

Are Female Managers Agents of Change or Cogs in the Machine? An Assessment with Three-Level Manager–Employee Linked Data

Margriet van Hek ^{1,2,*} and Tanja van der Lippe¹

¹Department of Sociology, Utrecht University, 3584 CH Utrecht, the Netherlands and ²Department of Sociology, Radboud University, 6500 HE Nijmegen, the Netherlands

*Corresponding author. Email: m.vanhek@maw.ru.nl

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Abstract

In this study, we investigate whether female managers contribute to greater gender equality in organizations. Specifically, we examine whether women's and men's earnings are affected by the share of female managers in their organization, and by being supervised by a female manager. We formulate opposing hypotheses arguing that women are either change agents who reduce gender inequality in earnings in their organization, or cogs in the machine who do not influence or even enlarge gender inequality in earnings. We employ unique manager–employee linked data from nine countries to test these hypotheses. Results are in line with the weak version of the women as cogs in the machine hypothesis: women's and men's earnings are not affected by the share of female managers in their organization, nor by being supervised by a female manager. Gender equality in earnings is thus not stimulated by female managerial representation. Between-country variations in results are discussed.

Introduction

The past decades have seen a steady increase in women's representation in all levels of management (Jacobs, 1992; Bygren and Gähler, 2012). Women's access to management has been the subject of many studies which have led to imperative insights on how gender inequality in access to power is established (Smith, 2002). Now that women increasingly occupy managerial positions, the question arises what the implications of the growing number of women in these positions might be (Huffman, 2016). Managers play a key role in organizations and decide on the hiring, wages, promotions, and training of employees (Huffman, 2013). As such, a change in the demographic representation of managers may affect inequalities among employees. Today, gender

inequality in earnings is still one of the most pronounced and visible forms of gender inequality in organizations (Reskin, 2000; Cha and Weeden, 2014; Blau, 2016). Abundant studies have investigated explanations for the gender gap in earnings, but only a small proportion has concentrated on the influence of women's representation in management (Abendroth *et al.*, 2017). This contribution relates these two phenomena and focuses on the implications of female representation in managerial positions for gender inequality in earnings.

Existing studies propose opposing hypotheses regarding the influence of female managers on gender equality in organizations (Cohen and Huffman, 2007; Abendroth *et al.*, 2017). On the one hand, female managers may function as 'agents of change' who actively

foster gender equality in the workplace (Huffman, 2013). This hypothesis is rooted in Kanter's (1977) observation that the unequal representation of women and men in positions of power in organizations is related to processes producing workplace inequality. On the other hand, scholars argue that female managers act as 'cogs in the machine', lacking either the power or the will to actively stimulate gender equality in the workplace (Cohen and Huffman, 2007).

Previous studies have yielded contradictory results, partly depending on the type of data used (Huffman, 2016). First, some studies relied on data at the organizational level to test the aforementioned hypotheses. These cross-sectional (Shenhav and Habersfeld, 1992; Cohen and Huffman, 2007) and longitudinal (Baron *et al.*, 1991; Cardoso and Winter-Ebmer, 2010; Kurtulus and Tomaskovic-Devey, 2012) studies reported smaller gender inequalities in earnings and advancements opportunities in organizations with a high proportion of female managers, thus lending support to the 'agents of change' hypothesis. Second, due to the limited availability of appropriate data, a far smaller number of studies used data on individual employees and their managers, which allowed them to directly assess whether female employees benefit from being supervised by a female manager. These studies overall reported results more in line with the 'cogs in the machine' hypothesis. For example, employing cross-sectional data with direct manager-employee links on a large sample of organizations, Abendroth *et al.* (2017) studied implications of both an organization's managerial composition and the sex of employees' direct manager. Interestingly, they found that gender wage gaps were lower for low qualified jobs in organizations with a high proportion of female managers but, in general, the earnings of female employees did not benefit from having a female manager. Maume and Ruppanner (2015) found that women do not earn more when they report to a female as opposed to a male supervisor. Penner *et al.* (2012) and Srivastava and Sherman (2015) assessed longitudinal data with direct manager-employee links from a single organization from the United States and also found that women's earnings are not positively influenced by being supervised by a female manager.

Studies employing individual-level data are limited in some respects. Of the cross-sectional studies, Abendroth *et al.* (2017) only assessed large German firms (>500 employees) and Maume and Ruppanner (2015) used employee reported data which limited them in controlling for organization characteristics, such as its proportion of female managers. The longitudinal studies by Penner *et al.* (2012) and Srivastava and Sherman (2015) only

assessed one firm and therefore the question remains how generalizable the results of these studies are to other organizations. Except for Abendroth *et al.* (2017), all studies assessed data from the United States. Previous studies that used organizational-level data were foremost limited in that they did not establish whether women in fact worked for a female manager. Huffman (2016: p. 184) underscores the importance of assessing direct manager-employee links because they: 'allow us to more confidently link the actions and decisions of those in managerial positions to patterns of inequality among their supervisees'. Indeed, female managers may directly advance or impede the earnings of same-sex subordinates within their discretionary HR policy space. However, female managers can also influence women's earnings through various indirect mechanisms, e.g. their support for gender equality enhancing policies in the organization. So, female managers may improve the earnings of women working directly underneath them, but also the earnings of other women in the organization. To thoroughly assess whether female managers contribute to gender equality in organizations, it is therefore desirable to study simultaneously whether women's and men's earnings are affected by the gender composition of managers in their organization and the sex of their own manager.

