The male-female earnings gap for nurses in Germany: A pooled cross-sectional study of the years 2006 and 2012

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ABSTRACT

Background: Nursing is one of the largest occupations for women in every country. Evidence suggests a substantial male-female pay gap for registered nurses in the U.S., possibly contributing to disparities between genders more broadly. Differences in motivation and skills between men and women have long been considered important factors in the gender earnings gap, but these factors are difficult to measure. Because of country specific educational pathways and limited upward job mobility in Germany, nurses tend to be more homogenous in their motivation to work and their work skills compared to the U.S.
Objective: To study male-female earnings in the nursing labor market in Germany.
Design: This is a pooled cross-sectional study of survey data collected for the years 2006 and 2012.
Methods: We used a representative survey of nurses (n = 828) who are active labor force participants. In a multivariate ordinary least squares regression, the analysis estimated the log of monthly earnings for male and female nurses. The full model accounted for demographic, human capital, and geographic characteristics, in addition to employment characteristics, such as hours worked, additional education obtained, years of nursing experience, years of labor market experience, career inactivity, years with the employer, and responsibilities at work, among other factors. We conducted follow-up analyses to test alternative explanations for the pay gap, examining earnings for nurses who no longer worked in nursing and testing potential differences in motivation with the likelihood of working nightshifts and length of time with current employer.
Results: Unadjusted monthly earnings for full-time male nurses were 30% higher, or 700 Euros more, than monthly earnings for full-time female nurses. In the fully adjusted analysis, male nurses out-earned female nurses by approximately 9.3%, or 260 Euros per month. Follow-up analyses suggested that better outside options exist for male than female nurses in the German labor market, while we found no support for gender differences in motivation.

What is already known about the topic?

- A male-female earnings gap exists for registered nurses in the U.S., even after accounting for education, experience, hours worked, and many work setting characteristics, such as specialty area and job position.
- The gap is present for new graduates, for nurses who take no time out of the labor force for childrearing, and for nurses working in pediatric and newborn care where physical strength is not considered advantageous.

What this paper adds

- Examining the earnings of nurses in Germany allows for studying a homogenous group of workers in an almost entirely public sector industry with compensation regulations at federal and regional level and little room for worker negotiations. This reduces differences in motivation and skills between men and women, key factors considered to be drivers of earnings.
- This analysis accounts for important information on nurses' job roles and employment, such as supervisory responsibilities and tenure with the employer, characteristics that previous studies have not been able to measure.
- Results of this study lend support for possible pay discrimination

and suggest that even in a predominantly public sector labor market with comprehensive compensation regulations, earnings differences by gender are not prevented with pay scales. Further, results suggest that better outside options for male nurses may play a role in the earnings gap in nursing.

1. Introduction

Nursing is a predominately female occupation. Even though the numbers of male nurses are slowly increasing across OECD countries, the share of male nurses remains around 10–15% of the nursing profession (Eurostat, 2015). Because nursing is the largest occupation within health care services, a substantial share of women in the labor force are nurses (U.S. Bureau of Labor Statistics, 2015). In the U.S., close to 3 million women are employed as registered nurses, approximately 4.5% of the total female labor force (U.S. Department of Labor, 2012). In Germany, approximately 700,000 nurses were actively practicing in 2011, constituting the largest nursing workforce in the European Union (Eurostat, 2015). A recent study reported male-female earnings differences for registered nurses of as high as $10,000 in the United States (Muench et al., 2015). A gap of $5148 persisted after taking into account demographic, human capital, and employment characteristics.

The aim of this study is to examine male-female earnings of nurses in Germany. Understanding and addressing differences in earnings by gender is important because differences in pay accumulate over a nurse's career and can lead to substantial disparities between genders, especially if they systematically affect one of the largest occupations for women.

The theoretical framework for this study is guided by theories of discrimination that have been posited within economics. Specifically, our study is informed by Phelp's and Arrow's Statistical Discrimination theory, grounded in the notion of stereotypes (Phelps, 1972; Arrow, 1973). Discrimination may arise because, on average, women take more time out of the labor force for family commitments and are thus perceived to be less stable employees. For this reason, even women who do not take time out from the labor force may experience discrimination in pay, hiring or promotion, due to the employer's beliefs about the group's average.

