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Elke Holst • Anne Busch

Glass Ceiling Effect and Earnings –
The Gender Pay Gap in Managerial Positions in Germany

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Glass Ceiling Effect and Earnings - The Gender Pay Gap in Managerial Positions in Germany

Elke Holst* and Anne Busch**

Abstract

Although there are a variety of studies on the gender pay gap, only a few relate to managerial positions. The present study attempts to fill this gap. Managers in private companies in Germany are a highly selective group of women and men, who differ only marginally in their human capital endowments. The Oaxaca/Blinder decomposition shows that the gender pay gap in the gross monthly salary can hardly be explained using the human capital approach. Adding variables on gender-specific labor market segregation and dimensions of the household and family to the model allows more than two-thirds of the gender pay gap to be explained. However, taking selection effects in a managerial position into account (Heckman correction), the proportion explained decreases to only one-third. This reveals the real extent to which women are disadvantaged on the labor market. In addition, we observe not only that the wages in typical women's jobs are lower than in typical men's jobs but also that women are paid less than men in typical women's jobs. The two-thirds of the gender pay gap that remain unexplained represent the unobserved heterogeneity. This includes, for example, general societal and cultural conditions as well as structures and practices on the labor market and in companies that subject women to pay discrimination and pose an obstacle to them breaking the glass ceiling.

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1   Introduction

A variety of national and international studies on the gender-specific wage differential (gender pay gap) shows a wage disadvantage for women (Blau et al. 2006; Blau/Kahn 2006, 2003, 2000, 1997, 1996; Federal Ministry of Family Affairs, Senior Citizens, Women and Youth 2008a, b; European Commission 2007; for an overview, see Kunze 2008). Only a few articles are related to the gender pay gap in leadership positions and attempt to explain them (Bertrand/Hallock 2001; Kirchmeyer 2002; Lausten 2001). Women are to a large extent underrepresented in these higher hierarchical levels in Germany (Holst et al. 2009; Holst/Stahn 2007a, b). They are a strongly selected group of highly qualified employees, and in their human capital accumulation they are almost on the same level as men in comparable positions (Holst et al. 2009). However, there is still a gender pay gap also in managerial positions (Holst 2006; Holst/Schrooten 2006).

The present study analyses the gender pay gap in leadership positions in the private sector in Germany, based on the German Socio-Economic Panel Study (SOEP) (Wagner et al. 2007). To explain this wage differential, besides the human capital theory (Becker 1993, 1991), sociological approaches on gender-specific labor market segregation are also included in the model (England 1982; Ridgeway 2001). The goal of the empirical analysis is to extract the determinants of the gender pay gap with the aid of an Oaxaca/Blinder decomposition (Blinder 1973; Oaxaca 1973) and use this to explain to what extent the wage differential is, for example, related to the gender-specific human capital endowments or to gender-specific segregation on the labor market. In a second step, the gender-specific chances of occupying a leadership position are taken into account in the empirical model, using Heckman correction (Heckman 1979).

The study is structured as follows: Firstly, the essential theories explaining the gender pay gap and the state of research are presented (section 2), and related working hypotheses are formulated (section 3). Then the multivariate method for the quantitative analysis of the gender-specific wage differential in leadership positions (Oaxaca/Blinder decomposition and Heckman correction) is illustrated (section 4). After the data material and variables used are explained in section 5, the empirical findings are presented in section 6. Finally, in section 7, the results are summarized and discussed.

2   Theory

Human Capital approach

Normally in economics, the pay and pay differentials between women and men are explained by varying human capital accumulation – independently of the hierarchical position. The different human capital investments of men and women are interpreted as a result of a rational cost-utility calculation (Becker 1993, 1991): Women are more focused on their families than men and plan a more indirect professional path accordingly. Hence, for women, investments in educational and occupational training are less profitable, also because the accumulated knowledge becomes obsolete during breaks in employment (Blau et al. 2006). Furthermore, women invest less than men in knowledge accumulation during their working life (on-the-job training), because - as a result of less occupational continuity - they cannot benefit from this investment to the same extent (Mincer 1962; Tam 1997). The family orientation of the women also results in a restriction of their professional time availability. This leads to a "family gap" in the form of a wage disadvantage for women with a family (Nivorozhkina/Nivorozhkin 2008; Waldfogel 1998). For more highly qualified people, the opportunity costs of reduced occupational work or of not being employed are particularly high. For them, a traditional role allocation implies higher costs than for less qualified people.

Based on the human capital theory, not only the general gender-specific pay differentials, but also the different proportions of women and men in certain occupations and fields of work and thus the gender-specific labor market segregation is explained with the so-called self-selection (Polachek 1981): The gender-specific occupational choice is also a result of a rational cost-utility calculation; women choose in particular jobs that can be combined with family responsibilities, for example, those that allow part-time work and breaks in employment and those with a low obsolescence risk. The different level of integration into the labor market can, in accordance with this approach of self-selection, explain gender-specific career mobility to a large extent: "If women were to have a full commitment to the labor force, the number of women professionals would increase by 35%, the number of women in managerial professions would more than double, and women in menial occupations would decrease by more than 25%" (Polachek 1981: 68). This means it is possible to explain not only horizontal segregation - women and men are allocated in different occupations - but also vertical segregation - women and men are allocated on different hierarchical levels – in

human capital theory by self-selection.[1] Because of their family orientation, women are more often employed in lower hierarchies, less demanding occupations and in those which have fewer career opportunities. For Germany, it has been shown that the fields of study in which exams are taken have a major influence on the gender-specific wage differential (Machin/Puhani 2002).

Even in managerial positions, there are segregation mechanisms at work in Germany: On the one hand, according to vertical segregation, women, including those in higher positions, tend to work at lower hierarchical levels than men. The top leadership positions are mainly occupied by men (Holst/Stahn 2007a, b). On the other hand, according to horizontal segregation, there are also gender-specific occupational differences in sizes of the enterprise, economy sector and industry (Bischoff 2005; Kleinert et al. 2007): Women more often head smaller firms, and they more frequently work in health care, welfare, and in the private services. Furthermore, female managers are more often employed in public service than in the private sector (Brader/Lewerenz 2006; Holst 2006; Holst/Schrooten 2006). Research also shows that typical "women's jobs" have fewer career opportunities than typical "men's jobs" – and that this dependency is stronger for women than for men (Busch/Holst 2009).

The part of the gender-specific wage differential which is due to differences in human capital accumulation and preferences is interpreted as *legitimate* differences; people who invest more in human capital receive a fair productivity bonus (Blinder 1973; Card 1998; Mincer 1970; Oaxaca 1973). The wage difference is only seen as problematic when it is due to *illegitimate* discrimination and prejudice practices, independently of human capital accumulations. In numerous studies, this illegitimate, inexplicable part of the gender pay gap has been analyzed and quantified (Blau/Kahn 2006, 2003, 2000, 1997, 1996; Busch/Holst 2008a; Oaxaca 1973; Oaxaca/Ransom 1994; Olsen/Walby 2004; for an overview, see Kunze 2008). Here, decomposition methods that divide the wage differential into one "explicable" and one "inexplainable" part (see section 4) are normally used.