Data to properly assess whether female managers contribute to gender equality in organizations is thus very rare. Huffman (2016) in this respect stressed that new data-collection efforts need to be made, and that appropriate data most importantly include direct manager-employee links, but ideally also cover characteristics of employees, their managers and the organizations for which they work. This study contributes the European Sustainable Workforce Survey (hereafter ESWS): a unique, recently collected cross-national three-level dataset that holds information about employees, their department managers and the organizations for which they work, allowing us to optimally test the influence of female managers on gender equality in the organization in a wide range of contexts (van der Lippe *et al.*, 2016). First, the ESWS data allow us to directly connect employees to their managers. As one of the few, we can directly assess whether earnings of female and male employees are differently affected by reporting to a female or male manager and by the proportion of female managers in their organization (Maume and Ruppanner, 2015; Abendroth *et al.*, 2017). Second, the ESWS data contain elaborate information about employees, their managers and the organizations in which employees and managers are embedded. As a result, we can account for variation and characteristics on different levels. Third, the ESWS data cover organizations from various sizes,

six sectors and nine countries and therefore allow us to assess whether female managers advance the earnings of women in a wide variety of organizations in several countries. Testing the aforementioned hypotheses in a wide range of contexts is important, since social contexts most likely matter for the influence female managers have on gender inequality in organizations (Maume and Ruppner, 2015). Most importantly, whereas both prior individual- and organizational-level studies mostly employed data from the United States, we test the aforementioned hypotheses in the European context. Interestingly, in one of the very few European studies, Abendroth *et al.* (2017) found for Germany that the proportion of female managers only reduces the gender pay gap in low qualified jobs whereas earlier studies from the United States found a more univocal alleviating effect of female managers on the gender pay gap in organizations. In this study we are able to check for variation in results between countries, sectors and different types of organizations and employees.

The first goal of this article is to examine the association between the share of female managers in the organization and women's and men's earnings. Its second goal is to examine whether the earnings of female and male employees are affected by reporting to a female or a male manager. If these conditions affect women's and men's earnings differently, they influence the gender gap in earnings. Accordingly, we formulate hypotheses on both the organizational- and individual level. In line with previous studies on this topic, we formulate contrasting hypotheses stating that female managers are either agents of change or cogs in the machine (Maume, 2011). We employ (cross-level) interactions to test our hypotheses.

Theoretical Framework

Agents of Change

There are several reasons why female managers might improve the earnings of female employees. First, female managers, as do male managers, have the tendency of homophily (Kanter, 1977; McPherson *et al.*, 2001; Elliott and Smith, 2004). Kanter (1977) theorizes that managerial positions are characterized by a high level of uncertainty, and that the need for trust, discretion, and clear-cut communication between actors is for that reason more important on managerial levels. As do other people, managers rely on social bases for trust because people that are more similar to them are more likely to share the same values, preferences, and 'speak the same language' (Kanter, 1977). Sex is a key characteristic based on which people make social distinctions, so people expect same-

sex peers to be more similar to them (England, 2010). So, managers likely expect less difficulties working with same-sex employees and, hence, are more likely to support the careers of same-sex subordinates and assign them to positions directly underneath them (Elliott and Smith, 2004). While Kanter (1977) used this argument to explain why men's opportunities are superior to women's, the mechanism of homosocial reproduction might benefit women when a female manager is in power (Maume, 2011; Srivastava and Sherman, 2015). Hence, female managers might particularly stimulate the careers of female subordinates, invoking mechanisms that stimulate their earnings. Studies have indeed shown that if a subordinate has the same sex, managers are more likely to mentor and befriend them (McPherson *et al.*, 2001; Ehrlich and Kimber, 2015). This would give women more access to beneficiary organizational networks improving their careers and earnings if they have a female manager. In addition, research has demonstrated that subordinates are evaluated better by a manager of the same sex (Castilla, 2011). This could be due to subordinates performing better under a same-sex manager, but also to managers having a preference for same-sex subordinates due to mechanisms of homophily. Performance evaluations are, evidently, correlated with promotions and earnings (Lyneess and Heilman, 2006).

Second, female managers might enhance earnings of their female subordinates because they are more able to sympathize with and willing to support other women because of shared experiences with sex-based discrimination (Maume, 2011). Research has shown that women who became mothers are perceived less competent and less favorable candidates for being hired, promoted, or educated (Cuddy *et al.*, 2004). Due to their own experiences, female managers might be more aware of this form of discrimination and even be more motivated to negate the negative effects of pregnancy on the career prospects and earnings of their female subordinates. Halpert *et al.* (1993) indeed demonstrate that women's performance evaluations of pregnant employees are less biased than men's. In addition, female managers are also more familiar with the work-family conflicts of their female subordinates than male managers. Linehan and Walsh (2000) showed that female managers did the majority of childcare and household tasks, irrespective of their working hours. As a result, female managers may be more understanding and flexible when their female subordinates have work-family conflicts. Abendroth and den Dulk (2011) show that workplace support for work-life balance positively impacts employees' work-life balance satisfaction. Butts *et al.* (2013) have shown that employees with fewer work-family conflicts are

more satisfied with and committed to their job which, in turn, could benefit their career prospects and earnings.

The previous two mechanisms specifically explain why female managers might directly enhance the earnings of their female subordinates. In addition, the support of female managers for gender equality enhancing policies in organizations possibly benefits the earnings of *all* women in an organization; even for women who do not have a female manager themselves. Cohen and Huffman (2007) demonstrated that female managers are more in favor of gender equality enhancing policies than male managers. They showed that in the 1996 wave of the General Social Survey, female managers were 1.32 more likely than male managers to agree with the statement 'Because of past discrimination, employers should make special efforts to hire and promote qualified women'. Female managers may be stronger advocates of gender equality enhancing policies because they are more familiar with sex-based discrimination, but it may also be in their own interest to actively pursue the implementation of such policies in an organization. If organizations with more female managers more often adopt policies that stimulate the hiring and promotion of qualified women, then female employees in these organizations should be more often found in higher ranked and better paid positions. Research on whether female managers indeed contribute to the implementation of gender equality enhancing policies is limited (Huffman, 2016). Dobbin *et al.* (2011) show that the share of female managers in organizations is positively related to the implementation of diversity policies. In combination with the finding that female managers agree more with the statement that organizations should make efforts to hire and promote qualified women, this signals that female managers are stronger advocates for such policies than their male colleagues (Cohen and Huffman, 2007). All in all, this mechanism explains why the proportion of female managers in an organization might positively relate to women's earnings in an organization.

