

Wages of Nurturant and Reproductive Care Workers: Individual and Job Characteristics, Occupational Closure, and Wage-Equalizing Institutions

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ABSTRACT

Despite the work's social importance, nurturant and reproductive care workers earn less than others with comparable human capital and work demands. We explore three broad questions related to pay for care work. First, we examine nurturant and reproductive care penalties together to investigate what mechanisms produce the lower wages for these workers. Second, we examine how occupational closure through education credentials and licensing requirements creates varying returns to care work. Finally, we explore the roles of wage equalizing institutions—labor unions and government sector care provision—in reducing wage disparities associated with care work. Using the 1979–2012 waves of the National Longitudinal Survey of Youth (NLSY) and fixed-effects regression models, we find that selection on stable factors and human capital differences explain much of the lower wages for reproductive workers, but none of the low wages of nurturant workers. However, compared to non-care workers, college-educated nurturant care workers receive lower returns to work experience, suggesting limitations in how much learning can increase efficiency in care work, given the labor intensive, face-to-face nature of much of it. Occupational closure matters: care jobs with the highest educational and licensing requirements pay a wage bonus, while less closed care occupations incur a penalty. Wage equalizing institutions have both floor and ceiling effects on care worker wages that mitigate care penalties for selected workers: women reproductive workers and women in low-education/high-licensing occupations. More consistently, ceiling effects of these institutions lower the wages of otherwise higher paid care workers: nurturant and high-education/high licensing occupations.

KEYWORDS: care work; wage penalty; occupational closure; human capital; gender.

Care work is central to the daily survival and future prosperity of human society. Historically in the United States, unpaid family members or private domestic workers provided this care in the home. Paid care work has grown dramatically with the expansion of women's paid employment and

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concomitant need for childcare, and the increasing proportion of the elderly population in need of medical and other care. With the shifting of care provision from the family to the market, scholars have shown increasing concern over care supply and the labor market outcomes of care workers (Barron and West 2013; Dill, Glynn, and Rakovski 2016; Dodson and Zincauge 2007; Duffy 2005, 2007, 2011; Dwyer 2013; England, Budig, and Folbre 2002; Findlay, Findlay, and Stewart 2009; Folbre 2001; Glenn 1992; Hondagneu-Sotelo 2001). One strand of this research documents that care workers earn less than non-care workers with comparable skills, education, work experience, and work conditions (Barron and West 2013; Budig and Misra 2010; England 1992; England et al. 1994; England et al. 2002; Hirsch and Manzella 2015). In addition to negative impacts on individuals' wages, the care sector's growth in the late twentieth century is implicated in growing job polarization in the U.S. labor market: The bifurcated nature of care jobs contributed to the rise of both low-paid, reproductive care jobs and high-paid, high-qualification nurturant work in medical fields (Dwyer 2013).

Most studies of care wage penalties have centered on what we call “nurturant care work.” Nurturant care is work in occupations where workers provide face-to-face services that strengthen the physical health and safety or the physical, cognitive, or emotional skills of those they serve (Budig and Misra 2010; England et al. 2002; England and Folbre 1999). Nurturant care occupations tend to be female dominated, and many of them have high levels of professionalization, human capital, and have high interactional requirements. Nurturant care includes childcare providers, nursing assistants, classroom teachers, midwives, family physicians, psychiatrists, and religious workers. The wage penalty for nurturant care is 5 to 6 percent, controlling for numerous human capital and job characteristics (England et al. 2002).

A second form of care work, reproductive care, includes paid work—such as cleaning, food preparation, food service, and laundry—that is similar to the non-interactive portions of housework in that it ensures the daily maintenance and reproduction of the labor force and others (Duffy 2005, 2007, 2011; Glenn 1992). Reproductive care occupations tend to require less direct interaction and have lower human capital requirements relative to nurturant care work. Reproductive workers include barbers and cosmetologists, janitorial and laundry workers, domestic workers, and bakers, cooks, and food servers (Duffy 2005, 2007, 2011; Dwyer 2013). While nurturant care work employs high numbers of white women, reproductive care tends to employ higher proportions of black and Latino workers (Duffy 2005, 2007, 2011; Glenn 1992). Despite differences between nurturant and reproductive care, all of these occupations fall under the umbrella of “care work” by providing essential services for human health, development, and maintenance, yet many are subject to lower wages compared to non-care work.¹

A substantial proportion of care work is unpaid; however, employed care workers comprise a growing segment of the paid work force. Duffy (2011) estimates that the proportion of all employed people who are nurturant care workers rose from 3 percent in 1900 to more than 13 percent in 2007, with comparable growth in reproductive care workers from 2 to 8 percent over the same period.

While the fact of a care wage penalty is established (England et al. 2002), systematic tests of the mechanisms producing the penalty are lacking. Moreover, most studies have not distinguished nurturant and reproductive care when estimating penalties, despite the fact that the mechanisms producing their penalties may be distinct. Drawing on the work of Paula England, Michelle Budig, and Nancy Folbre (2002), Mignon Duffy (2005, 2007, 2011) and Rachel Dwyer (2013), our study

1 Other scholars measure care differently. Using O*NET occupational attributes, Hirsch and Manzella (2015) create a “care index” that scores occupational skills on three factors: “assisting and caring for others,” “concern for others,” and “developing and teaching.” While measuring caring skills, the resultant occupational sorting is confusing across factors (e.g., relative to childcare workers, ambulance drivers and clergy score higher on “assisting and caring” and lower on “concern for others”). Alternatively, Barron and West (2013) group care and non-care occupations into 19 socioeconomic groups. While this approach increases the similarity of care and non-care occupations compared, some care occupations, such as nurses, have greater variability and less precision in their occupational matches, forcing suboptimal non-care comparison groups.

examines wage penalties for both types of care work. We use fixed-effects regression models to extend the analysis of [England and colleagues \(2002\)](#), the only prior study on care work wages to use this method. While they analyzed workers through their mid-30s, our analysis covers work histories across most of the life course until age 55. This allows us to more completely capture the penalty for care work, and estimate whether returns to experience over a career are distinctive for care work.