In economics, there are various approaches that explain the illegitimate part of the gender pay gap. Gary S. Becker's theory of "tastes of discrimination" says that there are personal prejudices concerning cooperation with a certain group (Becker 1971; Blau et al. 2006; Febrero/Schwartz 1995). These prejudices do not reflect a real dislike per se, but they are based more on the traditional roles of men and women with a resulting attribution of abilities. According to this theory, actors in the labor market anticipate that the employment of a

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[1] For the labor market segregation, see, for example, England 1982; England et al. 1988; Gottschall 1995; Heintz et al. 1997; Jacobs 1989.

woman produces higher costs than the employment of a man. This is because they assume that women have higher family responsibilities and are less work oriented. Therefore, in this approach, discrimination on the labor market is defined as rational profit maximization. In the view of the employer, the employment of women leads to higher personnel costs because he assumes that women are less productive than men. According to the human capital theory, he will hire women only at a lower wage to compensate these costs.

This theory has been reformulated inter alia by Edmund S. Phelps as "statistical discrimination" (Phelps 1972): This approach is based on the assumption of the employer's information deficits about the employees. The prejudices against women are again not personal, but they are more motivated by the fact that the employer must make hiring and promotion decisions based on incomplete information. Consequently, the employer switches to general information that is based on experience and observations in everyday life and related to the expected potential productivity of the employees. Since employers observe that on average women more often disrupt their occupation due to family responsibilities with negative results for productivity, they prefer to recruit men, or to employ women at a lower wage and offer them fewer training and career opportunities. This leads not only to wage disadvantages for women, but also to the problem that also women *without* family responsibilities - nevertheless seen as potential mothers – are subject to statistical discrimination right from the beginning of their career. As a result, women hit on a "glass ceiling" that prevents them from being promoted to a leadership position and - although they perhaps already work in a managerial position - reduces their chances of occupying a top managerial position (International Labour Office 2004; Wirth 2001). Related to this, data show that also for Germany, particularly in the higher paid positions, the gender pay gap is especially high (Arulampalam et al. 2006).

The explanatory power of the human capital theory is limited, particularly for explaining the general disadvantages (and the persistence thereof) of women on the labor market, independently of human capital accumulation. Therefore, it is questionable whether the observed channeling of women into lower paid jobs may be an explanation for *justified* wage differences. In fact, the channeling *itself* could be a result of discriminatory practices on the labor market (England 1982; England et al. 1988). Studies show that, from the beginning of their career on, women seem to be "trapped" in the sense of a "lock-in-effect" in occupations with lower pay (Fitzenberger/Kunze 2005). Back in the early 1980s it was shown that women who plan to interrupt their occupations did not - contrary to the thesis of self-selection - more frequently choose a typical "women's job" than other women (England 1982). In addition, an

analysis for West Germany showed that career breaks indeed have a negative effect on wages for men as well as for women, and also that this negative effect is particularly strong if the interruption is due to family responsibilities (e.g. parental leave) (Beblo/Wolf 2002). Furthermore, the implicit "given" gender-specific preferences in the human capital approach has been criticized in numerous studies (for an overview, see Ferber 1987; Holst 2000).[2]

Sociological Approaches

At this point, it is important to take sociological approaches as explanations for gender-specific wage differences into account. Here, it is assumed that societal modernization processes on the macro level (re)produce the gender-specific division of labor (Beck-Gernsheim 1980; Beck 1986; Gottschall 2000; Gottschall 1995). The historical responsibilities for the family (women) and for the occupation (men) developed in the modernization process lead to corresponding gender-specific values and norms internalized by the individuals and thus to gender-specific orientations and "preferences" for special jobs, as well as to discriminatory practices on the labor market.

This internalization of gender roles in our values and norms is (re)produced in the form of a "doing gender" in everyday interaction processes (Gottschall 2000; Ridgeway 2001; Ridgeway/Smith-Lovin 1999; West/Zimmerman 1987): In daily face-to-face interactions, people make gender-specific categorizations about the interaction partner that serve to simplify the interpretation of the actions of the counterpart. This categorization activates gender stereotypes; the interacting people fill the particular category (man/woman) with cultural perceptions about the relevant gender.

One of these stereotypes is the "gender status belief," which means the idea that one gender (the male) is more competent and thus has a higher status, with the result that in general it is justified for men to have a higher position of power and more privileges (Ridgeway 2001; Ridgeway/Smith-Lovin 1999). This leads to gender differences on the labor market: Men are expected to have higher work-related competence and effectiveness/performance than women (see also Foschi 1996), with the result that there are different career opportunities and pay (because income reflects the expected effort of the employee) for men and women.

As far as pay is concerned, in the *devaluation hypothesis* a general devaluation of female work is postulated (England et al. 1988; England et al. 2000; Liebeskind 2004; Steinberg

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[2] For a general critical evaluation of the theory, see Blau et al. 2006, Humphries 1995; for a feminist critique related to the male-oriented implications of the neoclassic approach, see, for example. Ferber/Nelson 1993, Kuiper/Sap 1995, Nelson 1996; for the historical development, see Pujol 1995; for a critique related to the reasons for the development of preferences, see England 1989, Nelson 1992, Woolley 1993.

1990; Tam 1997). This devaluation leads to lower pay for "female" jobs; the higher the percentage of women in a specific job, the lower the pay for women as well as for men. This is indicated in the literature with the term "evaluative discrimination" (Achatz et al. 2005; Peterson/Saporta 2004).[3] In addition, studies have shown that even *within* a specific job (i.e. within a female-dominated, male-dominated or gender-integrated profession), the work of women is devaluated and paid less than that of men. This is labeled as "allocative discrimination" (Achatz et al. 2005; Peterson/Saporta 2004).[4]

The devaluation thesis is important especially with regard to leadership positions: Here, because of cultural internalized perceptions about gender-specific occupational positions (gender status beliefs), employers tend to believe that women fit the leadership profile less; they attribute a higher competence to men (Eagly/Karau 2002; Gmür 2006, 2004; Ridgeway 2001). In addition, according to the "homophily principle" - which states that people interact primarily with others who are similar in given characteristics and build gender homogeneous networks[5] -, when making decisions about promotion, people prefer others who are similar in given characteristics; consequently, the predominantly male decision-makers prefer to promote men to leadership positions (Ridgeway 2001). If, despite all the barriers, women obtain a managerial position normally the domain of male employees, they are highly visible "tokens" (Kanter 1977) and thus faced with a more rigorous evaluation of their performance and possible mistakes than men.