A fourth mechanism that explains why women earn more when the share of female managers in an organization is higher relates to social cognition with respect to sex (Ely, 1995; Kurtulus and Tomaskovic-Devey, 2012). Studies have shown that employers view female employees as less capable, ambitious and devoted as men (Ridgeway, 2001; Acker, 2006). Research has frequently found indications that these stereotypes hinder women in obtaining high paid positions in organizations (Heilman, 2012). The presence of women in managerial positions in the organization may, however, challenge stereotypes about women's ambition and capability. Ely (1995), for example, shows that sex roles are less

stereotypical in firms with a higher proportion of women in management. In addition, the presence of female managers might also challenge the specific stereotypical image of how a leader (manager) looks like. As a result, women might more often advance to positions with authority in organizations where women are well represented in management. Smith (2002) argues that job authority is a workplace resource and highly associated with income. Importantly, this mechanism not only applies to the earnings of women working for a female manager, but to the earnings of all women in an organization.

In sum, this combination of research currents underpins the 'women as change agents' proposition. It expects that the representation of female managers positively relates to the earnings of *all* women in an organization due to their support for gender equality enhancing policies and mechanisms of social cognition with regard to sex. Based on mechanisms of homosocial reproduction and higher levels of support due to shared experiences with sex-based discrimination, we expect that female managers positively affect the earnings of their *direct* female subordinates. Since some of these proposed mechanisms point to opposite effects for men, we specify the 'change agent' hypothesis as follows:

Hypothesis 1a: Women's earnings are positively related to the proportion of female managers in an organization, men's earnings are negatively related to the proportion of female managers in an organization

Hypothesis 2a: Women's earnings are positively related to having a female manager compared to a male manager, men's earnings are positively related to having a male manager compared to a female manager

Cogs in the Machine

There are, however, also reasons to expect that female managers lack the power or do not have the motivation to enhance the earnings of other women in the organization. We describe three main mechanisms that lead to a weak and a strong version of the cogs in the machine hypothesis. First, female managers may not have sufficient power to significantly influence the earnings of other women in the organization (Cohen and Huffman, 2007). This refers to both their position in the organization and their executive power as managers. Maume and Ruppner (2015) argue that female managers are often stuck at lower levels of management where they do not have enough power to substantially affect the careers of employees. In addition, lower-level managers have little influence on organizational-level policies

compared to managers in senior positions. Furthermore, Charles and Grusky (2004) showed that the increase in women's representation in management since the 1970's has coincided with increasing organizational bureaucratization. Due to increasing adherence to procedures, the influence of managers in an organization has become restricted, especially that of low-level managers, which hampers the possibilities of female managers to improve the earnings of their female subordinates. Jacobs (1992) argued that managers often have the title of manager but not the executive power it suggests and that, since women are more often found in low and middle management, this is more true for female managers than for male managers. Female managers may thus *want* to stimulate the careers and earnings of other women including their female subordinates, but they may simply *lack the power* to make a substantial difference (Cohen and Huffman, 2007; Maume, 2011). This argumentation leads to what we call here the 'weak' version of the cogs in the machine hypothesis:

Hypothesis 1b: Women's and men's earnings are unrelated to the proportion of female managers in an organization

Hypothesis 2b: Women's and men's earnings are unrelated to the sex of their manager

The 'strong' version of the hypotheses goes one step further, suggesting that female managers may *not want* to actively contribute to gender equality in earnings. Again, several mechanisms may be at play. First, it has been argued that only women who accept the organizational status quo are selected into (senior) management roles (Cohen and Huffman, 2007; Huffman, 2016). If acceptance of an organization's existing structure and culture is one of the—implicit, but salient—selection criteria based on which individuals are selected into (high) management, female managers' commitment to gender equality is expected to be low and by implication women's earnings will not improve. Second, 'queen bee' theory asserts that women in leadership positions have to distance themselves from feminine issues in order to justify and secure their position (Ely, 1995; Kanter, 1977; Ridgeway, 2001). Actively and openly enhancing the careers and earnings of their female subordinates would jeopardize female managers' position because it raises the suspicion of female solidarity. Moreover, according to queen bee theory, women in leadership positions even legitimize gender inequality and actively oppose initiatives to tackle gender inequality in the organization (Derks et al., 2016). In line with this argument, Maume (2011) indeed showed, assessing direct employee-

manager dyads, that men experience more job-related support from a female manager than a male manager.

Third, research has shown that both women and men subscribe to gender stereotypes (Derks et al., 2011). As stated earlier, stereotypes hold that female employees are less devoted and capable employees than men (Ridgeway, 2001; Acker, 2006). If gender stereotypes are also present in female managers, they may not actively sympathize with and support their female subordinates or actively pursue gender equality enhancing policies in their organization. Instead, if female managers have and act on negative stereotypes about working women, this may harm the earnings of their female subordinates. These arguments lead to the following explication of the 'strong' version of the cogs in the machine hypothesis:

Hypothesis 1c: Women's earnings are negatively related to the proportion of female managers in an organization, men's earnings are positively related to the proportion of female managers in an organization

Hypothesis 2c: Women's earnings are positively related to having a male manager compared to a female manager, men's earnings are positively related to having a female manager compared to a male manager

Data and Measurements

Data

To test our hypotheses, we employ data from the ESWS (van der Lippe et al., 2016). The ESWS data contain information on organizations from nine European countries: Finland, Sweden, Germany, the Netherlands, the United Kingdom, Portugal, Spain, Bulgaria, and Hungary.¹ Within each country, organizations with 20–49 employees, 100–250 employees, and >250 employees and from the following six sectors were selected: manufacturing, healthcare, higher education, transport, financial services, and telecommunication. For each sampling cell (size-sector) a random sample of organizations was drawn from a national business list or, when such a list was not available, business lists of national branch organizations were used. If response rates were insufficient within a sector-size category, a matching strategy was applied in which organizations that did not wish to cooperate were replaced by a similar organization. Within-organization response rates are 61% for employees (ranging between 45% in Germany and 94% in Bulgaria), 81% for department managers (ranging between 71% in Finland and 96% in Bulgaria) and 100% for HR managers. When organizational representatives

(often the Human Resource manager or the chief executive officer (CEO)) agreed to participate, employees and their department-managers were requested to fill in a questionnaire. Each type of respondent received a different questionnaire. Organizations could choose whether they wanted to use the online or paper questionnaire. Within each organization, at least two departments that represented the core activity of the organization (e.g., nurses in a hospital) and one department that had other primary tasks (e.g., finances, communication) were approached. On average, 3.3 departments per organization were surveyed. Within departments, all workers were approached to participate.² The ESWs data thus have a three level structure: employees are nested in departments, which are nested in organizations. For 9,601 employees, we have information from their department managers (721) and organizational representatives (246). We selected respondents aged 18 and older working in organizations that employed both women and men. This left us with 9,267 employees working for 706 department managers in 238 organizations.