While the literature on the gender pay gap across the social and medical sciences is extensive (Blau et al., 2009a,b; Gravelle et al., 2011; Jagsi et al., 2013; Lo Sasso et al., 2011), only a handful of studies have conducted analyses in nursing (Jones and Gates, 2004; Kalist, 2002; Muench et al., 2016, 2015). Evidence suggests that the pay gap in nursing exists across clinical specialties (Muench et al., 2015) and that new graduate nurses are as affected as nurses unlikely to have left the labor force for child rearing (Muench et al., 2016). Our study adds to the literature by extending this research beyond the U.S. nursing labor market to the German nursing labor market. This allows us to examine a different set of possible explanations for the earnings gap that one cannot easily test in the U.S. context.

1.1. Background on nursing in Germany and study context

Empirically, studying the male-female earnings gap in the nursing labor market in Germany has two important advantages: first, German nurses are a relatively homogenous group of workers; second, the German wage structure of the health care sector which is predominantly public, is highly regulated, providing little to no latitude for workers to negotiate.

1.1.1. Homogenous study population

Compared to nurses in the U.S., German nurses are a homogenous group of workers for reasons related to its educational pathways and the roles available to nurses following their training. The standard pathway to becoming a nurse in Germany involves enrolling in a vocational school, which follows a country wide recognized curriculum established under federal law (Krankenpflegegesetz KrPflG) (Bundesministerium der Justiz und für Verbraucherschutz, 2016). In the U.S. nurses are incentivized to obtain a baccalaureate degree in nursing (BSN) as their entry qualification to practice nursing (IOM (Institute of Medicine), 2011). Despite the growth of BSN and other postgraduate programs in Germany over the last several years (Deutscher Berufsverband für Pflegeberufe (DBFK), 2014, 2016; Spitzer and Perrenoud, 2006), the share of graduates from these programs remains small compared with the total number of nurses who train through vocational programs.

Human capital theory suggests that education and experience are key explanatory factors to understanding earnings of workers (Becker, 1962). Occupations with wide variation in educational opportunities will attract workers with different motivations and skills, making it challenging to pinpoint reasons for observed differences in earnings between men and women, as motivation and skill are difficult or impossible to measure using survey data. Yet motivation and skill are important components of wage setting (Blau et al., 2009a,b). Professional opportunities for nurses beyond their clinical nursing roles are considerably greater in the U.S. compared to Germany, with a substantial number of nurses in the U.S. obtaining Master and PhD degrees and working as advanced practice nurses (APRNs), researchers, professors, administrators, and policy makers (U.S. Department of Health and Human Sercices Health Resources and Services Administration, 2010). Based on these differences in educational and professional opportunities between Germany and the U.S., economic theory posits that individuals who seek to become nurses in Germany are more similar to one another than nurses in the U.S. Thus, the traditional vocational pathway to becoming a nurse helps reduce motivational differences between men and women that we cannot observe in the data, making the German nursing labor market an ideal study setting.

1.1.2. Earnings structures

In Germany all professions, including nursing, are regulated by industry specific policies outlined in a collective agreement (Tarifvertrag für den öffentlichen Dienst, TVöD), which is developed by the *Vereinigung der Kommunalen Arbeitgeberverbände, VKA*, a national organization. This collective agreement sets forth tight pay scales with build in vertical and horizontal mobility based on job position and seniority (Vereinigung der kommunalen Arbeitgeberverbände (VKA), 2016). Overtime and holiday pay are also detailed in the agreement. While salary negotiations are conducted for industries at the federal level, the TVöD agreement leaves little margin for workers to negotiate and it is not common practice for workers to engage in negotiation for public sector employment (Deinert and Walser, 2015). This is beneficial for the purpose of this study as it establishes a level playing field for male and female nurses, given that studies have shown that men tend to be more successful at negotiations than women (Leibbrandt and List, 2012).