We take a three-pronged approach to investigating the mechanisms shaping the wages of care workers. First, we consider whether mechanisms hypothesized to explain the lower wages of nurturant care workers might explain the wages of reproductive care workers. Here we draw on past research ([England et al. 2002](#)) to investigate the role of selection into care work, human capital, and occupational gender composition in producing lower wages. Secondly, we draw upon [Kim Weeden \(2002\)](#) to examine how occupational closure through education and licensing requirements mitigate the care penalty for four subgroups of care workers who differ by licensing requirements and educational credentialing. Finally, we look at the efficacy of labor unions and public sector care provision to raise the wages of care workers relative to non-care workers. We begin by reviewing the major theoretical arguments for the care penalty and how it varies. We explain our methods before moving to our results.

BACKGROUND

Do Mechanisms Implicated in the Low Wages of Nurturant Workers Apply to Reproductive Workers?

Past research on the wages of nurturant care workers has examined the roles of selection into care work, human capital differences between care and non-care workers, and occupational gender segregation. We investigate whether these mechanisms apply to explain the lower wages of reproductive workers.

The first set of explanations for the lower wages of nurturant care workers relate to selection processes ([England et al. 2002](#)). This argument posits that care workers either self-select into care work based on their tastes for caring, or that care workers are negatively selected. In the first version of the selection argument, care workers are thought to tolerate lower earnings because there are nonpecuniary aspects of care work that serve as compensating differentials in satisfying their tastes or preferences for particular kinds of work ([England et al. 2002](#)). Related is the assumption that because care work is often provided “freely” in the domestic sphere, through some combination of love and/or obligation, a cultural norm has arisen dictating care provision should be its own reward even when performed for pay. This argument has been applied to nurturant care workers (nurses, teachers, religious workers, etc.) who may derive emotional and social satisfaction from their interactions with nurturant care recipients ([England et al. 2002](#); [Folbre 2001](#)). However, it is less clear how many groups of reproductive workers (cleaners, food preparation, laundry workers, etc.), who do not provide face-to-face services, would derive any greater satisfaction from their jobs than non-care workers would. Moreover, while it may be true that some workers are in care occupations due to their tastes for care work, it is equally likely that some workers are in non-care occupations because of their distaste for care work and their tastes for other kinds of work (see [Nelson 1999](#) for a similar argument).

The second version of the selection argument suggests that care workers may earn less because unobserved differences between care and non-care workers—such as career ambition or difficulty holding down a job—that predict lower earnings may also predict care work employment, resulting in a spurious relationship between care work and earnings. This may be particularly salient for reproductive care workers, who largely occupy low-skill jobs with few entry barriers, making it likely that some workers are in these jobs because they couldn’t get any others, again, due to characteristics such as cognitive skills that are unmeasured in our data. Both versions of the selection arguments lead us to predict:

H1a: If there is differential selection into care work, based on tastes for caring or negative worker characteristics not measured by researchers, care work wage differentials should be smaller in models that control for unobserved differences on stable characteristics.

To test this, we compare the effect of care work on wages from OLS against person and year fixed-effects regression models. Fixed-effects models implemented on panel data, which control for stable unobserved differences among respondents, should produce smaller care differentials than analogous OLS models if H1a is supported.

Time-varying human capital may also influence the relative wages of care workers. If so, the lower pay for care work may be explained by care workers having less education, less experience, or less seniority (i.e., less experience in the organization in which one is currently employed) than non-care workers do. It is also possible that care workers are more likely to work part time, or to have held many jobs, and that these factors depress hourly wages. Finally, at least some types of care work may require less cognitive skill than non-care jobs, and this could explain lower pay in the jobs. We expect that all these claims may be particularly true in the case of reproductive care jobs, given that these jobs tend to have low experience and educational requirements. Thus, we predict:

H1b: If differences in the human capital, labor supply of care workers, or the skill demands of care work lower the wages of care workers, the effect of care work on wages should be smaller in models that include time-varying measures of these factors.

Whether there are differences in the amounts of experience or seniority held by care and non-care workers, the wage returns to these forms of human capital may differ for the two groups. In theory, experience or seniority increase both the quality and the quantity of employee-produced goods or services, leading employers to reward pay accordingly. However, differences in care quality are hard for employers to measure and reward, and this may be particularly true for face-to-face nurturant care services. Moreover, quality and quantity are trade-offs in nurturant care work because it is less amenable to automation (Razavi 2007). Due to its intensive labor demands, there are limits on how quickly and how much nurturant care can be performed in a finite period. “Speeding up” the work process, either by making workers perform faster or by increasing the ratio of care recipients per worker, leads to high levels of worker turnover and lower levels of quality (Folbre 2001; Lopez 2007). Thus, workers with greater experience in nurturant care occupations, while potentially performing higher quality care, may not perform quantitatively more care than less experienced or qualified care workers.