Measurements

Dependent variable

Our dependent variable is employees' *net hourly income* in Euros. Employees were asked: 'What are your net monthly earnings from your main job at this organization? Please refer to your average earnings in recent months'. A definition of earnings was added: 'what you have left every month after deducting national and local taxes and compulsory national insurance contributions'. In case respondents did not answer this question, they were asked to choose one of 21 income categories; categories differed between countries.³ We took the median of the income category and all currencies were converted to Euros. To calculate the hourly income of respondents, respondents' earnings were divided by the hours they were contracted for their organization. If this information was missing, we used respondents' self-reported hours actually worked for the organization. We dealt with extreme values by converting the original value to its natural log.

Independent variables

Employee questionnaire. The main variable of interest on the employee level is *female*, on which men score a 0 and women score a 1. As control variables, we first include the *age* of employees and the quadratic term *age*² since we expect a non-linear effect of age. We also control for employees' *educational level*. Employees were asked: What is the highest level of education that you

have completed? There were 8 main categories: not completed primary education (0), primary education or first stage of basic education (1), lower level secondary education or second stage of basic education (2), upper secondary education (3), post-secondary, non-tertiary education (4), first stage of tertiary education (bachelor) (5), second stage of tertiary education (master) (6), and doctoral degree (7). We include this variable linearly in the analyses; including it categorical in the analyses did not affect the results. We control for occupational segregation by including employees' ISCO code based on the question: 'What is your occupation? Please give a full description of your occupation, for example nurse at the intensive care, cashier at the bakery counter.' We include ISCO codes on the one-digit level and construct a separate category for missing values (288 cases). The variable *tenure* captures the years employees worked for the organization. Last, we control for whether employees *live with a partner* (0/1) and whether the employee has *dependent children*. Employees with children below 18, or with children living at home score a 1, others score 0.

Department manager questionnaire. On the department level we look at whether the *department manager is female* (1) or male (0). Due to the hierarchical structure of the ESWs data, we know which employees are supervised by which department manager. This variable allows us to test whether earnings of female and male employees are affected by having a female or male department manager.

Organizational questionnaire. In most organizations, the HR-manager or CEO filled in the organizational questionnaire. To establish the *percentage of female managers in the organization*, the organizational representative was asked what percentage of managers in their organization are female. In case they did not know the precise figure, they were asked to estimate. As controls on the organizational level, we first include *organizational size*. HR-managers were asked: 'How many employees are there in the organization?'. We calculated the natural log of this variable. We also control for the *percentage of female employees*. HR-managers were asked what percentage of the employees in their organization was female. Originally, this variable was coded on a 9-point scale from there are no female employees (1) to all employees are female (9). We converted this variable into a linear scale by recoding these values into 0% and 100% and taking the median of categories in between.

We removed respondents with missing values from our dataset. Most missing values were on employees' hourly wage (969). Our final dataset consists of 7,697

Table 1. Descriptive statistics

	Minimum	Maximum	Mean	Std. Deviation
Employee variables				
Hourly wage (natural log)	0	5.521	2.065	0.830
Female	0	1	0.561	0.496
Age	18	74	42.013	10.936
Age ²	324	5476	1884.695	938.502
Living with partner	0	1	0.733	0.443
Dependent children	0	1	0.495	0.500
Educational attainment	1	8	5.386	1.427
Tenure (years working for organization)	0.083	55	10.576	9.805
ISCO 1: managers	0	1	0.061	0.239
ISCO 2: professionals	0	1	0.300	0.458
ISCO 3: technicians and associate professionals	0	1	0.282	0.450
ISCO 4: clerical support workers	0	1	0.158	0.365
ISCO 5: services and sales workers	0	1	0.045	0.208
ISCO 6: skilled agricultural, forestry and fishery workers	0	1	0.000	0.020
ISCO 7: craft and related trades workers	0	1	0.039	0.194
ISCO 8: plant and machine operators and assemblers	0	1	0.045	0.207
ISCO 9: elementary occupations	0	1	0.018	0.133
ISCO: missing	0	1	0.051	0.221
Department variables				
Female manager	0	1	0.383	0.486
Organizational variables				
Proportion female managers	0	1	0.362	0.250
Proportion female employees	2	9	0.497	0.242
Number of employees (natural log)	2.197	9.210	5.589	1.432
Sector: manufacturing	0	1	0.251	0.433
Sector: healthcare	0	1	0.242	0.428
Sector: higher education	0	1	0.156	0.363
Sector: transport	0	1	0.121	0.327
Sector: financial services	0	1	0.136	0.343
Sector: telecommunication	0	1	0.094	0.292
Country: United Kingdom	0	1	0.070	0.256
Country: Germany	0	1	0.093	0.291
Country: Finland	0	1	0.072	0.259
Country: Sweden	0	1	0.096	0.294
Country: the Netherlands	0	1	0.226	0.418
Country: Portugal	0	1	0.108	0.310
Country: Spain	0	1	0.077	0.266
Country: Hungary	0	1	0.126	0.332
Country: Bulgaria	0	1	0.131	0.338

Source: ESWS. N = 7,697 respondents, 669 departments, 231 organizations.

respondents, 669 departments, and 231 organizations. Descriptive statistics can be found in [Table 1](#).

Analyses

Methods

We perform three level linear regression models in which the intercept and the effect of female are allowed

to vary over departments and organizations ([Schmidt-Catran and Fairbrother, 2016](#)).⁴ Country and sector dummy variables are included in the models (except for model 0 and 1) to control for respondents' nesting in countries and sectors. The sector 'transport' and the country 'Hungary' are the reference categories.⁵ To replicate previous organizational-level studies, we do not control for having a female manager when estimating the effect of the proportion of female managers in the

organization in model 2 and 3, but we do control for the proportion of female managers when estimating the effect of having a female manager in model 4 and 5 (Abendroth *et al.*, 2017). Appendix A shows model 6 per country and includes a discussion of the country-specific results. Appendix B shows model 6 per sector.