1.2. Study aim

If a male-female earnings gap exists for nurses even in the German context, we can be more confident, relative to the U.S. context, that gender differences in motivation, skills, and negotiations are not the primary drivers for the pay gap in nursing. In this study we examine male-female earnings for nurses in Germany using a nationally representative survey of registered nurses who are actively participating in the labor force.

2. Methods

2.1. Study design and setting

This is a pooled retrospective cross-sectional study of German

registered nurses who reported being in the active labor force in either 2006 or 2012.

2.2. Sample

Nurses between the ages of 21 and 65 who had received training as a registered nurse and were currently working in nursing were included in the study. The occupation nursing was identified using four digit occupation codes. This included nurses who completed a three-year vocational training program leading to the qualification of registered nurse. To ensure similar working characteristics among nurses we excluded nurses who reported working less than 8 or over 45 contract hours per week and earning less than $5 Euros per hour or over $6000 Euros per month. Trimming the sample in this fashion excluded outliers for extreme values on working hours and earnings and included approximately 1% of the sample. These outlier observations tend to be associated with male nurses and including them in the analysis would bias the earnings gap upwards. Non-licensed nurses and nurses with missing contract hours or missing monthly wage information were also excluded. The final analytic sample consisted of 411 nurses in year 2006 and 417 nurses in year 2012 for a total number of 828 nurses.

2.3. Data

We used data collected by the Federal Institute for Vocational Education and Training (BIBB) in partnership with the Federal Institute for Occupational Safety and Health (BAuA). The BIBB/BAuA employment survey is a nationally representative survey of the German active labor force and includes approximately 20,000 employees aged 15 and older who are in paid employment with at least 10 working hours per week across all occupations. Carried out for the first time in 1979, the survey is now in its sixth iteration. We used the two latest survey years, 2006 and 2012, as earlier years are not comparable. In addition to demographics and education, the survey collects a rich set of workplace characteristics, including detailed data on a respondent's present job, such as tasks, skills, responsibilities, contract details, hours worked, and income (Rohrbach-Schmidt and Hall, 2013). The survey also collects information on work history, such as educational and vocational qualifications prior to becoming a nurse.

2.4. Measures

Our outcome variable of interest is monthly earnings. In Germany, income is typically measured as gross income per month and does not include overtime earnings. We adjusted earnings for inflation using 2012 as the base year by applying the German Federal Bank conversion index. In our regression models, we use the natural logarithm of monthly earnings as our dependent variable. Using the natural logarithm reduces skewness in earnings distribution, and allows us to interpret the effect of the independent variables as percent changes rather than a constant Euros impact on earnings.

Our independent control variables can be broadly grouped into four categories: demographic characteristics, human capital characteristics, employment characteristics, and geographic and time controls. *Demographic* characteristics included marital status (married/living together, single, separated/widowed); whether children live in the household (0/1); and if the nurse is German (0/1). Our *human capital* attributes were education, experience and hours worked. Education captured the highest education obtained (lower secondary education, lower secondary with further continuing education, secondary education, secondary education with further continuing education, university degree). Lower secondary education is the entry requirement to enroll in a three-year nursing program leading to the qualification of registered nurse in Germany. Experience was measured by two variables: potential nursing experience and potential labor market experience. Nursing experience was defined as years since completing nursing

training, and labor market experience was defined as years since highest education. We also included a binary variable indicating a period of career inactivity and an indicator variable for having obtained continuing education since qualifying as a nurse. The contract hours worked per week, a key explanatory factor to workers' earnings and closely related to productivity and accumulated experience, were included as a continuous measure. Further, we included whether a nurse worked overtime as a potential proxy for motivation and productivity. This binary variable indicated when a nurse had worked more hours last week than the hours specified in their contract.

Characteristics related to *employment* were specialty area, firm size, years with the employer, whether the nurse works shifts, and skills carried out in the current job. We were able to control for four clinical specializations including general nurse, operating room nurse, anesthesia nurse, and other. Psychiatry, midwifery, and labor/delivery were grouped into other due to small sample sizes or complete lack of men in those specialty categories. Firm size was measured in four groups ($< 100, < 500, < 1000, > 1000$). We captured differences in hospital sector with a categorical variable indicating public or private.