Past research has found that returns to experience are steeper for highly educated workers (England et al. 2016; Killewald and Gough 2013). This may be because greater education not only imparts skills, it also teaches individuals how to learn more with experience, which should increase productivity. However, as argued above, while learning can lead to higher quality nurturant services, the face-to-face nature of the work means that it is hard to achieve efficiencies in the quantity of people served. This implies that the limitations on achieving efficiencies in the care sector should impact highly educated workers more, relative to less educated workers. In other words, the difference in the returns to experience for nurturant care and non-care work will be larger among college graduates relative to non-college workers. Thus:

H1c: Returns to work experience will be less positive for nurturant care workers relative to non-care workers, and this relationship will be stronger among college graduates relative to non-college workers.

To examine this, in one analysis, we divide the sample into non-college and college graduates and test whether returns to experience differ among nurturant and non-care workers in each educational group.

Another explanation for the nurturant care penalty is that it is highly gender-segregated work, and occupations dominated by women systematically pay less, all else equal, compared to male-dominated or gender-balanced occupations (England 1992; Folbre 2001). While reproductive care occupations are somewhat less feminized than nurturant care occupations, both are more feminized than non-care workers. Thus, adjusting for the gender composition of occupations may partially account for the care penalties observed. Indeed, Barry Hirsch and Julia Manzella (2015) find that the pay penalties for caring skills decline when occupational composition is included in their regression models.² This leads us to predict:

H1d: If the higher percent of care work that is done by females (compared to non-care work) is responsible for some of the lower pay of care work, the effect of working in care work on wages should be smaller in models that include a measure of gender composition of occupations within industries.

Do Care Penalties Vary by the Degree of Occupational Closure?

Not all care occupations are associated with depressed wages. For example, Janette Dill, Kim Price-Glynn, and Carter Rakovski (2016) found that in highly credentialed health care work, male incumbents incur no penalty. Occupational barriers to employment, such as education and licensing, restrict the labor pool for specific occupations and may drive up relative wages. Weber's theory of social closure, elaborated by Weeden (2002), posits that occupational incumbents "construct and defend social and legal boundaries that, in turn, affect the rewards of their members" (p. 59). Occupational closure primarily operates through mechanisms that constrain the labor supply to occupations. These mechanisms include *licensing*, where state regulations or professional associations enforce barriers on labor supply, and *educational credentialing*, where employer's requirements restrict who enters the occupation (Weeden 2002). Notably, unlike educational credentials, licensing requires periodic renewal and continuing educational development. Each of these strategies is associated with higher wages. Variation in wage returns among different types of care work may operate according to different mechanisms of social closure across occupations. David Barron and Elizabeth West (2013) applied the social closure argument to British nurturant care workers and found that occupations requiring higher education and membership in professional associations fared better in terms of wages. These higher-paying care occupations were medicine, teaching, and nursing; in contrast, social welfare and childcare workers fared worse with respect to wages. Similarly, in her cross-national study limited to health care and education workers, Naomi Lightman (2017) found systematic nurturant care penalties for low-social closure workers and care bonuses for high-social closure workers. We expand on these two studies by examining a wider array of care workers, including reproductive care workers.

To examine the effects of occupational closure on raising the wages of subgroups of care workers, relative to comparable non-care workers, we divide care workers into four occupational/industrial groupings delineated by licensing and educational occupational barriers. Detailed occupational titles for the four groups described next appear in Appendix Table A1. This classification, used in some of our analyses, cuts across the distinction between nurturant and reproductive care; to keep things

2 In addition to being disproportionately staffed by women, people of color are overrepresented among care workers. Marginalized women—who face hiring and wage discrimination due to their nativity and race/ethnicity, as well as their gender—carry out much poorly paid care work, particularly domestic work and home-based childcare and eldercare (Duffy 2005, 2007, 2011; Glenn 1992; Hondagneu-Sotelo 2001). To examine whether care penalties varied by race/ethnicity, we tested for statistical interactions between race/ethnicity and care measures in all models. Results are available upon request. While the OLS model found greater nurturant and reproductive penalties for minorities, blacks and Latino/as did not incur significantly larger penalties in any fixed-effects model. These findings do not deny the possibility that discrimination against women of color and/or immigrant women leads them into care work, which lowers their wages. The lack of an interaction simply shows us that the penalty for doing care work is the same for (non-Hispanic) whites, (non-Hispanic) blacks, and Hispanics, and that wage penalties for membership in race/ethnic categories are the same within and outside of care work.

simple, when we assess whether credentialing and licensing affect the care penalty, we ignore whether care work occupations are nurturant or reproductive, and focus on the extent to which they are characterized by credentialing and licensing. The high-education/high-licensing category includes three groups of nurturant care, all of which are medical occupations: physicians and surgeons, other doctors (e.g., dentists and chiropractors), and high-skill other medical (e.g., PAs, RNs, therapists). All of these occupations require bachelor's degrees or higher, significant residency/internship training, continuing education for license renewal, and standardized testing for initial licensure and renewals. The second category of occupational closure is the high-education/low-licensing category, whose occupations also require a college degree or more, and may have certifications or licenses, but the absence or lapse of these credentials do not disbar employment in the occupation. These care occupations include educators (professors, K-12 teachers) and "other care high skill" (e.g., clergy and librarians). The third occupational closure category is low-education/high-licensing category, which includes low-skill medical occupations (e.g., EMTs, LPNs, and massage therapists), childcare providers, and some reproductive care occupations, such as body care workers (e.g., cosmetologists, barbers). These occupations do not require college degrees, but do require specialized training leading to licensure, and require regular renewal of licenses in order to continue employment. Finally, our last category of occupational closure for care workers is the low-education/low-licensing category, which includes low-skill other nurturant labor (e.g., teacher's aides, religious workers, welfare service aides), and a set of reproductive care occupations: domestic work, food preparation, food service, and cleaning. This final category of occupations has minimal education requirements and licenses to practice are largely absent. To ensure that we are measuring occupational closure mechanisms and not just overall cognitive skills demanded by jobs, skills that may affect pay independently of degree of occupational closure, we include an occupational average measure of cognitive skill from the *Dictionary of Occupational Titles* (England 1992). This measure also adjusts for educational demand differences between care and non-care occupations.