Results

The null-model in Table 2 shows considerable variation of employees' earnings between departments and organizations, justifying a multilevel approach.⁶ The intra-class correlation is 11% on the department level and 34% on the organizational level. Model 1 shows that there exists a considerable and significant gender gap in earnings. Men's average hourly wage, indicated by the intercept, is 8.33€ ($b = e^{2.120}$). Women in our sample earn on average 7.74€ per hour ($b = e^{(2.120-0.074)}$), which is .59€, or 7%, less than men. Considering a 40 hour workweek, the gender gap in earnings is about 104€ per month. Note that this figure is only adjusted for working hours and not for sector, country, educational attainment, job status and other organizational, or individual control variables.

In models 2 and 3, we test whether the proportion of female managers in an organization affects the earnings of female and male employees. The main effect of proportion of female managers indicates the effect for men (who score 0 on female), its interaction with female indicates the difference in the effect between women and men. Both the main effect of proportion of female managers and its cross-level interaction with female are not statistically significant in model 2 ($P = 0.918$ and $P = 0.292$). In model 3 control variables are added; the main and interaction effects of proportion of female managers stay largely the same. Individual control variables behave as one would expect; older, higher educated, more experienced employees and employees with children have a relatively higher wage. We conclude that both women's and men's earnings are not affected by working in an organization with a high share of female managers, which is in line with the weak version of the women as cogs in the machine argument and supports hypothesis 1 b. So, the share of women in managerial positions does not contribute to gender equality in earnings in an organization.

Models 4 and 5 show whether female and male employees' earnings are affected by having a female manager. The interaction effect of female manager with female in model 2 shows to what extent the effect of having a female manager differs between female and male employees. Both the main effect of having a female

manager and its interaction with female do not reach statistical significance in model 4 and this does not change when control variables are added in model 5. As a result, we conclude that women's and men's wages are not differently affected by the sex of their manager. This result is in accordance with hypothesis 2 b, again supporting the weak version of the women as cogs in the machine hypothesis. So, female managers do not reduce gender inequality in earnings in their organization by enhancing the earnings of their female subordinates. In model 6, we include both interactions and all individual and organizational control variables to control the interaction effects for each other's influence. Like previous models, model 6 shows that women's and men's earnings are not affected by the proportion of female managers in an organization, nor by having a female manager themselves.⁷

Conclusions

This study contributes to the growing body of literature on the significance of women's representation in managerial positions. The first goal of this study was to assess whether women's and men's earnings are affected by the proportion of female managers in their organization. In order to provide more insight in the on the ground actions of female managers, our second goal was to test whether women's and men's earnings are affected by being supervised by a female manager. Unique three-level manager-employee linked data from the ESWS allowed us, as one of the first, to study whether female managers enhance gender wage equality in organizations by enhancing the earnings of their direct female subordinates (Huffman, 2016). We were the first to assess this for a wide variety of organizations, sectors and countries.

Our results showed that women's and men's earnings are not affected by the share of female managers in their organization, nor by being supervised by a female manager themselves. Accordingly, we conclude that women in management positions do not make a substantial contribution to gender equality in earnings in organizations. This result is in line with the weak version of the female managers as cogs in the machine hypothesis that assumed no link between women's and men's earnings and the sex of (their) managers. We theorized that female managers are often situated in low-level management where they do not have enough power to influence organizational processes and the careers and earnings of their direct subordinates. In this, our study contrasts previous organizational-level studies but it is in

Table 2. Organizational-level analyses: linear 3-level regression models on hourly wage (natural log)^a

	Model 0			Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	B	SE		B	SE		B	SE		B	SE		B	SE		B	SE		B	SE	
Intercept	2.079***	0.048		2.120***	0.048		1.171***	0.071		0.307*	0.121		1.178***	.067		0.296*	0.121		0.303*	0.121	
Employee variables																					
Female				−0.074***	0.014		−0.092***	0.024		−0.082***	0.023		−0.064	0.017		−0.053***	0.016		−0.074**	0.023	
Age										0.027***	0.004					0.027***	0.004		0.027***	0.004	
Age ²										0.000***	0.000					0.000***	0.000		0.000***	0.000	
Educational level										0.068***	0.005					0.068***	0.005		0.068**	0.005	
Partner										0.019	0.012					0.019	0.012		0.019***	0.012	
Dependent children										0.027*	0.011					0.026*	0.011		0.026	0.011	
Tenure										0.003***	0.001					0.003***	0.001		0.003***	0.001	
Department variables																					
Female manager													−0.031	0.027		−0.010	0.024		−0.005	0.025	
Organizational variables																					
Proportion female managers							−0.009	0.088		0.043	0.083					0.089	0.074		0.040	0.083	
Proportion female employees										−0.145	0.090					−0.143	0.090		−0.139	0.091	
Number of employees (natural log)										0.012	0.011					0.012	0.011		0.012	0.011	
Interactions																					
Proportion female managers*female							0.061	0.058		0.054	0.053								0.070	0.055	
Female manager*female													−0.011	0.027		−0.024	0.025		−0.032	0.026	
Variance Statistics																					
Organization variance	0.711			0.711			0.219			0.186			0.219			0.186			0.186		
Department variance	0.143			0.153			0.157			0.122			0.156			0.121			0.122		
Employee variance	0.435			0.432			0.431			0.416			0.432			0.416			0.416		
Slope female over organizations				0.066			0.079			0.070			0.082			0.073			0.070		
Slope female variance over departments				0.105			0.090			0.066			0.086			0.063			0.065		

^a Country and sector dummies are included in models 2, 3, 4, 5, and 6 and ISCO codes are included in models 3, 5, and 6, but not shown in this table.

Source: ESWS. N = 7,697 respondents, 669 departments, 231 organizations.

~*p* < 0.1.**p* < 0.05.***p* < 0.01.****p* < 0.001.

accordance with previous research that assessed direct manager-employee links.

