2004	0,9438	1,2813***	0,7063**
2005	1,006	1,2761***	0,7551**
2006	1,0023	1,2264**	0,7697*
2007	0,979	1,4348***	0,6621***
2008	0,9792	1,4664***	0,6391***
2009	0,9688	1,2623***	0,7256**
2010	1,0839	1,2028**	0,8336
2011	1,0617	1,1739*	0,8659
2012	1,0828	1,2687***	0,7721*
2013	1,2046	1,1044	1,0032
2014	1,0552	1,0037	0,9693
Controls:			
Human Capital	✓	✓	✓
Hours worked	✓	✓	✓
Horizontal occupational segregation	✓	✓	✓
Sociodemographic characteristics	✓	✓	✓
Constant	0,0526***	0,1157***	0,0632***
Observations	128 613	63 420	65 193
Sample size	15 417	14 809	30 226
Pseudo R^2	0,226	0,169	0,188

Cluster robust estimation of standard error
**** p < 0.01, ** p < 0.05, * p < 0.10*

Source: SOEP V.31; calculation by DIW Berlin.

possible to identify a statistically significant positive development in favor of women for any of the given years.

Conclusion

The low share of women in management positions is one of the main reasons for the gender pay gap. More women in management positions—and hence more women with high incomes—should contribute to bridging the gender pay gap.

The present study shows that women still have a much lower probability of holding a senior management position than men do. This also applies if possible causes such as differences in human capital, working hours, or the presence of children in the household are taken into account and their effects controlled for.

Working full-time is still a prerequisite for a senior management position and considerably increases the odds of occupying such a position. Conversely, the importance of children living in the household must be relativized: if mothers still have the option of working full-time, children play no statistically significant role in the probability of the mothers holding a senior management position.

Studies show that decisions regarding working hours are made against the backdrop of a cultural context and institutional incentive structures.[15] Moreover, differences in working hours between women and men are lowest in countries with individual income taxation, well-developed child care, similar hourly earnings for women and men doing comparable work, and a high level of gender equality.[16] The proposals developed by DIW Berlin on the "family working-time benefits model" (*Familienarbeitszeit*) have these goals in mind—and combined with an improvement in the quality of day care centers, these proposals are important steps toward achieving employment configurations that are more geared toward an equal partnership, allowing both parents to reconcile family and working life.[17] If women more frequently hold down well-paid jobs, the gender pay gap in the couple household might also start to close, limiting the scope of economic incentive structures to reduce a female partner's working hours.[18]

The present analysis shows that the extent of the difference between women and men in terms of their odds of occupying a senior management position varies from one industry to another and is most pronounced in the financial sector. It is primarily men who benefit from the generally relatively good career prospects in this industry. If the current trend continues, this pattern is unlikely to change in the near future. In fact, a recent international comparative study on the situation in the financial

15 As has already been shown in previous studies, there are still considerable differences in the employment behavior of mothers in eastern and western Germany, for instance, although the institutional incentive structures and cultural values of the west are gradually also starting to have an impact on the behavior of eastern German mothers. See E. Holst and A. Wieber, "Germany 25 Years after Fall of the Wall – Eastern Germany Ahead in Employment of Women," *DIW Economic Bulletin*, no. 11 (2014): 33–41.

16 See Lena Hipp and Kathrin Leuze, "Institutionelle Determinanten einer partnerschaftlichen Aufteilung von Erwerbsarbeit in Europa und den USA," *Kölner Zeitschrift für Soziologie und Sozialpsychologie* 67(4) (2015).

17 See K.-U. Müller, M. Neumann, and K. Wrohlich, "The "family working-time benefits model" (*Familienarbeitszeit*): Giving mothers more time for work, giving fathers more time for family," *DIW Economic Bulletin*, no. 45/46 (2015): 595–602 and P. S. Schober and C. K. Spieß, "Die Kita-Qualität ist für das Erwerbsverhalten von Müttern mit Kleinkindern relevant – Zusammenhang eindeutiger in Ostdeutschland," *DIW Wochenbericht*, no. 21 (2014): 463–471.

18 See D. Triebe, "Wo(men) at Work? The Impact of Cohabiting and Married Partners' Earnings on Women's Work Hours," *SOEPpapers on Multidisciplinary Panel Data Research* 614 (2013). This study shows that women reduce their working hours when the income of the male partner increases.

sector shows that Germany is one of a group of "stuck in the mud"[19] countries: in other words, it is characterized by particularly low shares of women on executive committees as well as a particularly slow pace of change over the past few years. In this context, the study points to a "masculine culture" firmly anchored in the financial sector.[20] According to the study, deep-rooted gender role expectations and a family-unfriendly work culture reduce career opportunities for women.