The devaluation hypothesis proves to be controversial in the literature: In principle, it is acknowledged that on average typical women's jobs are paid less than typical men's jobs (Jacobs/Steinberg 1995; Olsen/Walby 2004). But concerning the *reasons* for this finding, there are contradictory analytical results: On the one hand, England et al. (1988) showed that, despite allowing for several wage relevant control variables, the negative dependency between the percentage of women in a job and the pay remained significant (see also England et al. 2000; Kilbourne et al. 1994). This was interpreted as cultural devaluation. On the other hand, Tam (1997) showed that the negative effect disappeared when taking into account the firm-specific on-the-job training. Tam concluded from this that the pay disadvantage in women's jobs is due to less firm-specific human capital accumulation in these jobs and that women may have less motivation than men to invest in this form of human capital (see also

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[3] The term "evaluative" indicates that one job is evaluated less than another only because the job is numerically dominated by one group of persons (men/women) (independently from the real job tasks and job demands) (Achatz et al. 2005: 469).
[4] "Allocative" discrimination involves wage disadvantages as a result of hiring, promotion and dismissal or firing, which are difficult to document (Peterson/Saporta 2004: 859).
[5] For the "homophily principle" see, for example, Ibarra 1997, 1992; McPherson/Smith-Lovin 1987; McPherson et al. 2001.

Tam 2000). An important question is whether it is the employer or the employee who decides on how much such training an employee receives.

However, neither study makes a clear distinction between evaluative and allocative discrimination. An explicit analytical distinction between these dimensions of discrimination has been made in a study by Juliane Achatz et al. (2005): Here, it could be shown that there is evaluative as well as allocative discrimination – wages decreased with an increasing percentage of women in a job cell,[6] and this wage disadvantage was higher for women than for men.

3   Hypotheses

Systematic studies that analyze the gender pay gap for a broad group of managers exist only occasionally (Bertrand/Hallock 2001; Jacobs 1992; Kirchmeyer 2002; Lausten 2001; for Germany, see Holst 2006 and Holst et al. 2006). But this group of people in particular is highly interesting: It may be assumed that the group of managers is relatively homogeneous, which means that there are only a few *observed* differences in human capital and that only the women and men who have high job-related motivation and orientation even achieve a managerial position. In connection with this, it may be assumed that women and men also have few *unobserved* differences (motivation, career orientation, etc.) in relation to other working groups on the labor market (Bertrand/Hallock 2001: 4).

The following hypotheses concerning the mechanisms of gender-specific wage disadvantages may be assumed:

- *Human capital hypothesis*: It is expected that women and men differ only marginally in human capital endowments. A high qualification is in general a requirement for promotion into a managerial position. Hence, it follows that a gender-specific different human capital accumulation can explain only a relatively low part of the gender pay gap - compared to the importance of human capital theory.

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[6] Achatz et al. did not use the percentage of women in the jobs, but the percentage of women in job cells. This was calculated as the percentage of (full-time employed) women in a job *per firm* (Achatz et al. 2005: 474). This is more detailed but can only be realized using an adequate dataset that includes the firm level.

- *Segregation hypothesis*: Conversely, it is thought that occupational segregation on the labor market can explain a relatively large part of the gender pay gap: In the sense of *evaluative discrimination*, it is hypothesized that occupations in which women are overrepresented, are also in managerial positions paid less than those in which men are overrepresented. We assume that cultural gender-specific ascriptions play a major role in the "choice" of occupation, and that, with this, women are channeled into gender typical jobs that are paid less. In addition, it is hypothesized that also *within* the gender-typical jobs according to *allocative discrimination*, women are paid less than men. This means, for example, that women in women's jobs are paid less than men in women's jobs.

- *Hypothesis concerning the selection for a managerial position (selection hypothesis)*: Finally, we assume that the group of managers, especially with respect to women, is a very selective group of highly motivated and career-oriented people. Hence, women and men in managerial positions should only differ marginally in these and other *unobserved* characteristics in relation to other groups of people in employment. It follows that the unexplained part of the gender pay gap is relatively low. However, if one controls for the gender-specific selection probability of obtaining a managerial position ("Heckman correction", see section), the calculated gender wage differential should increase because women have a lower chance than men of entering a managerial position. This increase should be due to an increased unexplained part of the gender pay gap since now the unobserved mechanisms that prevent women from being promoted are taken into account.

To test the hypotheses, we calculate stepwise wage (regression) models, for women and men separately, and the wage difference will be analyzed with the aid of decomposition techniques.

4   Methods

First, we estimate a wage equation according to Jacob Mincer (1974) with additional human capital variables, variables related to gender-specific labor market segregation and variables connected to social structure/family circumstances (see section 5), using a multiple linear regression:

(1) $Y_i = \beta_0 + \sum_{j=1}^{n} \beta_j \cdot X_{ji} + u_i$

Y_i is the logarithmic gross monthly earnings (for person i to n), X_{1i} to X_{ni} are the variables that explain Y (here, human capital factors, variables related to social structure/family circumstances, segregation variables). Then the regression model is estimated separately for the group of (on average higher paid) men (M) and (on average lower paid) women (F):

(2) $Y_i^M = \beta_0^M + \sum_{j=1}^{n} \beta_j^M \cdot X_{ji}^M + u_i^M$

(3) $Y_i^F = \beta_0^F + \sum_{j=1}^{n} \beta_j^F \cdot X_{ji}^F + u_i^F$

In the next step, the wage difference between men and women is analyzed. The gender-specific wage differential is divided into two components using the Oaxaca/Blinder decomposition method (Blinder 1973; Oaxaca 1973): One component quantifies the part of the wage difference that is due to differences in the observed independent variables, e.g. education and work experience. The other component quantifies the part of the wage difference that is due to differences in the monetary evaluation of these characteristics as well as to additional unobserved characteristics. In this method, the "higher earning group," here, men, generally form the reference group. Thus, it is assumed that in the event of absolute parity of treatment of the genders, women would earn the same amount as men, not the reverse.

Using this decomposition method, firstly the *wage differential (D)*, more precisely the difference between the mean (logarithmic) wages of men and women, is calculated by subtracting (3) from (2):

$$(4) \quad \overline{Y}^M - \overline{Y}^F = \beta_o^M - \beta_o^F + \sum_j \beta_j^M \cdot \overline{X}_j^M - \sum_j \beta_j^F \cdot \overline{X}_j^F + \overline{u}_i^M - \overline{u}_i^F$$

The mean of both residuals u_i is equivalent to the expected value, which is 0, so it can be dropped.

After a few transformations, we have:

$$(5) \quad \underbrace{\overline{Y}^M - \overline{Y}^F}_{D} = \underbrace{\beta_o^M - \beta_o^F}_{S} + \underbrace{\sum_j \beta_j^M \cdot \left(\overline{X}_j^M - \overline{X}_j^F \right)}_{E} + \underbrace{\sum_j \overline{X}_j^F \cdot \left(\beta_j^M - \beta_j^F \right)}_{P}$$

$$\underbrace{\phantom{\beta_o^M - \beta_o^F + \sum_j \beta_j^M \cdot \left(\overline{X}_j^M - \overline{X}_j^F \right) + \sum_j \overline{X}_j^F \cdot \left(\beta_j^M - \beta_j^F \right)}}_{R}$$

The separate components of the gender pay gap may be interpreted as follows:

- *Endowment effect (E)*: The difference in the average variable values between the two groups multiplied by the coefficient calculated for the male group reveals the share of wage disparity that can be explained by gender-specific differences in the various characteristics. This value corresponds to the percentage wage loss that men would experience if they had the same qualifications, working experience and other characteristics taken into account by the model as women, and if these characteristics were valued for women in the same way as for men.