Our findings differ from previous organizational-level studies that established higher earnings for women working in organizations with a high share of female managers (Cohen and Huffman, 2007; Cardoso and Winter-Ebmer, 2010). There are a few possible explanations as to why we found support for the weak version of the cogs in the machine hypothesis whereas previous organizational-level studies supported the women as change agents hypothesis. These explanations mostly relate to the sample of employees, managers, and organizations we employed. First, Cohen and Huffman (2007) found that the positive association between the share of women in management and women's earnings was almost exclusively driven by women in high status managerial positions. Our robustness analyses did not show variation in results between higher or lower status managers, but more direct information on, for example, managers' responsibilities may provide a clearer picture in this regard. In addition, other organizational-level studies also found equalizing effects of low level managers (Hultin and Szulkin, 2003) or managers of employees low in the organizational hierarchy (Abraham, 2017), so this is likely not the sole explanation for the difference in findings. Second, the great majority of previous organizational-level studies focused on the United States and/or a specific subset of organizations (Baron *et al.*, 1991; Cohen and Huffman, 2007). The fact that we, as one of the very few European studies, did not find an effect of the proportion of female managers on the gender gap in earnings and Abendroth *et al.* (2017) found it only for low qualified jobs in Germany could indicate that results are influenced by contextual characteristics that differ between Europe and the United States. An important contribution of our study is that we analyzed organizations from different sizes, sectors, and European countries enabling us to test our hypotheses in a wide range of contexts. The highly similar relationships we found in all countries and sectors and for different types of employees and organizations give little indication as to how contextual characteristics might affect the influence female managers have on gender inequality in organizations. Still, social contexts of employees, managers, and organizations likely affect the extent to which female managers function as change agents. Gender stereotypes in national and organizational cultures, for example, may influence incentives of women to strive for high paid positions but also of organizations to actively pursue gender equality in wage among their employees. Institutional factors, such as the extent to which markets and political forces determine

wages, differ greatly between Europe and the United States and affect the extent to which managers exert influence over employees' wages and therefore their opportunities to influence gender wage inequality. Only Maume and Ruppanner (2015) have studied the interplay between institutional contexts and the influence of female managers on the gender gap in earnings; their study showed that state liberalism did not affect the extent to which female managers functioned as change agents. Still, they hold that: 'it is not necessarily *whether* women in power reduce gender inequality, but *how* and *in what contexts* do female leaders ameliorate gender inequality among subordinates.' (Maume and Ruppanner, 2015: p. 136). Unfortunately, the sample of countries and sectors in the ESWS is too limited to test cross-level interactions between contextual characteristics and the influence of female managers on the gender gap in earnings. Future research should, however, find a task in interacting institutional and cultural contextual characteristics with managers' sex and the earnings of female and male employees. A last explanation for the difference in findings is that the sample of organizations in the ESWS data is not representative for all organizations in the participating countries. Although the wide variety of organizations and countries is a strength of the data we employed, the low number of organizations per country affects the generalizability of our results. Additionally, part of the ESWS data is collected using convenience sampling and, although this method is not uncommon in management studies, this could also affect also the generalizability of our results (Johansen and Zhu, 2017).

Our finding that women do not benefit in terms of earnings from having a female manager is in line with previous individual-level studies (Maume and Ruppanner, 2015; Abendroth *et al.*, 2017). A first logical follow up question is of course whether female managers benefit their female subordinates in other ways than in terms of earnings. There are reasons to suspect that female managers are more understanding of work-family conflicts of female subordinates than male managers, which might lead to less conflict or more job satisfaction when women have a female manager (Linehan and Walsh, 2000). Another question that remains is whether female managers lack the motivation or the power to improve the earnings of their female subordinates. The ESWS provided only information on department managers and did not include information on the executive power of these managers. Hence, we could not assess in depth whether female managers had—or felt to be having—the power to improve the earnings of their female subordinates. Robustness checks in which we

ranked department managers (see endnote 6) however showed no effect of high-ranked female managers. In addition, [Srivastava and Sherman \(2015\)](#) showed that even high status female managers do not improve the earnings of their female subordinates. This seems to indicate that a motivation of female managers to act as change agents is lacking, which relates to queen bee arguments ([Derks et al., 2016](#)). However, we also know that the extent to which female managers are motivated to support other women is influenced by the organizational culture in which they work. [Derks et al. \(2011\)](#) concluded that female managers do not necessarily have the tendency to compete with and distance themselves from other women (i.e., act as queen bees), but do so if and when they feel it is a way to rise on the organizational ladder, i.e., in organizations with strong masculine cultures. So, a task for future research lies not only in examining in which contexts female managers act as change agents, but also in exposing the mechanisms behind why female managers are not motivated and able to significantly contribute to gender equality in their organization.

Although gender gaps in earnings have decreased over time, they are persistent in all countries and almost all types of organizations ([Blau, 2016](#)). Our study indicates that gender inequality in organizations is not automatically tackled by increasing the number of women in managerial positions. Since gender gaps in earnings are so persistent, it is unlikely that one organizational factor solely greatly contributes to gender equality in organizations. A growing body of literature points to an interplay of organizational culture, characteristics of organizational stakeholders and larger societal and institutional contexts in which they operate ([Watts, 2009](#); [Derks et al., 2011](#); [Johansen and Zhu, 2017](#)). So, if organizations want to reduce existing inequalities between women and men, but possibly also between other majority and minority groups, it is likely they have to take measures on different levels in their organization. This could refer to measures that stimulate an organizational climate in which women are motivated to and can act as change agents, but also policies that independently of female managers tackle gender inequalities on various levels in the organization. An example could be specific types of formalization policies that have been shown to be effective in reducing inequalities between employees from majority and minority groups ([Dobbin et al., 2015](#)). However, since managers decide on the implementation of these measures, an important focus should remain on how the distribution of power in organization relates to inequalities among employees.