Even legislation can have an adverse effect on women and contain an unconscious gender bias. One example of this can be found in Section 25c of the German Banking Act (*Kreditwesengesetzes*, KWG): "The management board members of an institution shall have the necessary professional qualifications, be trustworthy, and dedicate sufficient time to performing their functions. A prerequisite for the professional qualifications of management board members is that they have adequate theoretical and practical knowledge of the business concerned, as well as managerial experience. A person shall normally be assumed to have the necessary professional qualifications if he/she can demonstrate three years' managerial experience at an institution of comparable size and type of business."[21] The Federal Financial Supervisory Authority (*Bundesanstalt für Finanzdienstleistungsaufsicht,* BaFin) also stipulates in the accompanying Guidance Notice: "The legal presumption may also be assumed to apply if a person currently holds, or has held, a management position which is hierarchically directly below management board level."[22] Since men already occupy the majority of these posts, they benefit from this legislation much more than do women, a considerably higher proportion of whom face the often difficult task of having to prove that they are fit for the post.

For instance, the former President of the Federal Constitutional Court of Germany, Hans-Jürgen Papier, already established in a report "that gender stereotypes and a traditional division of roles affect women's performance appraisals and competence assessments and tend to be biased against female applicants."[23] This claim is also backed by other studies that come to this conclusion: "What is described by men [in management positions] as "false" attitude logic and behavioral patterns of ambitious women are not objective appraisals of women but to be interpreted first and foremost as subjective appraisals of the mindset of men occupying the floors above the 'glass ceiling.'"[24]

In order to change this mentality and sustainably increase the share of women in senior management positions, we should therefore examine to what extent legislation as well as existing practices and organizational processes within companies create, preserve, or challenge unequal treatment of women and men in the financial sector—and in other industries as well. It is essential that we overcome the existing barriers to women climbing the career ladder and thus counteract the constant reinforcement of the uneven odds of occupying a (senior) management position that women are still facing today.

19 Oliver Wyman, ed., Women In Financial Services, 54, 2016, accessed August 16, 2016, http://bit.ly/2cgEKUO

20 The following explanation is provided in the study: "[A] culture is masculine when the population displays a preference for achievement, heroism, assertiveness, and the material rewards for success. A masculine society is competitive rather than consensual. A feminine culture, according to Hofstede, prefers cooperation, modesty, caring for the weak, and quality of life. When plotting cultural masculinity against female representation on financial services firms' ExCos, there is a negative correlation." See Wyman, ed., *Women In Financial Services*, 54.

21 Working translation by the German Bundesbank, accessed on September,13,2016, http://bit.ly/2cUD3uc

22 Federal Financial Supervisory Authority (BaFin), Guidance Notice on management board members pursuant to the German Banking Act (Kreditwesengesetz – KWG), the German Payment Services Supervision Act (Zahlungsdiensteaufsichtsgesetz – ZAG) and the German Capital Investment Code (Kapitalanlagegesetzbuch – KAGB) (Bonn/Frankfurt a.M.: January 4, 2016), 19, last modified on August 8, 2016, accessed on August 24, 2016, http://bit.ly/2cGJL6A

23 Hans-Jürgen Papier in collaboration with Dr. Martin Heidebach (2014): *Rechtsgutachten zur Frage der Zulässigkeit von Zielquoten für Frauen in Führungspositionen im öffentlichen Dienst sowie zur Verankerung von Sanktionen bei Nichteinhaltung im Auftrag des Landes Nordrhein-Westfalen*, represented by the Ministry for Municipal and Internal Affairs, Munich. www.mgepa.nrw.de/mediapool/pdf/presse/pressemitteilungen/Gutachten_Zielquoten.pdf (retrieved August 24, 2016).

24 See BMFSFJ/Carsten Wippermann (2010): *Frauen in Führungspositionen – Barrieren und Brücken* ("Women in management positions—barriers and bridges"). Berlin/Heidelberg, page 73.

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JEL: G2, J16, J78, L32, M14, M51

Keywords: Gender, Gender Leadership Gap, managerial positions, promotion probability, Executive Committees (ExCos), glass ceiling, working hours, motherhood penalty, financial sector, BaFin, corporate culture, temporal flexibility

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DIW Berlin
ISSN 2192-7219