- *Price effect (P)*: The differential between the coefficients estimated for men and for women multiplied by the average of each variable for the female group gives the share of the gender wage differential that can be explained by the different monetary valuation placed on the characteristics. It shows how much more women would earn if their qualifications, working experience, etc. were rewarded to the same extent as men's.

- *Shift effect (S)*: This is the share of the wage differential that is due to the unobserved heterogeneity, so it is the part that *cannot* be explained by differences in the various characteristics or how they are rewarded.

- *Residual effect (R=P+S)*: In technical terms, this is the sum of the price and shift effect. It is frequently interpreted as "discrimination." However, caution is required since this component also covers unobserved differences between the groups, e.g. career motivation (Chevalier 2007). In addition, some differences in the variables recorded could be due to

discrimination, for instance, if it is more difficult for women to access particular forms of education or employment (Olsen/Walby 2004). For this reason, here the sum of the price and shift effect is described as the "residual effect."

When the estimation described is calculated without taking into account the chances of promotion, there is the risk of a bias in the estimation results. This is the case when it is not coincidental whether there is a man or woman in a managerial position (*non-random selection for a managerial position*): Especially for women, the promotion into such a position is strongly affected by the household context, for example. These selection effects can be analytically taken into account using Heckman correction (Engelhardt 1999; Heckman 1979). Here, in addition to the *wage estimation*, a *selection estimation* for the population observed is calculated - more precisely a probit model for the probability of being in a managerial position. In this probit estimation, a correction factor of λ is computed, which is composed of the correlation between the residuals of the probit and the wage estimation (ρ) as well as of the standard error of the residuals of the wage estimation (σ). If ρ is significantly different from zero, there is a statistically significant "selection effect" for a managerial position.

If the Oaxaca/Blinder decomposition is calculated using Heckman correction, the wage differential thus calculated differs from that calculated without Heckman correction because here the probability of being in a managerial position is also taken into account.

5   Data and Measurement

The wage estimations are calculated on the basis of data of the German Socio-Economic Panel Study (SOEP) (Wagner et al. 2007). Calculations are for 2006. The sample observed consists of managers *in full-time employment*,[7] identified with the aid of the variable "occupational position." Here, managers are defined as employees with managerial duties as well as employees with highly qualified duties. The inclusion of the second group of employees was important because of the very small number of cases of women in top positions, which would not allow a more in-depth analysis.

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[7] Full time employment is here defined as working with an agreed weekly work time of 35 hours or more or with an actual weekly work time of 35 hours or more, if no work time is agreed.

Definition of persons in managerial positions

They are defined here as being at least 18 years old and having specified themselves in the SOEP questionnaire as white-collar full-time employees in the private sector with

(1) extensive managerial duties (e.g. managing director, manager, head of a large firm or concern) or with

(2) highly qualified duties or managerial function (e.g. scientist, attorney, head of department).

The limitation to the private sector is due to the differences between private and public sector in the mechanisms concerning promotion and payment. In addition, studies showed that the gender pay gap especially in the private sector is particularly high in the upper wage quintile (Arulampalam et al. 2006).

For our defined group of managers in the private sector, the SOEP estimates about 3.4 million persons, of whom approximately 900,000 are women (27 percent), and around 2.5 million are men.[8] The dependent variable is the (logarithmic) gross *monthly* earnings of women and men. The concentration of the gross monthly instead of the (more common) gross hourly earnings has been made because particularly in managerial positions overtime is generally an integrated part of the work profile without extra pay. Long working hours are common in managerial positions and thus included in the monthly income. Hourly earnings do not take this into consideration.

The following independent variables will be used for the analysis:

Human Capital: The *duration of education* (in years), the *work experience* (full-time plus part-time, in years), as well as the *work experience squared* as an indicator of the diminishing marginal utility of the work experience will be taken into account as important human capital resources for the income.[9] In addition, also the *share of working experience gained through part-time work* will be included in the model, because it has to be taken into consideration that

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[8] Including part timers in managerial positions in the private sector, the SOEP estimates about 3.7 million employees in the year 2006 of whom approximately 1.2 million were women (31 percent).

[9] The SOEP includes the actual work experience. Because of a lack of data material, studies often use an approximation of the work experience (age minus duration of education minus 6). This approximation is very unreliable, however, especially in a comparison between women and men.

experience gained through part-time work is often valued less in monetary terms than full-time experience (Olsen/Walby 2004). The human capital factors mentioned do not yet include the accumulation of firm-specific human capital - "on-the-job training" - in the firm, which is also an important resource for the income (Blau et al. 2006; Tam 2000, 1997). Because of this, we also include the *length of employment with current employer* (in years) in our model.

Segregation: As an important variable concerning horizontal segregation, we include the *percentage of women in each job* as a predictor for the income.[10] We also consider the *economic sector* and the number of *employees at the place of employment*. The assumption is that in the manufacturing industry the wage options are better than in parts of the service sector. In addition, in larger firms there are often internal labor markets and better opportunites for promotion , so that the chance of having a larger income is on average higher here than in small firms (for a descriptive overview, see Busch/Holst 2008b; for the theory of internal labor markets, see Doeringer/Piore 1971). To look at the glass ceiling effect and show a better picture of segregation related to hierarchical levels (vertical segregation), we also include information about whether the person performs *extensive managerial duties* or *highly qualified duties/a managerial function*.

Control dimensions concerning social structure and family circumstances: To control for the different restrictions for women and men related to family responsibilities, we include the family status and the number of children aged under 16 in the household as predictors for earnings. Furthermore, we take into account whether the people concerned spend *time on housework* (washing, cooking and cleaning) on a working day or not ("zero hours," "one hour or more"). Other studies have shown that there is a negative dependency between the time spent on housework and earnings (Hersch/Stratton 2002, 1997; Noonan 2001).

In addition, we include the information on whether the person lives in *eastern (new) or western (old) federal states of Germany*: On the one hand, in eastern Germany the wages are lower than in western Germany on average. On the other hand, it may be expected that the gender-specific pay differential is lower in eastern than in western Germany, due to better

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[10] The indicator "percentage of women in each job" shows to what extent women and men are employed in women's, gender-integrated or men's jobs. The variable has been computed while taking the mean percentage of women in each job of the job classification of the Federal Office of Statistics. This classification is more appropriate than the ISCO88-code (International Standard Classification of Occupations) to show the horizontal segregation and related inequalities because it has many more job categories than the ISCO88. The values have been taken from a special evaluation of the microcensus, conducted by the Federal Office of Statistics.

egalitarian structures in the new federal states.[11] This can also be seen in the fact that the percentage of women in managerial positions is higher in eastern Germany (Brader/Lewerenz 2006).