Notes

- 1 The term organization refers to an organization but sometimes, in the case of multi-site companies or organizations, to the local unit (the establishment).
- 2 In a few organizations, only the participation of a sample of workers was supported.
- 3 The exact question to determine the income category of respondents was: "If you don't know exactly what your net monthly earnings are, perhaps you can provide the approximate range. Which category best describes your net monthly earnings from your main job at this organization? If you don't know the exact category, please give an estimate." Contract hours were measured as follows: "How many hours a week are you contracted to work for this organization? Exclude any paid or unpaid overtime." For respondents that did not fill in that question we used their answer on the following question: "How many hours a week do you actually work for this organization? Include paid or unpaid overtime, but not your commuting time." Results do not differ when only respondents who filled in their actual income are included in the analyses.
- 4 Robustness analyses with organization/department fixed-effects analyses showed highly similar results and lead to identical conclusions.
- 5 Results do not differ when other reference categories of sector and country are taken. Sector correlates with the percentage of female employees and female managers. Estimates stay largely the same when sector dummies are excluded from the models.
- 6 Recent studies indicated that it is important to look at within organizational variation with regards to effects of the proportion of female managers and having a female manager ([Abendroth et al., 2017](#); [Abraham, 2017](#)). To this end, we examined variation between high and low-educated employees and large and small organizations. Results did not show statistically significant effects for any of these subgroups. We also tested whether results differed when controlling for the status of the manager, or when differentiating between high and low-status managers based on the managers' educational level and income (Cohen and Huffman, 2007), the time she/he has been managing the department, the number of employees in the department and the average ISEI score of the manager's employees. This did not appear to be the case (results available upon request). Unfortunately, the ESWS does not provide more specific data to determine managers' status, nor does it has information on respondents' ethnicity so we

could not investigate its influence on the associations we examined. In addition, we checked whether the effect of having dependent children on earnings differed between female and male employees, and whether mothers benefited more from having a female manager than others (i.e. fathers or employees without children). Results showed no variation between these subgroups. We checked for influential cases using the Jack-knife procedure. When removing Spain or Portugal from the analyses, the cross-level interaction of the proportion female managers with female becomes significant at the 0.1 level. When removing Sweden from the analysis, the interaction of having a female manager and female becomes significant at the 0.1 level. We do not consider these estimates reliable enough to draw solid conclusions from and therefore do not discuss them in the main text. Finally, since there exists variation in income levels between countries we performed robustness checks in which we adjusted income according to price levels in the different countries (Eurostat, 2017). Results stay virtually the same when considering this adjusted measurement of income.

- 7 The three-way interaction between female, female manager and proportion female managers is not statistically significant.

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- Margriet van Hek** is a postdoctoral researcher in the Department of Sociology/ICS, Radboud University in Nijmegen, the Netherlands. Her main research interests comprise social stratification, gender issues, educational sociology, and cultural tastes and lifestyles.
- Tanja van der Lippe** is Professor of Sociology at Utrecht University, head of the Department of Sociology and research director at ICS Utrecht. Her research interests are in the area of work–family linkages in Dutch and other societies, for which she has received a number of large-scale grants from Dutch and European Science Foundations. She is an elected member of the European Academy of Sociology (2010), the Royal Netherlands Academy of Arts and Sciences (2014), and the Royal Holland Society of Sciences and Humanities (2013). She has published extensively on work and care of men and women in European countries.

Appendix A

Country-Specific Analyses

Table A.1. Model 6 separately for: Finland, Sweden, Germany, the Netherlands, the United Kingdom

	Finland		Sweden		Germany		The Netherlands		United Kingdom	
	B	SE	B	SE	B	SE	B	SE	B	SE
Intercept	2.451***	0.326	2.254***	0.513	1.404***	0.244	1.844***	0.139	2.315***	0.338
Employee variables										
Female	-0.044	0.063	-0.019	0.125	-0.120**	0.045	-0.091**	0.028	-0.247*	0.097
Age	0.013	0.011	0.033	0.021	0.037***	0.007	0.024***	0.004	0.031**	0.011
Age ²	0.000	0.000	0.000	0.000	0.000***	0.000	0.000***	0.000	0.000*	0.000
Educational level	0.040**	0.015	0.023	0.022	0.055***	0.008	0.039***	0.006	0.029*	0.014
Partner	-0.007	0.033	-0.015	0.060	0.069**	0.024	-0.006	0.013	0.046	0.042
Dependent children	0.053~	0.031	-0.044	0.061	0.037	0.023	0.027*	0.013	0.004	0.040
Tenure	0.002	0.002	-0.002	0.003	0.002	0.001	0.000	0.001	0.004	0.003
Department variables										
Female manager	-0.105	0.066	-0.179	0.142	-0.018	0.050	-0.015	0.037	-0.077	0.071
Organizational variables										
Proportion female managers	0.373	0.223	0.015	0.349	-0.386	0.170	0.053	0.199	-0.359	0.355
Proportion female employees	-0.739*	0.299	-0.072	0.219	0.075	0.251	0.018	0.146	-1.046*	0.408
Number of employees (natural log)	-0.039	0.045	-0.026	0.032	-0.007	0.026	-0.006	0.017	-0.033	0.035
Interactions										
Proportion female managers*female	-0.026	0.126	-0.139	0.367	0.087	0.086	0.201~	0.111	0.375	0.277
Female manager*female	-0.034	0.072	0.234	0.162	0.013	0.055	0.009	0.042	0.077	0.082
Variance statistics										
Organization variance	0.099		0.000		0.119		0.084		0.092	
Department variance	0.030		0.263		0.083		0.088		0.072	
Employee variance	0.304		0.646		0.263		0.219		0.388	
Slope female over organizations	0.032		0.000		0.048		0.030		0.069	
Slope female variance over departments	0.001		0.246		0.001		0.098		0.000	

Note: ISCO codes are included but not shown in this table. In Sweden ISCO 6 and 9 is not available, in the UK the healthcare sector is not available.

Source: ESWS.

~ $P < 0.1$.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

N¹Finland = 557; N¹Sweden = 738; N¹Germany = 718; N¹The Netherlands = 1,741; N¹UK = 541.

Table A.2. Model 6 separately for: Portugal, Spain, Hungary and Bulgaria.