Considering this array of occupations along education and licensing barriers, we predict:

H2: The most occupationally closed category of care workers, high-education/high-licensing, will incur a smaller penalty or even a wage bonus, while other care work will incur a significantly larger wage penalty.

Can the Public Sector and Unions Equalize Wages for Care and Non-Care Workers?

Care work may pay less because private sector companies cannot fully charge all the beneficiaries of care workers. While care work directly benefits the recipient, it frequently has spillover effects that benefit society more broadly (England 2005; Folbre 2001). For example, care provided by teachers in developing students' cognitive skills benefits the students directly. Indirectly, this care benefits the student's future family, employers, and community, all of whom benefit from the knowledge the former student brings to all their activities. As a public good, scholars argue care will be underprovided and perhaps underpaid in the private sector because companies cannot charge those who benefit from these spillover effects (England 2005; Folbre and Nelson 2000). The vulnerability of many care recipients hampers their ability to pay for care services, also limiting profitability or unsubsidized sustainability of this type of work (England et al. 2002); those who need care are disproportionately children, elderly, or sick.

Given these limitations on the profitability of care services in the private sector, we consider the roles of public sector employment and labor unions in shaping the care wage penalty. These institutions often set wage floors and ceilings on workers in public employment and in unionized settings (Duffy 2005; Hirsch and Manzella 2015). Jobs that are unionized or in government are less likely than private sector or nonunionized jobs to pay very low or very high wages due to the greater legal and public scrutiny they face (Kearney and Carnevale 2001). Governments are less bound by what is

profitable because they tax to raise money for the salaries of care providers (although they are constrained by the willingness of elected legislators to tax citizens). Given the tendencies of labor unions and government employment to create wage floors and ceilings, we expect that public provision is more likely to raise the wages for very low paid reproductive care workers, but may have no effect on or could even lower wages for highly paid care workers, such as high-education/high-licensing care occupations. Because care work contains very low and very high paying jobs (Dwyer 2013), we formulate a series of hypotheses about how the wages of subtypes of care work are affected differently by whether their incumbents work in unionized or public sector settings. Underlying each of these hypotheses is the same logic—low-wage care work will have its care penalty reduced by being unionized or in the public sector (floor effects), while high-wage care work will have these high wages lessened (ceiling effects). Based on past scholarship, we expect the lower paying care work to be reproductive care (Duffy 2011; Dwyer 2013) and care occupations with lower degrees of social closure (Weeden 2002). Similarly, we expect higher paying care categories will be nurturant care and more closed care occupations (Dwyer 2013; Weeden 2002).

With respect to public sector employment, first classifying care into reproductive versus nurturant care, we predict:

H3a: The reproductive care penalty will be smaller in the public sector than in the private sector, due to the wage floors found in the public sector. However, in nurturant care occupations, the care penalty will be larger in the public sector relative to the private sector, due to ceilings on public sector wages.

Next, classifying care by occupational closure categories, we predict:

H3b: In less closed care occupations, the care penalty should be smaller in the public sector, relative to the private sector, due to the wage floors found in the public sector. However, in the high-education/high-licensing occupational closure category, the care penalty will be larger in the public sector relative to the private sector, due to ceilings on public sector wages.

Lower-skill occupations that are unable to achieve closure through educational and credentialing barriers may utilize worker unions to restrict the pool of labor and raise wages, such as in the case of home-care workers (Boris and Klein 2006). Indeed, low-wage care workers increasingly populated the labor movement in the final decades of the twentieth century (Boris and Klein 2010). Other care occupations, notably K-12 teachers, have had historically high rates of union membership. Union membership should raise the wages of care workers, particularly low-wage care workers (floor effects), whether nurturant or reproductive. However, while supporting the wages of less skilled workers, unions may dampen the wage gains in high-skilled care occupations (ceiling effects) (Card 1996, 2001). The wage equalizing effects of unions are implicated in the finding that, among highly educated and experienced workers, those in unionized jobs earn less than those in nonunionized jobs (Card 2001). To examine this, we test for statistical interactions between four groups of care work occupations and union membership. With respect to how unions affect reproductive versus nurturant care penalties, we predict:

H4a: Unionized reproductive care workers should incur a smaller wage penalty than nonunionized reproductive care workers due to unions putting floors under low-paid workers' wages; in contrast, among nurturant care workers, unionized workers should incur a larger penalty relative to nonunionized workers due to ceiling effects on wages.

In regard to how unions differentially affect occupational closure categories, we predict:

H4b: Workers in the less occupationally closed categories of care work should incur a smaller wage penalty if unionized than if not unionized (floor effect of unions); in contrast, workers in the

high-education/high-licensing occupational closure category of care work should incur a larger penalty if unionized than if not unionized (ceiling effect of unions).

The rationale for these hypotheses is similar to that for predicting interactions with public sector employment; like the public sector, union jobs may bring up the lowest wages and create a ceiling on the highest.