Finally, we include some more control dimensions in the multivariate analysis:

- Control dimension *actual working time per week*: The actual working time per week takes into account the influence of the actual number of hours worked on earnings.

- Control dimension *high-income subsample G*: The SOEP has been enlarged in 2002 with the high-income subsample G (households with a monthly net income of over 3,835 euros), with the objective of providing a more extensive data basis for the analysis of life circumstances, income and asset accumulation of households in the upper-income range (Schupp et al. 2003). Persons living in these households are also included in our analysis. To prevent a bias of the wages "upwards," we control for information on whether the person is part of the subsample or not. (The results are not shown in the tables.)

- Control dimension *imputation of gross monthly earnings*: Questions concerning income normally receive fewer responses than other questions. This can lead to biases in the results because these "item non-responses" are generally not distributed proportionally across the different groups of people. Consequently, in our analysis, we use the imputed gross monthly earnings, provided in the SOEP (Grabka/Frick 2003). We also include a dummy variable which shows if the particular income has been imputed or not. (The results are not shown in the tables.)

Selection variables: In the last step of our analysis, Heckman correction, we include the same variables in the selection equation as in the wage equation,[12] as well as the selection variable *school education of the father* as an important indicator for the social background of the managers.[13] The social background plays a major role in the later professional success of the children: The chances of being a manager in later years are largely dependent on the social class in which the person grows up, for example, the resources provided and also the family

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[11] It has been shown that eastern and western Germany still show different occupational structures with different occupational opportunities, particularly for women (Trappe 2006).

[12] The variable of whether the person performs extensive managerial duties or highly qualified duties or a managerial function (vertical segregation) is not entered in the selection equation because this information cannot be observed for non-managerial persons.

[13] The school education of the mother has also been tested as an indicator for the social background. However, this variable did not have a significant effect on the occupational position (neither for women nor for men), and it did not change the estimation results for the other variables in the model.

expectations are higher if a family belongs to a higher educated class (Hartmann/Kopp 2001). In addition, we include personality traits in the selection equation because we expect dimensions such as what are known as the "*Big Five*" – extraversion, neuroticism (opposite: emotional stability), conscientiousness, agreeableness and openness to experience – as well as the *subjective willingness to take risks at work* to influence the probability of being in a managerial position (Borghans et al. 2008; Dohmen et al. 2005).

The following table gives an overview of the arithmetic mean values of the applied predictors on earnings for managers employed full time in the private sector (shown separately for women and men).

Table 1

Managers employed full time in the private sector: Overview of predictors (weighted means and unweighted observation numbers) 2006

	Women		Men	
	Mean	N	Mean	N
Human capital				
Gross monthly earnings (euros)	3704	235	4801	973
Duration of education (in years)	14.9	233	14.9	963
Work experience (in years)	14.8	212	19.3	860
Share of work experience gained through part-time work	13.4	212	6.0	860
Length of employment with current employer (in years)	8.5	235	11.1	972
Actual working time per week (in hours)	45.3	235	48.4	971
Segregation				
Type of managerial position				
With highly qualified duties or managerial function	0.93	212	0.85	800
With extensive managerial duties	0.07	23	0.15	173
Economic sector				
Manufacturing industry	0.39	55	0.48	493
Trade, hotels and catering, transport	0.20	53	0.17	148
Other services	0.41	127	0.35	327
Number of employees at place of employment				
fewer than 20	0.19	52	0.16	125
20 – 199 employees	0.24	68	0.30	281
200 – 1,999 employees	0.33	55	0.23	233
2,000 employees or more	0.24	58	0.31	330
Percentage of women in each job	42.8	222	26.8	938
Control dimensions for social structure and family circumstances				
Family status				
Married and living with spouse	0.33	123	0.64	718
Married but separated/unmarried	0.67	112	0.36	255
Number of children in household aged under 16 (if there are children)	1.30	38	1.70	413
Time spent on housework				
Zero hours	0.08	17	0.40	419
One hour or more	0.92	216	0.60	502
Place of residence				
Old (western) federal states	0.83	163	0.90	823
New (eastern) federal states	0.17	72	0.10	150
For information only: Age category				
Up to 29	0.25	28	0.08	44
30-44	0.41	106	0.49	443
45-59	0.33	94	0.37	417
60-64	0.01	6	0.06	57
Over 64 years	0.00	1	0.01	12
For information only: Age in years	38.6	235	43.6	973

Discrepancies in the totals are due to figures being rounded up or down

Source: SOEP 2006, DIW Berlin calculations.

In 2006, with a mean gross monthly income of around 3,700 euros, women earned 77 percent of the male mean income. Hence, the gender pay gap was 23 percent for managers employed full time in the private sector. As far as education is concerned, the human capital accumulation is balanced; both women and men have on average almost 15 years of education. However, women have only 14.8 years of work experience, compared to 19.3 years for men. This difference is essentially age-related: As can be see in the table, the women employed full time in managerial positions are on average around 5 years younger than their male counterparts; 25 percent of the female and only 8 percent of the male managers are younger than 30 years. Therefore, only with respect to part-time experience can the traditional structures be seen in human capital accumulation; the value is much higher for women than for men.

Stronger gender-specific differences may also be observed concerning the occupational dimensions: Only 7 percent of the women but 15 percent of the men work in top positions with extensive managerial duties. These results indicate a glass ceiling that reduces women's chances of being promoted. Furthermore, women in managerial positions less frequently than men work in the manufacturing industry or in large companies with 2,000 or more employees. Women are conversely more often occupied in "other services" (e.g. banking and insurance services, real estate, legal advice and others) as well as in companies with 200 to less than 2,000 employees. In addition, the gender-specific segregation can be shown with the mean percentage of women in the particular job: Women work in jobs with a mean percentage of women of 42.8 percent; for men, the value is 26.8 percent.[14]

Marked differences can also be seen in the variables concerning social structure and family circumstances: Women in managerial positions are less frequently married than men, have a lower mean number of children in the household, and more often than men spend one or more hours on housework on a working day. Furthermore, they live in the new federal states more often than men.

Overall, the descriptive comparison between women and men shows that there are no strong gender-specific differences in the human capital endowments, but very marked differences concerning the segregation structures on the labor market as well as the family circumstances. This means that, compared to segregation and social structural/family factors, human capital

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[14] In a broader description of the labor market and irrespective of the volume of work, the gender-specific segregation is much greater: In 2006, female employees (not including managers) worked in jobs with a mean percentage of women of 73 percent, for men, the mean value was 38 percent (Holst et al. 2009).

endowments should explain only a marginal part of the gender pay gap in managerial positions.

6   Findings

Tables 2 and 3 show the results of the linear regression, separately for men and women, and for the decomposition. The variables concerning *human capital* (Model 1) as well as *segregation* (Model 2) are included in the model stepwise, so that we have two interrelated regression models. Finally, Table 4 shows the results of the completed Model 2 taking into consideration *selection* for a managerial position (Heckman correction) (Model 3). All steps of the analysis include the control variables for social structure/family circumstances. We first discuss the hypotheses from chapter 3 in detail and then sum up the results at the end of this section.