	Portugal		Spain		Hungary		Bulgaria	
	B	SE	B	SE	B	SE	B	SE
Intercept	-0.096	0.510	1.362**	0.414	0.443	0.395	-0.152	0.342
Employee variables								
Female	-0.022	0.085	-0.034	0.085	0.036	0.073	-0.203*	0.081
Age	0.031~	0.019	0.031~	0.018	0.031**	0.012	0.026*	0.011
Age ²	0.000	0.000	0.000~	0.000	0.000*	0.000	0.000~	0.000
Educational level	0.197***	0.023	0.041**	0.015	0.107***	0.015	0.087***	0.013
Partner	0.090*	0.045	0.055	0.045	-0.023	0.034	0.010	0.036
Dependent children	0.059	0.042	0.056	0.043	-0.023	0.035	0.055	0.034
Tenure	0.006~	0.003	0.009**	0.003	0.005*	0.002	0.005*	0.002
Department variables								
Female manager	0.061	0.075	-0.008	0.075	0.080	0.064	-0.034	0.079
Organizational variables								
Proportion female managers	0.494	0.397	0.462	0.273	0.036	0.409	0.280	0.195
Proportion female employees	-0.091	0.326	-0.426	0.300	-0.402	0.489	0.013	0.225
Number of employees (natural log)	0.039	0.041	0.021	0.023	0.009	0.035	0.015	0.039
Interactions								
Proportion female managers*female	0.163	0.234	-0.155	0.194	0.038	0.119	0.223	0.159
Female manager*female	-0.160~	0.089	-0.059	0.081	-0.191**	0.072	-0.007	0.077
Variance statistics								
Organization variance	0.245		0.001		0.150		0.141	
Department variance	0.035		0.119		0.058		0.176	
Employee variance	0.506		0.404		0.458		0.459	
Slope female over organizations	0.092		0.000		0.004		0.073	
Slope female variance over departments	0.010		0.060		0.003		0.000	

Note: ISCO codes are included but not shown in this table. In Portugal, Spain, Hungary and Bulgaria ISCO 6 is not available.

Source: ESWS.

~ $P < 0.1$.

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

N¹Portugal = 830; N¹Spain = 592; N¹Hungary = 971; N¹Bulgaria = 1, 009.

Discussion of Country-specific Analyses

Appendix A provides model 6 specified for each country. Mostly, country analyses display the same picture as analyses in which all countries are combined: women's and men's earnings are not differently affected by the proportion of female managers in their organization, nor by having a female manager themselves. There are, however, some exceptions. In the Netherlands, working in an organization with a high proportion of female managers is more positively related to women's earnings than to men's ($b = 0.201$). In Portugal and Hungary, women's earnings are more negatively affected by

having a female manager than men's ($b = -0.160$ and $b = -0.191$).

Since the number of organizations per country is limited we need to be cautious with the interpretation of our country-specific results. Yet, our findings for the Netherlands, Portugal, and Hungary seem to be in line with findings of previous organizational-level and individual-level studies (Cohen and Huffman, 2007; Abendroth et al., 2017). Whereas in the Netherlands we find positive effects of the proportion of female managers in an organization for women's earnings, in Portugal and Hungary we see that women's earnings are lower when they have a female manager.

Appendix B

Sector-Specific Analyses

Table B.1. Model 6 separately for: manufacturing, healthcare, higher education, transport, financial services, and telecommunication

	Manufacturing			Healthcare			Higher education			Transport			Financial services			Telecommunication		
	B	SE		B	SE		B	SE		B	SE		B	SE		B	SE	
Intercept	0.292	0.234		-0.124	0.212		-0.327	0.306		0.856*	0.339		1.173**	0.436		-0.352		0.504
Employee variables																		
Female	-0.073~	0.043		-0.065	0.069		-0.037	0.061		-0.046	0.055		-0.075	0.071		-0.028		0.093
Age	0.031***	0.008		0.024***	0.005		0.021*	0.010		0.030***	0.009		0.034*	0.014		0.034*		0.018
Age2	0.000**	0.000		0.000***	0.000		0.000	0.000		0.000**	0.000		0.000~	0.000		0.000		0.000
Educational level	0.059***	0.010		0.094***	0.007		0.087***	0.012		0.034**	0.011		0.031	0.016		0.057**		0.020
Partner	0.001	0.027		-0.004	0.016		0.062*	0.029		0.033	0.028		0.029	0.038		-0.018		0.054
Dependent children	0.008	0.025		0.008	0.016		0.036	0.028		0.023	0.025		0.101**	0.037		0.035		0.056
Tenure	0.002	0.001		0.002*	0.001		0.004*	0.002		0.005**	0.002		0.004~	0.003		0.006		0.004
Department variables																		
Female manager	-0.086	0.059		0.088*	0.041		-0.027	0.052		0.106	0.067		-0.005	0.054		-0.063		0.102
Organizational variables																		
Proportion female managers	0.313	0.255		0.182	0.150		-0.093	0.135		0.064	0.334		0.074	0.232		-0.080		0.543
Proportion female employees	-0.210	0.192		0.112	0.190		-0.144	0.195		-0.136	0.256		-0.707*	0.285		0.029		0.499
Number of employees (natural log)	-0.001	0.025		0.022	0.017		0.008	0.027		-0.008	0.037		-0.049~	0.028		0.064		0.053
Interactions																		
Proportion female managers*female	-0.103	0.158		0.100	0.113		-0.063	0.123		-0.178	0.203		0.189	0.146		0.143		0.272
Female manager*female	0.044	0.065		-0.081~	0.043		0.015	0.055		-0.001	0.081		-0.091	0.066		-0.082		0.122
Variance statistics																		
Organization variance	0.191	0.191		0.126	0.126		0.087	0.087		0.143	0.143		0.157	0.157		0.279		0.279
Department variance	0.157	0.157		0.080	0.080		0.104	0.104		0.074	0.074		0.001	0.001		0.004		0.004
Employee variance	0.454	0.454		0.285	0.285		0.401	0.401		0.324	0.324		0.471	0.471		0.586		0.586
Slope female over organizations	0.066	0.066		0.080	0.080		0.001	0.001		0.017	0.017		0.073	0.073		0.088		0.088
Slope female variance over departments	0.119	0.119		0.079	0.079		0.003	0.003		0.124	0.124		0.002	0.002		0.003		0.003

Note: ISCO codes are included but not shown in this table. In Sweden ISCO 6 is not available in healthcare, financial services and telecommunication, the healthcare sector is not available in the UK.

Source: ESWs.

~ $p < 0.1$.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

N¹ manufacturing = 1,902; N² healthcare = 1,830; N³ higher education = 1,179; N⁴ transport = 928; N⁵ financial services = 1,037; N⁶ telecommunication = 723.