DATA AND METHODS

Sources of Data

We pooled the 1979-2012 waves of the NLSY, a national probability sample of individuals, with over-sampling for blacks and Latinos. The NLSY interviewed respondents annually through 1994 and biannually thereafter. Respondents were 14 to 21 years of age in 1979, and 47 to 54 in 2012. We limited the sample to those over age 18 and employed part or full time during at least two of the years, since the fixed-effect models require at least two observations on each person. This results in a sample size of 183,457 person-years as units of analyses (88,994 women and 94,463 men). We calculated the percent female in each detailed occupation from the 1980, 1990, and 2000 Census data (U.S. Bureau of the Census 1993; U.S. Bureau of Labor Statistics 2000). We drew a measure for occupational cognitive skill from the *Dictionary of Occupational Titles (DOT)*. We merged these measures onto the NLSY data using a crosswalk devised by Peter Meyer and Anastaysia Osborn (2005) for harmonizing three-digit Census occupational codes for all three decades of available data.

Description of Variables

The dependent variable is the natural log of hourly wage in the respondent's current or primary job. We bottom and top coded hourly wages at \$1.00 and \$75.00 and converted to 1996 constant dollars. Our two principal independent variables are dummy variables indicating whether the occupation is nurturant or reproductive care work, with all other (non-care) occupations as the reference category. Following England and colleagues (2002), we coded nurturant care as occupations involving face-to-face services that increase the capabilities of the recipient. This includes childcare, health care, education, and helping professions such as therapists, social workers, and clergy. Following Duffy (2005, 2007, 2011) and Dwyer (2013), we coded reproductive care as including (nonmedical) body care services (such as barbers, hairdressers, and cosmetologists), food preparation and service (such as cooks and waiters/waitresses), domestic service and housekeeping, and cleaning services. Appendix Table A1 provides lists of all occupations coded as nurturant care work and reproductive care in both the 1980 and 2000 Census codes.

Some analyses include variables for four categories of occupational closure among nurturant and reproductive care, also listed in Table A1. We divided the care occupations by educational and licensing requirements without regard to whether they are nurturant or reproductive. As detailed in the discussion of occupational closure above, the four categories are high-education/high-licensing, high-education/low-licensing, low-education/high-licensing, and low-education/low-licensing.

Demographic controls include dummy indicators for region of residence and urban or suburban residence. Race/ethnicity was measured using dummy variables that indicate a respondent is (1) Hispanic, (2) non-Hispanic black, or (3) non-Hispanic white or other (such as very small numbers of Asians or Native Americans). Human capital includes highest grade of schooling completed, years of general work experience (and its square), years of seniority (i.e., experience in the organization for which one currently works), and its square. Because returns to experience vary by educational attainment, we included an interaction between education and experience. In some models, we divided the sample by educational attainment and interact experience and its square with care statuses to test whether care workers receive lower returns for experience, relative to other workers, and whether

these differences in returns to experience for care versus non-care work are greater among better-educated workers. We included control variables for labor supply: part-time status (coded 1 if under 35 hours weekly) and the total number of jobs the respondent has ever held.

To measure occupational and industrial gender composition, we calculated percent female in each occupation within industry by cross-classifying detailed industry and occupation codes and used the 1980 Census data for survey years 1979-1989, the 1990 Census for survey years 1990-2000, and the 2000 census for survey years 2002-2012. We measured cognitive skill demanded in an occupation with a scale created by England (1992:134-35) with occupational averages of variables from the DOT. Union status is a dichotomous measure indicating whether the respondent's wages in the current job are set by a collective bargaining agreement. Public sector is a dummy variable indicating employment in local, state, or federal government.

Methods

In preliminary models we use ordinary least squares (OLS) with robust standard errors and fixed-effect regression to analyze data arranged in a pooled time-series cross-section with person-years as the units of analysis. In most models, we use person fixed effects to reduce omitted-variable bias created by the failure to include controls for unmeasured, unchanging personal characteristics that have additive effects. For fixed-effects models, we conducted the Hausman test to assess whether random-effects models were adequate. In each case, the test indicated a need for fixed effects.

RESULTS

Table 1 presents means and standard deviations for all variables. We use *t*-tests for paired means to test for differences by gender in the top panel, and within-gender by care status in the lower panel of the table. We present nurturant and reproductive care statistics by gender, and separate all other measures by care status and gender. Women are overrepresented in both forms of care work, with 18.6 percent of women workers in nurturant and 12.8 percent in reproductive occupations, compared to 3.8 and 8.7 percent of men. When we divide care work another way, by its occupational closure (education and licensing), we also see women to be more likely than men to be in each of the types of care work. For both genders, it is the low-education/low-licensing form of care work that employs the most workers, comprising 12.7 percent of women and 8.6 percent of men. The leading occupations in this category are food service for women and food preparation and janitors for men (results not shown). Among the four types of care work categorized by occupational closure, women are most disproportionate in the low-education/high-licensing occupations, which employ 10.5 percent of women but only 1.6 percent of men; these occupations are largely less-skilled medical occupations such as LPNs and medical technicians (results not shown). High-education/low-licensing occupations (largely K-12 teachers and professors), employ 5.8 percent of women and 2.0 percent of men. High-education/high-licensing occupations are the rarest, and women predominate here at 3.4 percent, compared to .7 percent of men. Women are largely RNs in this category, while men are more likely to be physicians and surgeons.

Table 1 also allows us to compare nurturant care, reproductive care, and non-care workers on other variables. For both women and men, unadjusted mean earnings are highest for nurturant care workers, lowest for reproductive care workers, with non-care workers falling in the middle. Consistent with Duffy (2011), we find African Americans of each gender are overrepresented among reproductive care workers. Within each gender, nurturant care workers are the most educated while reproductive workers the least educated. Reproductive care workers are the least experienced and most likely to work part time. Finally, for both men and women, nurturant care work is highly feminized, more likely to be unionized, and disproportionately in the public sector, relative to reproductive and non-care work.