Human capital hypothesis:

The first model, including the human capital factors, shows a relatively high explained variance of more than 45 percent for men as well as for women (Table 2).

Table 2

Managers employed full time in the private sector: in the private sector: Determinants of gross monthly earnings 2006: Model 1 (OLS regression)

	Coefficients		Decomposition	
			Endowment	
	Men	Women	effect	Price effect
Human capital				
Duration of education (in years)	0.046***	0.069***	-0.18	-34.67
Work experience (in years)	0.029***	0.016	7.00	23.31
Share of work experience gained through part-time work	-0.001	-0.004***	0.74	4.45
Work experience^2	-0.0004***	-0.0003	-3.87	-4.96
Length of employment with current employer (in years)	0.004**	0.007**	0.76	-3.55
Actual working time per week (in hours)	0.017***	0.013***	3.59	19.35
Control dimensions concerning social structure and family circumstances				
Married and living with spouse (reference value: married but separated/unmarried)	0.070**	0.087	1.48	-0.90
Number of children in household aged under 16	0.036***	0.081*	1.99	-0.98
Spending one or more hours on housework (reference value: spending zero hours)	-0.053**	-0.185**	2.07	12.20
Place of residence: new (eastern) federal states (reference value: old (western) federal states)	-0.367***	-0.336***	5.21	-0.93
Constant	6.501***	6.449***		5.13
N	762	192		
R^2 adjusted	0.463	0.481		
Endowment effect			20.68	
Price effect			12.11	
Shift effect			5.13	
Residual effect			17.24	
Wage differential			**37.92**	
Percentage share of endowment effect on wage differential			*54.54*	
Percentage share of residual effect on wage differential			*45.46*	
For information only: without variables for social structure/family circumstances				
Percentage share of endowment effect on pay differential			*27.85*	
Percentage share of residual effect on pay differential			*72.15*	

* Level of significance < 10 percent; ** level of significance < 5 percent; *** level of significance < 1 percent.
Dependent variable: Logarithm of gross monthly earnings, controled for subsample G and for imputed earnings.
Source: SOEP 2006, DIW Berlin calculations.

In managerial positions, too, there is a strong correlation between human capital and wages. Investments in education and in firm-specific training (length of employment with current employer) have a positive effect on wages, for men as well as for women. Work experience shows the hypothesized positive effect, only for men: Women's income is not higher with increasing work experience, whereas men's income is 2.9 percent higher if the work experience increases by one year.[15] This is perhaps due to less continuity in women's work experience, while the accumulated human capital diminishes in value during career breaks (Beblo/Wolf 2002). Furthermore, men might have built up more profitable work-related networks during their work experience, which may be of advantage to their occupational career and wages. This network effect may well have been captured by the work experience. At the same time, the diminishing marginal utility of the work experience (work experience squared) is only significant for men. The "quality" of the work experience is only of importance as far as female managers' earnings are concerned: The proportion of work experience gained through part-time work decreases the women's income significantly. This shows that also in the long run part-time employment continues to have a negative effect on earning opportunities.

Furthermore, the control dimensions around social structure and family responsibilities are also important factors that may explain the income: While married men (living together with their wives) earn significantly more than other men, no effect has been verified for women. Especially for men, but also, against expectation, for women, the number of children has a positive effect on the income. This surprising result serves to emphasize that women in managerial positions are a highly selected group in which even the presence of children can be advantageous. Spending at least one hour on housework on a working day leads to pay reductions for women as well as for men in management positions. Hence, these results do not reflect traditional preferences or learned role models as clearly as in other studies. Role models in managerial positions seem to be more egalitarian.

To what extent can the wage differential between men and women be explained by gender-specific differences in the variables included as well as their different monetary valuation? The wage differential calculated in the Oaxaca/Blinder decomposition at a value of 54.5 percent can be explained by the different endowments concerning the variables included (Table 2). However, around half of this value is due to the variables around social structure

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[15] By taking the logarithm of the gross monthly earnings, it is possible to interpret the regression coefficients as a percentage change of the wage, if the particular independent variable increases by one unit.

and family circumstances: For example, a higher proportion of female managers work in eastern Germany where pay is lower. When the decomposition is calculated without these control variables, the endowment effect decreases to around 28 percent. Especially since they have more work experience on average, men can "score points" here. It has to be mentioned that the greater working experience of men is grounded in an age effect; female managers are younger on average, which leads to a lower level of work experience (see above). Both the duration of education and the length of employment with their current employer show only marginal gender-specific differences in endowments. The sometimes negative signs in the price effects show even better opportunities for women to make the most of human capital investments. Education in particular is more important for women in managerial positions than for men (which can also be seen from the regression coefficients which are sometimes higher for women than for men). Therefore, it can be observed that human capital is not able to fully explain pay disadvantages of women in managerial positions.

Segregation hypothesis:

Taking into account gender-specific labor market segregation increases the model fit by almost 10 percentage points for women and almost 8 percentage points for men (Table 3).

Table 3

Managers employed full time in the private sector: Determinants of gross monthly earnings 2006: Model 2 (OLS regression)

	Coefficients		Decomposition	
	Men	Women	Endowment effect	Price effect
Human capital				
Duration of education (in years)	0.037***	0.056***	-0.14	-29.57
Work experience (in years)	0.027***	0.018**	6.60	16.47
Share of work experience gained through part-time work	-0.001*	-0.004***	1.12	2.95
Work experience^2	-0.0004***	-0.0004*	-3.31	-0.04
Length of employment with current employer (in years)	0.001	0.007**	0.21	-6.02
Actual working time per week (in hours)	0.015***	0.011***	3.07	14.16
Segregation				
With extensive managerial duties (reference value: with highly qualified duties or managerial function)	0.263***	0.216***	1.92	0.48
Economic sector (reference value: manufacturing industry)				
Trade, hotels and catering, transport	-0.077**	-0.214***	0.74	3.43
Other services	0.062**	-0.101*	-1.02	8.33
Number of employees at place of employment (reference value: fewer than 20)				
20 – 199 employees	0.165***	0.120*	0.19	1.29
200 – 1,999 employees	0.272***	0.194***	-0.13	1.82
2,000 employees or more	0.279***	0.280***	2.76	-0.04
Percentage of women in each job	-0.002***	-0.002	4.12	-1.76
Control dimensions concerning social structure and family circumstances				
Married and living with spouse (reference value: married but separated/unmarried)	0.049	0.112**	1.04	-3.31
Number of children in household aged under 16	0.028**	0.058	1.54	-0.66
Spending one or more hours on housework (reference value: spending zero hours)	-0.033	-0.139*	1.29	9.76
Place of residence: new (eastern) federal states (reference value: old (western) federal states)	-0.357***	-0.315***	5.07	-1.29
Constant	6.608***	6.638***		-2.92
N	762	192		
R^2 adjusted	0.538	0.577		
Endowment effect			26.47	
Price effect			14.38	
Shift effect			-2.92	
Residual effect			11.45	
Wage differential			**37.92**	
Percentage share of endowment effect on wage differential			*69.80*	
Percentage share of residual effect on wage differential			*30.20*	

* Level of significance < 10 percent; ** level of significance < 5 percent; *** level of significance < 1 percent.