The BIBB/BAuA survey asks about a range of skills/roles carried out on the job, but these are non-occupation specific. Of those skills we identified four with relevance to nursing: managerial responsibilities, leadership responsibilities, use of technology, and the number of people that a nurse supervised. All were measured as binary indicator variables, except the number of people supervised, which was kept continuous.

We adjusted for *geographic* variations in earnings using both a binary rural/urban indicator and east/west indicator. We chose the east/west variable over Germany's sixteen federal states because previous research showed that earnings variations are well adjusted with the east/west control (Gernandt and Pfeiffer, 2007). Finally, we included binary variables for each survey year to account for time effects between 2006 and 2012. All continuous variables were mean-centered, estimating the earnings differences for nurses at their average: age, number of years of experience, number of years of potential labor market experience, number of years with the employer, and number of employers supervised.

We conducted follow-up analyses of potential factors that might contribute to explaining earnings differences. The measures used were number of nightshifts worked, number of years with the employer, and monthly earnings for nurses not currently working in nursing.

2.5. Statistical analysis

Summary statistics are reported by gender and assessed for significant differences using χ^2 for categorical data and 2-sample t-tests for continuous data. We estimated male-female earnings with an ordinary least squares regression (OLS). Our models were built in stages; each iteration incorporated additional explanatory variables. The final adjusted model included demographic variables, human capital attributes, employment characteristics, skills and motivations, and geographic and time controls and was of the following form:

$$\ln(\text{monthly earnings}) = \beta_0 + \beta_1(gender) + \beta_2(dem) + \beta_3(humancap)$$
$$+ \beta_4(employ) + \beta_5(skills) + \beta_6(geo) + \beta_7(yr) + \varepsilon$$
$$(1)$$

where *gender* denotes whether the nurse was male or female; where *dem* is a vector of variables of the following demographic characteristics: marital status, child status, foreign; where *humancap* denotes a vector of the following human capital characteristics: education, years of experience since nursing training, years of experience since graduated from highest education, experience squared, career inactivity, contract hours, and overtime worked last week; where *employ* represents a vector of the following workplace characteristics: specialty, firm tenure, hospital size, and hospital sector; where *skills* represents four skills

Table 1
Overview of analysis.

Dependent Variable	Log of monthly earnings					
	1	2	3	4	5	6
Female coeff (SE)*						
Demographics		X	X	X	X	X
Human Capital			X	X	X	X
Work Characteristics				X	X	X
Skills					X	X
Geographic Characteristics						X
Survey year						X

related to nursing; where *geo* describes a vector of the following geographic attributes: rural/urban status, east and west status, and where *yr* indicates each survey year; and where ε captures unobservable characteristics. Table 1 shows an overview of the models estimated.

In these models the dependent variable was specified in logs following the conventional approach in labor economics and the independent variables were modeled as percent returns. Coefficients from these regressions are interpreted as percent changes in monthly earnings arising from a one-unit change in the independent variable when holding all other variables constant. All analysis were weighted according to the BIBB/BAuA survey guidelines (Rohrbach-Schmidt and Hall, 2013) and were conducted with STATA 14.

Finally, for follow-up analyses of potential factors that might explain differences in earnings we tested the means for male and female nurses working nightshifts, years with the employer, and monthly earnings for nurses not working in nursing.

3. Results

3.1. Sample characteristics

The sample characteristics of the nurses in our data are shown by gender in Table 2. Unadjusted female monthly earnings were significantly lower than male earnings (2264 vs. 2951 Euros, [95% CI, women 2197–2330 Euros, men 2781–3121 Euros; $p < 0.001$]). Demographic characteristics differed between male and female nurses on their marital status. While the majority of both male and female nurses were married more women reported being either single or separated/widowed than men. There were no differences by gender for children in the household and whether the nurse was from Germany. The educational background of the men and women in our sample was, as hypothesized, similar. Approximately 45% of nurses of both genders had completed lower secondary education and roughly 30% had achieved upper secondary qualification.