Table 1. Means and Standard Deviations for Selected Variables, 1979-2012

	<i>Women</i>			<i>Men</i>		
Nurturant care	.186 ^a			.038 ^a		
	.389			.192		
Reproductive care	.128 ^a			.087 ^a		
	.334			.283		
Non-care occupations	.686 ^a			.874 ^a		
	.464			.332		
Subtypes of care by occupational closure						
High-education/high-licensing	.034 ^a			.007 ^a		
	.181			.084		
High-education/low-licensing	.058 ^a			.020 ^a		
	.234			.139		
Low-education/ high-licensing	.105 ^a			.016 ^a		
	.306			.124		
Low-education/low-licensing	.127 ^a			.086 ^a		
	.333			.280		
	<i>Women</i>			<i>Men</i>		
	<i>Nurturant</i>	<i>Reproductive</i>	<i>Non-care</i>	<i>Nurturant</i>	<i>Reproductive</i>	<i>Non-care</i>
Dependent variable						
Hourly wage (CPI Adjusted)	\$10.563 ^b	\$7.035 ^b	\$10.512 ^b	\$14.367 ^b	\$8.155 ^b	\$13.060 ^b
	8.073	5.786	7.607	12.308	5.938	9.676
Demographic characteristics						
Black	.267	.323 ^b	.252 ^b	.262	.402 ^b	.247 ^b
	.443	.468	.434	.440	.490	.431
White	.563	.544 ^b	.571 ^b	.584 ^b	.421 ^b	.573 ^b
	.496	.498	.495	.493	.494	.495
Latino/a	.170	.132 ^b	.177 ^b	.154 ^b	.177	.179 ^b
	.376	.339	.382	.361	.381	.384
Urban	.194	.182 ^b	.204 ^b	.231 ^b	.268 ^b	.199 ^b
	.396	.386	.403	.421	.443	.399
Suburban	.244	.245	.255 ^b	.222 ^b	.220 ^b	.254 ^b
	.430	.430	.436	.416	.414	.435
Human capital and labor supply						
Education	14.161 ^b	11.900 ^b	13.047 ^b	15.743 ^b	11.908 ^b	12.657 ^b
	2.532	1.812	2.125	2.832	1.947	2.341
Seniority	4.297 ^b	2.512 ^b	4.017 ^b	4.128	2.819 ^b	4.264 ^b
	5.293	3.846	5.115	4.903	4.251	5.402
Experience	10.877 ^b	7.126 ^b	10.420 ^b	11.817 ^b	8.067 ^b	11.197 ^b
	7.911	6.761	8.013	8.280	7.423	8.322
Number of jobs	7.561 ^b	6.615 ^b	7.06	9.234 ^b	7.319 ^b	7.769
	5.246	5.178	5.249	5.917	5.809	5.800
Part-time hours (< 35)	.290 ^b	.401 ^b	.229 ^b	.190 ^b	.253 ^b	.135 ^b
	.454	.490	.420	.392	.435	.342

(continued)

Table 1. Means and Standard Deviations for Selected Variables, 1979-2012 (continued)

	Women			Men		
	Nurturant	Reproductive	Non-care	Nurturant	Reproductive	Non-care
Job characteristics						
Percent female in occupation	79.571 ^b	64.303 ^b	57.790 ^b	58.903 ^b	43.125 ^b	22.462 ^b
	18.124	22.385	27.686	25.054	21.166	21.567
Cognitive skill	1.684 ^b	-2.692 ^b	.132 ^b	3.881 ^b	-2.788 ^b	-.613 ^b
	3.345	1.355	2.424	3.248	1.220	2.563
Union	.212 ^b	.085 ^b	.130 ^b	.241 ^b	.152 ^b	.174
	.408	.278	.336	.428	.359	.379
Public sector	.316 ^b	.080 ^b	.133 ^b	.424 ^b	.132 ^b	.093 ^b
	.465	.271	.339	.494	.339	.291
N	88,994			94,463		

^a*p* > .05 significance across gender (two-tailed tests). Tests were between reproductive or nurturant care and non-care occupations.

^b*p* > .05 significance within gender by care status (two-tailed tests).

What Mechanisms Explain Low Wages for Nurturant and Reproductive Workers?

We turn to the multivariate analyses presented in Table 2 to test whether mechanisms argued to account for lower wages for nurturant workers can explain low wages for reproductive workers as well. To calculate the percent change in wage rates associated with a one unit change in the independent variable, we exponentiate the coefficients from the models. Models 1 through 4 are nested in this table, such that each successive model includes all variables in the prior model. The baseline OLS Model 1 reports the pay differences between nurturant, reproductive, and non-care workers that are not adjusted for any of our control variables except for geographic variables. Model 1 shows significant and large reproductive care coefficients of roughly negative 29 percent for both women and men ($[\text{EXP}[-.352]-1]*100$; $[\text{EXP}[-.344]-1]*100$). In contrast, we do not observe baseline lower wages for nurturant workers, whose wages, relative to non-care workers, are 4 and 6 percent higher among women and men, respectively.

To test Hypothesis 1a that posits that selection on unmeasured, stable preferences, tastes, and skills can account for lower wages among care workers, we re-estimate the baseline model using fixed effects. If negative selection on stable factors can account for the low wages of care workers, then the fixed-effects regression model should reveal smaller care differentials compared to OLS results. Hypothesis 1a is strongly supported for reproductive care workers: the negative effect of reproductive care is much reduced in the fixed-effects model, from 29 percent originally to 7 percent for women and 11 percent for men. In contrast, Hypothesis 1a is not supported for nurturant care workers: in contrast to positive effects of nurturant care in the OLS model, we find negative effects of nurturant care in the fixed-effects model, of 9 and 5 percent for women and men, respectively. Confirming previous research, this indicates that workers in nurturant care work are positively selected on unobserved characteristics that enhance wages, and if it were not for these more favorable characteristics, the unadjusted care wage differential would be greater (Budig and Misra 2010; England et al. 2002). However, the reduction in the reproductive wage differentials for both men and women indicate that the workers who enter these jobs have unmeasured characteristics that negatively affect wages. Model 2 also shows that, net of unobserved factors, care effects on wages vary by gender: working in nurturant care (relative to non-care) has more negative effects on women's than men's wages, while working in reproductive care (relative to non-care) has more negative effects on men's than women's wages (gender differences in coefficients significant at $p < .05$).