Dependent variable: Logarithm of gross monthly earnings, controled for subsample G and for imputed earnings.

Source: SOEP 2006, DIW Berlin calculations.

As expected, the vertical segregation shows higher earnings in the upper hierarchical levels (extensive managerial duties) as compared to other management positions (highly qualified duties). For men, there is a difference of 26.3 percent between both hierarchical levels, for women, it is slightly lower at 21.6 percent. For the economic sector, we can see that earnings in "trade, hotels, catering, and transport" are lower than in the manufacturing industry, for men as well as for women. Working in other services (banking and insurance services, real estate, legal advice and others) compared to the manufacturing industry is disadvantageous for women and advantageous for men. Employment in large companies leads to higher wages for both men and women; for example, in firms with 200 to less than 2,000 employees, men earn 27.2 percent more than men in smaller firms with less than 20 employees. For women, this value is lower at 19.4 percent.

The effects of some other variables change when taking into account the segregation variables, which is an indicator for an underspecification of (the reduced) Model 1. It can be seen that the length of employment with current employer is no more significant for men. The effect is now captured by the firm size.[16] For men, working in a large firm has a greater influence on income than job tenure. Firm size and job tenure are positively correlated (results not shown) because persons in large firms often have longer job tenure. If firm size is not taken into account, the positive effect on income is statistically captured by the length of employment with the current employer. For women, conversely, both variables are of importance for earnings; the correlation between both variables is not as high for them.

Taking segregation variables into account, work experience becomes significantly positive for women. It seems as if particularly in typical women's jobs, women in managerial positions have a relatively high level of work experience; this experience is positively correlated with the variable "percentage of women in each job" (results not shown). While in these jobs pay is relatively low, for women the connection between work experience and earnings, which is in fact positive, has been underestimated.

Interestingly, the family effects change when the new variables are included in the model. Then it can be seen that married women (living together with their husbands) earn significantly more than other women in managerial positions. This is contrary to the results of other studies, which are not focused on managers but on employees in general, where marriage has a negative effect on women's pay. Here it seems as if married women in

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[16] Calculating the regression analysis without the firm size shows that the length of employment with the current employer again has a statistically significant effect on earnings (results not shown).

managerial positions differ from other working women in the sense that their way of life is less oriented to traditional gender roles. In the reduced Model 1, the positive correlation between marriage and pay – as with work experience – has been underestimated: Married women seem to work primarily in typical women's jobs, which leads to an underestimation of the link between family status and earnings. For men, the opposite may be observed: For them, in the full model that covers also segregation variables (Model 2), it no longer has any effect on income whether they are married (living with their wife) or not. In the reduced model (Model 1) the correlation between family status and wages has been overestimated, which may be explained by the assumption that married men more often work in better paid typical men's jobs.

Taking the segregation variables into consideration enhances the explained part of the wage differential in the Oaxaca/Blinder decomposition: The endowment effect now accounts for almost 70 percent of the wage differential. This is primarily due to the variable "percentage of women in each job:" While women work in jobs where is typically a higher percentage of women and these jobs are lower paid, the endowment effect increases by more than 4 units. While controlling for familiarly aspects, this result can inadequately be explained by the voluntary self-selection into particular jobs assumed in human capital theory. Instead, other mechanisms in the labor market seem to play a role in 'channeling' women into certain jobs. Furthermore, the price effects calculated in the decomposition show the indication that women working within the segregated parts of the labor market, especially in the "other services," are disadvantaged in comparison to men.

It is surprising that the "percentage of women in each job" only has a significant negative effect on earnings for men. At present, this result contradicts other studies that focus not only on managers and clearly show stronger negative effects for women than for men (Achatz et al. 2005; England et al. 1988). This indicates that selection effects lead to an underestimation of this correlation for women in managerial positions.

Selection hypothesis:

Selection into a leadership position - in other words, taking into consideration the probability of being a manager – indeed has an impact on the earnings of women and men (Table 4, columns 1 and 2).

This first becomes obvious through the coefficient ρ, which is significantly different from zero for women and men. For both groups in a managerial position, there are significant

selection effects. For women, ρ is positive (and negative for men), which means that the observed wages are *overestimated* for female managers (and underestimated for men). For instance, women in management are highly qualified more often than other working women, as is the case in the reference group for men in management. Taking these different overrepresentations and underrepresentations into consideration with Heckman correction leads to statistical scaling down of female managers' wages and scaling up for male managers' wages.

Table 4

Managers employed full time in the private sector: Determinants of gross monthly earnings 2006: Model 3 taking into consideration selection effects for a managerial position (Heckman's correction)

	Corrected wage equation		*For information only: Selection equation*	
	Men	Women	Men	Women
	1	2	3	4
Human capital				
Duration of education (in years)	0.013*	0.083***	0.279***	0.228***
Work experience (in years)	0.027***	0.019**	0.010	0.021
Share of work experience gained through part-time work	-0.001	-0.004***	-0.003	-0.001
Work experience^2	-0.0004***	-0.0003	0.0002	-0.0002
Length of employment with current employer (in years)	0.001	0.009**	-0.002	0.012
Actual working time per week (in hours)	0.011***	0.018***	0.043***	0.058***
Segregation				
With extensive managerial duties (reference value: with highly qualified duties or managerial function)	0.255***	0.173**		
Economic sector (reference value: manufacturing industry)				
Trade, hotels and catering, transport	-0.060	-0.178**	-0.291***	0.484***
Other services	0.057**	-0.065	-0.042	0.412***
Number of employees at place of employment (reference value: fewer than 20)				
20 – 199 employees	0.145***	0.111*	0.148	0.106
200 – 1,999 employees	0.271***	0.195***	-0.215	0.102
2000 employees or more	0.266***	0.253***	0.035	-0.254
Percentage of women in each job	-0.001	-0.004***	-0.008***	-0.016***
Control dimensions for social structure and family circumstances				
Married and living with spouse (reference value: married but separated/unmarried)	0.031	0.132**	0.135	0.113
Number of children in household aged under 16	0.027**	0.069*	0.059	0.166
Spending one or more hours on housework (reference value: spending zero hours)	-0.022	-0.187**	-0.157*	-0.448
Place of residence: new (eastern) federal states (reference value: old (western) federal states)	-0.330***	-0.351***	-0.268**	-0.248*
Selection variables				
School education of the father (reference value: less than a vocational school-leaving certificate)				
At least a vocational school-leaving certificate			-0.138	0.285*
Don't know/no answer			-0.210	0.296
Big Five				
Neuroticism			-0.040	-0.021
Openness			0.052	0.113*
Agreeableness			-0.058	-0.109*
Extraversion			-0.038	0.043
Conscientiousness			0.026	0.154**
Willingness to take risks at work			0.064***	0.060**
Constant	7.233***	5.845***	-5.890***	-6.145***
N	736	180	1297	807
Wald Chi^2	515.70***	232.52***		
Rho			-0.591**	0.669**
Endowment effect			22.26	
Price effect			-96.35	
Shift effect			138.83	
Residual effect			42.49	
Wage differential			**64.75**	
Percentage share of endowment effect on wage differential			*34.38*	
Percentage share of residual effect on wage differential			*65.62*	

* Level of significance < 10 percent; ** level of significance < 5 percent; *** level of significance < 1 percent.
Dependent variable: Logarithm of gross monthly earnings, controled for subsample G and for imputed earnings. A Heckman selection model has been estimated.
Source: SOEP 2006, DIW Berlin calculations.