Female nurses contract hours were 5.6 h less per month than male nurses hours, while women had, on average, 4 more years of nursing experience. More nursing experience for women is typical because women tend to enter their nursing careers as their first career whereas men are more likely to choose nursing as a second career path. The majority of nurses worked as a general nurse and had spent, on average, 15 years with their present employer. Fewer women worked in large hospitals of > 1000 employees compared to men. While approximately equal proportions of women and men reported working with technology and being involved with leadership activities, a greater share of men reported carrying out managerial tasks. The number of people that male and female nurses supervised was similar between the groups.

3.2. Multivariate regression analysis

Table 3 shows detailed OLS results with an increasing set of control variables from column 1–5. Column 1 presents a regression without controls. In this specification, male nurses out-earn female nurses by

Table 2
Sample characteristics by gender.

	Male		Female		
	N	% (mean, SD)	N	% (mean, SD)	p value
Outcome variable					
Monthly earnings	106	2951.5 (85.9)	722	2264.022 (33.9)	< 0.001
Demographics					
Marital Status	106		722		< 0.001
Married/Living together	56	52.8	380	52.6	
Single	41	38.7	188	26.1	
Separated/widowed	9	8.5	154	21.3	
Children in HH					0.340
No	70	66.0	442	61.2	
Yes	36	34.0	280	38.8	
German speaking					0.274
No	4	3.8	47	6.5	
Yes	102	96.2	675	93.5	
Human Capital					
Education					0.410
Lower Secondary	47	44.3	336	46.5	
Lower Secondary +	18	17.0	91	12.6	
Upper Secondary	28	26.4	233	32.3	
Upper Secondary +	5	4.7	27	3.7	
University	8	7.6	35	4.9	
Additional training					0.047
No	68	64.2	530	73.4	
Yes	38	35.9	192	26.6	
Hours/Productivity					
Weekly contract hours	106	36.9 (4.8)	722	31.4 (9.1)	< 0.001
Overtime hours last week	52	49.1	354	47.8	0.807
Experience					
Nursing exp	106	17.5 (10.5)	722	21.9 (10.2)	< 0.001
Labor market exp	106	21 (10.1)	722	23.5 (10.2)	0.017
Career break					0.001
No	60	56.6	281	38.9	
Yes	46	43.4	441	61.1	
Work Characteristics					
Specialty					0.076
General nurse	82	77.4	512	70.9	
OR	5	4.7	41	5.7	
Anesthesia	5	4.7	14	1.9	
Other	14	13.2	155	21.5	
Yrs w employer	106	14.2 (9.4)	722	15.9 (10)	0.078
Firm size					0.221
< 100	18	17.0	182	25.2	
< 500	30	28.3	200	27.7	
< 1000	18	17.0	123	17.0	
> 1000	34	32.1	168	23.3	
Sector					0.513
Public	76	71.7	495	68.6	
Private	5	4.7	24	3.3	
Other sector	25	23.6	203	28.1	
Skills					
Managerial	48	45.3	258	35.7	0.057
Technology	50	47.2	350	48.5	0.802
Leadership/business	31	29.3	205	28.4	0.856
Number of people supervised	106	5.9 (10.6)	722	5.1 (15)	0.607
Geography					0.173
Population size	44	41.5	223	30.9	
500k-1mill					
100-499k	27	25.5	233	32.3	
50k-99k	11	10.4	86	11.9	
< 50k	24	22.6	180	24.9	
East	19	18.0	147	20.4	0.559

31% ($p < 0.001$). Columns 2–5 correspond to the 4 variable categories described above, demographics, human capital, employment, and geographic and time characteristics. As we enter variables in sets, regression coefficients stay stable with a gender earnings gap between 9

Table 3

Ordinary least square regression results of monthly earnings differences between male and female nurses.