Table 2. Effect of Nurturant Care, Reproductive Care, and Care by Degree of Occupational Closure on Wages, by Gender

	Results Reported as $(e^{b-1}) \times 100$			
	Women		Men	
	Nurturant Care	Reproductive Care	Nurturant Care	Reproductive Care
OLS				
Model 1: baseline model (%) ^a	4.1**	-29.7**	6.0**	-29.1**
Fixed effects				
Model 2: baseline fixed-effects model (%) ^b	-9.3**	-6.8**	-4.5**	-10.8**
Model 3: human capital and skill model (%) ^c	-16.4**	-1.5*	-14.5**	-8.1**
Model 4: gender composition model (%) ^d	-14.2**	-1.4*	-10.6**	-5.5**
	Women		Men	
Fixed effects for occupational closure categories				
Model 3: human capital and skill model ^c				
High-education/high-licensing (%) ^e		7.9**		19.4**
High-education/low-licensing (%) ^f		-18.8**		-23.4**
Low-education/high-licensing (%) ^g		-15.0**		-6.1**
Low-education/low-licensing (%) ^h		-6.3**		-8.1**

^aModel 1 is an OLS regression that includes measures for care status, population in place of residence, and region of residence.

^bModel 2 is a fixed effects regression that includes the same measures as Model 1.

^cModel 3 includes measures in Model 2, plus measures for highest grade completed, years of general work experience and its square, years of seniority and its square, part-time status, total number of jobs ever held, and cognitive skills demanded by the occupation.

^dModel 4 includes all measures in Model 3, plus percent female in occupation within industry.

^eHigh-education/high-licensing category includes MDs, other doctors, and high skill other medical occupations.

^fHigh-education/low-licensing includes professors, k-12 teachers, and high-skill social service occupations.

^gLow-education/high-licensing includes body care services, childcare workers, and low-skill other medical occupations.

^hLow-education/low-licensing includes low-skill social service occupations, janitors and laundry workers, domestic workers, and food preparation and food service workers.

* $p < .05$ ** $p < .01$ (two-tailed tests)

In Model 3 we introduce time-varying measures for human capital, labor supply, and occupational cognitive skills to test Hypothesis 1b, which states that the lower wages for care workers may be due, in part, to lower education, experience, or seniority of care workers, their less consistent labor supply, or the low cognitive skill demanded in care occupation. We find no support for Hypothesis 1b for nurturant care workers, but strong support for reproductive care workers, particularly among women. The negative nurturant care coefficient increases in Model 3, to 16 (from 9) percent for women and to 15 (from 5) percent for men. This is consistent with the findings in Table 1 showing that, compared to non-care workers, nurturant care workers have more education, more experience, and work in jobs requiring substantially more cognitive skill, and our regressions show all these factors to have positive returns (results not shown). These characteristics of nurturant care workers and their jobs make up for some of their wage losses for doing care work, so that holding these factors constant reveals a steeper net penalty for care. For reproductive care, including these measures substantially reduces the wage differential from 7 to 2 percent among women, and from 11 to 8 percent among men. This is consistent with the findings in Table 1 showing that, compared to non-care workers, reproductive care workers have low education, experience, seniority, are more likely to work part time, and are in jobs with low cognitive skill demands, all of which our regressions show to reduce wages (results not shown). Thus, a cluster of factors known to

affect earnings—human capital, labor supply, and the skill demands of the occupation—explain much of the wage differences between reproductive workers and non-care workers among women, and some of it among men.

Thus far our analysis assumes that effects of variables entered in our models are additive. An equally important question, however, is whether nurturant and reproductive care workers receive the same wage *returns* to experience. Hypothesis 1c states that, due to limits on achieving efficiencies in the nurturant care sector, experience may yield lower returns for nurturant care workers. Moreover, this hypothesis states that, due to the steeper returns to experience among more educated workers, the lower returns to experience for nurturant workers will be more pronounced among college graduates, relative to non-college workers. To investigate this, we divided the sample by college attainment and created statistical interactions for years of work experience with each of nurturant and reproductive care status, to see if the slopes on experience differed between each type of care and non-care workers. We found that returns to experience did not vary by care work status among the non-college sample. However, we find significant differences in returns to experience by care status among college graduates. To visualize the results from these interactions relevant to Hypothesis 1c, we plot the predicted wages at different years of experience for nurturant care and non-care jobs among college graduates in **Figures 1a** (men) and **1b** (women). **Figure 1a** shows that men in nurturant care occupations have significantly lower returns to experience than male non-care workers, and **Figure 1b** shows analogous but even larger differences for women between the returns to experience for those in nurturant and non-care work. Thus, Hypothesis 1c, positing lower returns to experience for nurturant care than non-care work, and that the differences in returns will be greater among those with higher education, is supported. Indeed, the differences in returns to experience are only significant for college graduates. The figures also show that the returns to experience for women in nurturant care are especially low because men's returns to experience are higher than women's in either nurturant care or non-care work, and the gap between returns in nurturant care and non-care work are larger for women than men.