When Heckman correction is used to estimate women's earnings, the effects concerning human capital factors and social structure/family circumstances tend to increase. In Model 2 where selection effects are not taken into consideration, the influence of these factors has been underestimated. Overall, taking the selection effects into account, the differences between men and women increase for some coefficients, as can be seen for example for the education coefficient, which increases for women and decreases for men. This result confirms other studies that show a stronger effect of education on earnings for women than for men (e.g. Dougherty 2005). This observation can be explained with the expectation that education not only increases women's productivity and abilities, but is also associated with a reduction of prejudices and discrimination practices. Furthermore, Model 3 shows that the differences in earnings between women in managerial positions with extensive managerial duties and those with highly qualified duties is now even smaller than before.

For men, greater differences can be observed for the estimation without Heckman correction, especially for the "percentage of women in each job:" This variable - which is generally seen as a factor with a negative effect on income - becomes insignificant for men. For women, conversely, it becomes significantly negative, which means that only women have a wage disadvantage when the percentage of women in their jobs increases. This result confirms other studies that show similar results: This means that typical women's jobs are not only paid less than typical men's jobs, but within women's jobs – in line with *allocative discrimination* – women are also paid less than men. Furthermore, the share of work experience gained through part-time work is negatively associated with earnings only for women in managerial positions.

Allowing for selection effects, the coefficient concerning the number of children in the household now has a positively significant effect on the wage again. In addition, also in this model, married women who live with their partner still earn more than other women in managerial positions. Nevertheless, traditional family duties – such as housework – still have a negative impact on the earnings of women in managerial positions, but not on the earnings of men.

How does taking into consideration selection effects now affect the results of the Oaxaca/Blinder decomposition? Although women can sometimes achieve even higher "prices" than men (negative sign for the price effect) as far as human capital and other characteristics included in the model are concerned, the wage differential calculated in the decomposition increases when the selection effect is taken into account. This increase is primarily due to a rise in the unexplained residual effect (from 30.2 to 65.6 percent), which represents, for example, societal and cultural conditions such as discriminating structures and

practices on the labor market and in firms preventing women from being promoted into managerial positions.

Altogether our hypotheses in chapter 3 can be confirmed: In the uncorrected models the gender-specific different human capital accumulation could explain about 28 percent of the gender wage differential. This is less than one would expect due to the importance of human capital theory. Segregation accounts for about 15 percent of the gender wage differential which is – compared to the prominence of human capital theory – relatively much. While the uncorrected model explained about two thirds of the gender wage differential, the bias corrected model showed that only one third of the gender wage differential could be explained – that means that the explanatory power of the variables employed in the model has to be reduced accordingly. Furthermore, occupations in which women are overrepresented were paid less than those in which men are overrepresented. And even *within* the gender-typical jobs women were paid less than men. At last, the calculated gender wage differential increased when taking selection effects into account. This increase was due to an increased unexplained part of the gender pay gap.

Excursus: Selection effects

Finally, we briefly present the main results of the selection equation showing the effects for the probability of being in a managerial position.[17] The social background (school education of the father) is important for the occupational success for women in particular (Table 4, columns 3 and 4): Women whose fathers have at least a vocational school-leaving certificate have a higher probability of being in managerial positions than women whose fathers have a lower level of education. Personality traits also play a role: If women are conscientious, open and less agreeable, their chances of being managers increase. The same applies to women as well as for men with respect to willingness to take risks at work.

For the other variables that are also predictors for earnings, the segregation factors in particular show gender differences to women's disadvantage. Women working in "trade, hotels and catering, transport" for example, as well as in "other services" have a significantly higher probability of being in a managerial position than in the (better paid) manufacturing

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[17] For the results of the selection equation, it has to be taken into consideration that they differ slightly from the results of a single probit regression. The reason for this is that we did not use the "two-step" Heckman option because the size of our sample is relatively small. The "two-step" option should only be used if the sample has a large number of observations because the regression coefficients in the second step are heteroscedastic (Engelhardt 1999).

industry. The variable "percentage of women in each job" shows for men as well as for women significantly negative effects on the probability of being in a managerial position. The higher the percentage of women in each job, the more restricted the career opportunities. However, the estimated coefficient is lower for men than for women, which indicates that for women it is even more difficult than for men to become a manager in a typical women's job.

7   Conclusions

Nowadays, women employed full time in managerial positions in the private sector in Germany have similar qualifications to their male counterparts. There are no longer any differences in education and differences in work experience are basically due to age differences. The gender-specific human capital endowments (with the additional variables "actual working time" and "work experience gained through part-time work") can explain 28 percent of the gender pay gap in the gross monthly earnings. Around another 15 percent is due to gender-specific segregation structures on the labor market. Here, it has been taken into account that – also within the group of managers – women work in lower paid "women's jobs" and sectors more often than men (horizontal segregation). Furthermore, it has been taken into consideration that women less often work in managerial positions with extensive managerial duties (vertical segregation).

For women who achieved a full time managerial position, family circumstances have a less negative impact on earnings than for other working women. For example, married women have higher average earnings than other female managers. It seems to be that these married women are a strongly selective group of highly motivated employees.

Only taking selection effects for a leadership position into account - and thus the lower probability of women than men being in a managerial position - shows the real extent of the disadvantages for women on the labor market: The Heckman correction intensifies the results of the wage equation for women; "*allocative discrimination*" (women working within women's jobs and sectors are paid less than men) only comes to light after selection effects have been taken into consideration. The unexplained part of the gender pay gap increases from 30 percent to two-thirds; the explicitly considered predictors of the wage equation lose explanatory power in accordance with this.

The analysis has shown to what extent the – quantitatively difficult to measure – societal and cultural conditions have an impact on the gender pay gap. These conditions include, for example, general societal and cultural conditions as well as structures and practices on the labor market and in companies that subject women to pay discrimination and prevent them from breaking the glass ceiling. To capture these effects, datasets on employers would be useful with regard to relevant factors influencing recruitment and promotion of managers, which could then be correlated with data on employees. What might be of special interest is, for example, information concerning network structures as well as existing prejudices about the traits and abilities of men and women, which play a role in the selection and promotion of employees.

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