Variables	Model 1 Coeff.	Signif.	Model 2 Coeff.	Signif.	Model 3 Coeff.	Signif.	Model 4 Coeff.	Signif.	Model 5 Coeff.	Signif.	Model 6 Coeff.	Signif.
Female	−0.305	***	−0.314	***	−0.113	***	−0.09	**	−0.099	***	−0.093	***
Demographics												
Marital Status												
Married/Living together			Ref		Ref		Ref		Ref		Ref	
Single			0.099	**	0.032		−0.003		0.012		−0.009	
Separated/widowed			0.092	**	−0.001		0.019		0.021		0.012	
Children in HH												
No			Ref		Ref		Ref		Ref		Ref	
Yes			−0.197	***	0.026		0.035		0.031		0.031	
German speaking												
No			Ref		Ref		Ref		Ref		Ref	
Yes			−0.181	***	−0.097	**	−0.107	**	−0.107	**	−0.079	*
Human Capital												
Education												
Lower Secondary					Ref		Ref		Ref		Ref	
Lower Secondary +					−0.016		−0.006		−0.039		−0.008	
Upper Secondary					0.044		0.026		0.034		0.05	*
Upper Secondary +					0.139	**	0.118	*	0.105	*	0.119	*
University					0.048		0.041		0.027		0.063	
Additional training					0.072	**	0.038		0.029		0.017	
Hours/Productivity												
Weekly contract hours					0.036	***	0.037	***	0.036	***	0.038	***
Overtime hours last week					0.087	***	0.089	***	0.079	***	0.07	***
Experience												
Nursing exp					0.017	***	0.018	***	0.018	***	0.019	***
Labor market exp					0.002		0.004		0.003		0.002	
Career break												
No			Ref		Ref		Ref		Ref		Ref	
Yes					−0.047		−0.04		−0.034		−0.02	
Work Characteristics												
Specialty												
General nurse							Ref		Ref		Ref	
OR							0.109	*	0.132	**	0.148	**
Anasthesia							0.137		0.128		0.126	
Other							0.121	***	0.12	***	0.124	***
Yrs w employer							−0.002		−0.002		0	
Firm size												
< 100							Ref		Ref		Ref	
< 500							0.095	***	0.087	**	0.078	**
< 1000							0.134	***	0.126	***	0.106	***
> 1000							0.157	***	0.144	***	0.126	***
Sector												
Public							Ref		Ref		Ref	
Private							−0.099	***	−0.112	***	−0.096	***
Other sector							−0.061		−0.091		−0.061	
Skills												
Managerial									0.078	***	0.074	***
Technology									0.037		0.028	
Leadership/business									0.067	***	0.03	
Number of people supervised									0	***	0	***
Geo/time Characteristics												
Rural/urban status											YES	
East											YES	
Year											YES	
Constant	7.922	***	8.142	***	7.898	***	7.823	***	7.781	***	7.877	***
Observations	828		828		828		828		828		828	
R-squared	0.055		0.131		0.563		0.615		0.627		0.653	

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

and 10% and with predictors able to explain 65% of the variation in monthly earnings. While this R squared may seem high, it is due to hours in the model explaining almost two-thirds of the variations in earnings, which is typical.

4. Discussion

Using data from a nationally representative sample of the German active labor force, we found that male nurses out-earned female nurses by 10%. One potential explanation for this male-female earnings gap could be that because male nurses work more hours than female nurses they accumulate more experience over time, leading to higher earnings. To test whether the female-male pay gap is a function of differences in experience, previous research examined the gender earnings gap in a sample of newly trained nurses in the U.S., when experience between workers is more similar than at any other point during the career. Results showed that recent-graduate male nurses who obtained a nursing degree within the last two years had higher earnings than their recent-graduate female colleagues (Muench et al., 2016). We were not able to examine the earnings of recent graduates in this study, as our

sample was not large enough for the analysis of subsets of the sample.

Another potential reason for the gender earnings gap in nursing is motivational differences between male and female nurses. Even though examining male-female earnings in German nurses reduces many of the motivational differences that are inherent in countries with greater vertical workplace mobility for nurses, such as in the U.S. and U.K., motivational differences likely existed. Studying both part-time and full-time workers, a research design choice we made to maximize sample size, does introduce worker heterogeneity in motivation. For example, it is possible that systematic differences by gender existed in the numbers of nightshifts worked, which generate extra pay and could contribute towards explaining earnings differences. Further, economic theory suggests that workers can build human capital and increase wages through changing jobs, signaling high motivation through job mobility. We conducted a follow-up analysis examining both the likelihood of working nightshifts and job tenure with the employer. However, we did not find evidence that male nurses were more likely to work nightshifts or that male nurses stayed with the same employer for shorter periods than female nurses.

Still, there are likely other unobservable characteristics between men and women that affect earnings. For example, Muench and colleagues found in their U.S. sample of full-time nurses who changed jobs the previous year that even though there were no systematic differences between men and women with regards to having changed jobs for promotion, a greater proportion of male nurses reported having changed for pay (Muench et al., 2016). Such differences by gender are more likely to be present between part-time and full-time workers. Given that the women in our study worked significantly fewer hours, these and other unobserved motivational differences could possibly have overestimated the male-female earnings gap in these data.

Finally, economic theory postulates that better outside options for men contribute to earnings differences between men and women. If men are able to generate better offers outside of nursing than women can, employers may need to offer men higher earnings to retain them, thus leading to male nurses gaining higher pay in response. While we were unable to directly observe nurses' outside offers, the BIBB/BAuA survey asks nurses who are currently working outside of nursing for their earnings information. Male nurses who no longer worked in nursing earned salaries 16% points higher than the average male nurse salary working in nursing. Conversely, female nurses who no longer worked in nursing reported earnings 6% points lower than the average female nurse salary. This may provide evidence that in the German nursing labor market male nurses have better outside options than women nurses do and that this may, in part, explain the pay gap observed in these data.

The employer's choice to hire a male nurse over a female nurse in a labor market with tight hospital budgets and an adequate supply of nurses – as is the case in Germany – is likely determined by multiple factors, such as employer, patients, and nurse preference, attempts to diversify the workforce, and men's physical strength advantage, among other factors. However, Germany's compensation regulations at the federal and regional level and negotiations for pay by unions and local municipalities should successfully prevent earnings differences by gender. It suggests that gender discrimination in earnings might play a role and that the factors that determine pay scales for nurses provide loopholes that can lead to male-female pay differences.

4.1. Study strengths and limitations

This study utilized survey data and as such relies on accuracy of participant reporting. The BIBB/BAuA survey is a representative sample of all workers in the active labor force in Germany, and yields relatively small samples by occupation. Therefore, we were limited in the subanalyses we were able to conduct. For example, the study design would have further reduced motivational differences in skills if the analysis had been conducted on full-time nurses only. We would also like to

emphasize that the analysis conducted tested an association and our results cannot be interpreted as causal effects. Further, because the survey encompasses all occupations, information collected on tasks are non-occupation specific, including higher-level tasks applicable to most occupations. Nursing specific tasks would likely have captured differences in skills by gender more precisely. However, other survey data available to study earnings, such as census data that generate large samples, do not include any employment related factors. Because employment characteristics are substantial explanatory factors in earnings, a major strength of this study is that we can adjust our analysis for employment characteristics. Other strengths are that conducting this analysis on German data provides a study setting with a homogenous labor force population, reducing differences in motivation and skills between male and female nurses and thus allowing for other potential explanations to surface.

4.2. Conclusions

Male nurses out-earned female nurses by approximately 10% (or approximately 260 Euros a month/3100 Euros per year) in Germany, a homogenous nursing labor market characterized by federal pay regulations developed specifically for the nursing profession as part of the public sector where minimal negotiating opportunity, if any, exists. Previous findings documented that earnings differences in nursing cannot be explained by: women taking time out of the labor force, male nurses' physical strength advantage, and male nurses accruing more experience over time. The results of our study taken together with previous findings, suggest that gender differences in motivation and skills are also not likely to be the key drivers of earnings differences in nursing. Our results support two plausible explanations, better outside options for male nurses and gender discrimination in pay. One would expect pay scales to counteract the outside option effect.

Nursing is the largest health care occupations in every country and as such a gender pay gap in nursing affects a sizable share of women in the labor market globally. A combination of federal and local approaches seems warranted to address possible gender pay discrimination, including efforts to narrow pay scale margins, annual firm compensation review with equity adjustments, and open-pay policies.

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