Next, we tested Hypothesis 1d, which predicts that care jobs may pay less because they are more feminized. Model 4 in **Table 2** includes a measure for the percent female in the worker's occupation-by-industry category. We find general support for Hypothesis 1d: the high levels of feminization of care work contribute to the lower wages of care workers. Comparing Models 3 and 4, we find that women's nurturant penalty falls from 16 to 14 percent, while men's nurturant penalty falls from 15 to 11 percent. Women's reproductive penalty, already only 2 percent, is virtually unchanged (it reduces two-tenths of one percent), while men's reproductive penalty falls from 8 to 6 percent. This suggests that the gender composition of jobs matters for explaining the pay of both nurturant and reproductive care work relative to non-care work. However, the gender composition does not explain the entire care penalty for either type of care work; significant care penalties persist even after we hold gender composition constant.

To return to the central question of this section—can the mechanisms argued to contribute to the lower wages of nurturant workers account for the lower wages of reproductive workers—we find mixed results. In the case of selection on unmeasured preferences or skills, it helps explain low reproductive care wages but not low nurturant care wages; comparing Model 1 and 2, adding fixed effects accounts for 77 percent (women) and 63 percent (men) of the reproductive care wage differential, but none of the nurturant care wage differential. The change in reproductive penalties from Models 2 to 3 shows that differences in human capital, labor supply, and cognitive skill demands of their occupations explain 78 percent of women's and 25 percent of men's remaining wage gap between reproductive care workers and non-care workers. Yet, none of these factors contributes to explaining the lower wages among nurturant workers. However, the lowered returns to experience for nurturant care workers among the college educated may account for some of their penalty relative to other workers at high experience and education levels. Finally, occupational and industrial gender composition explains a share of the two care penalties, though much more for nurturant care because it is

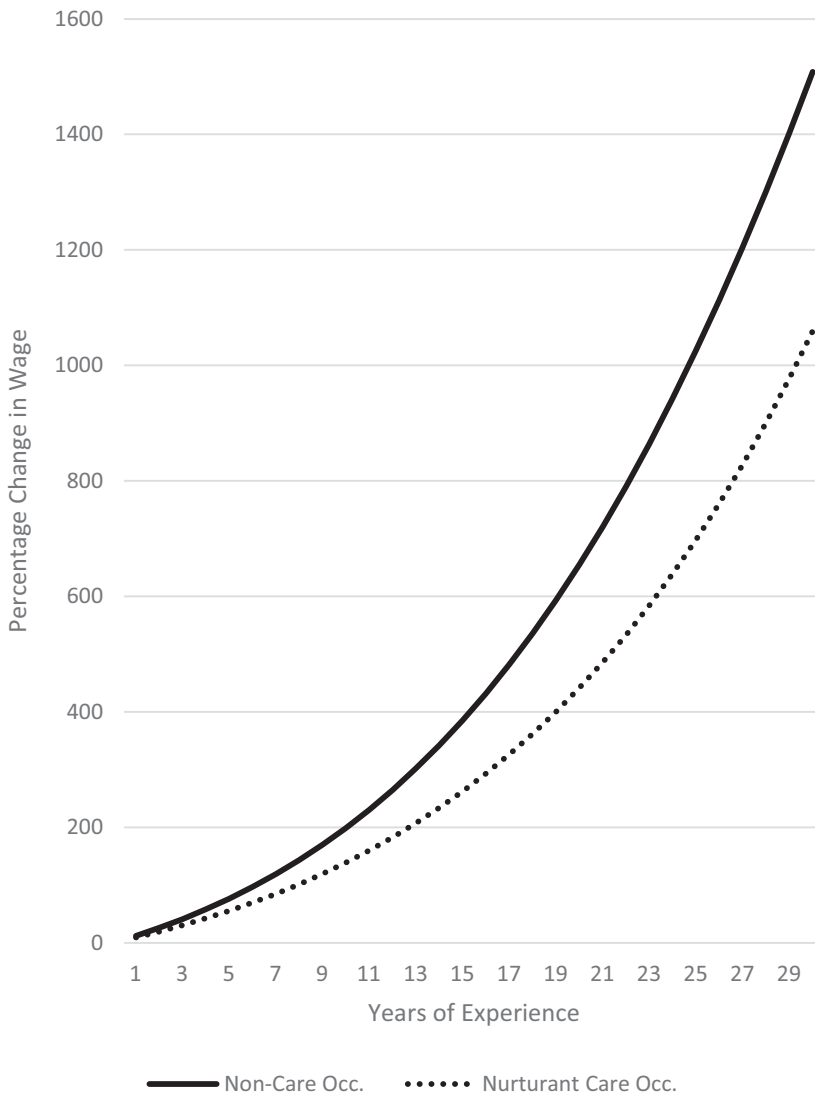


Figure 1a. Men College Graduates' Returns to Experience, by Occupation Type

more feminized than reproductive care. In sum, selection on stable individual factors and human capital, as well as low cognitive skill demands in the work, explain much more of the lower wages of reproductive than nurturant care workers, while reduced returns to experience and gender segregation more strongly explain the nurturant, relative to the reproductive, care penalty.

Are All Care Workers Penalized? Occupational Closure and the Care Penalty

Our next question is whether the care work penalty can be mitigated by reducing competition for care jobs through occupational closure. To assess how wages vary by occupational closure, the bottom panel of Table 2 shows the effect of employment in four sub-categories of care work on earnings, separately for men and women. All models include measures in Model 3, which controls for fixed effects, human capital, labor supply, and the cognitive skill demand of the occupation. These models compare the wages in each type of care work classified by occupational closure to the wages of those

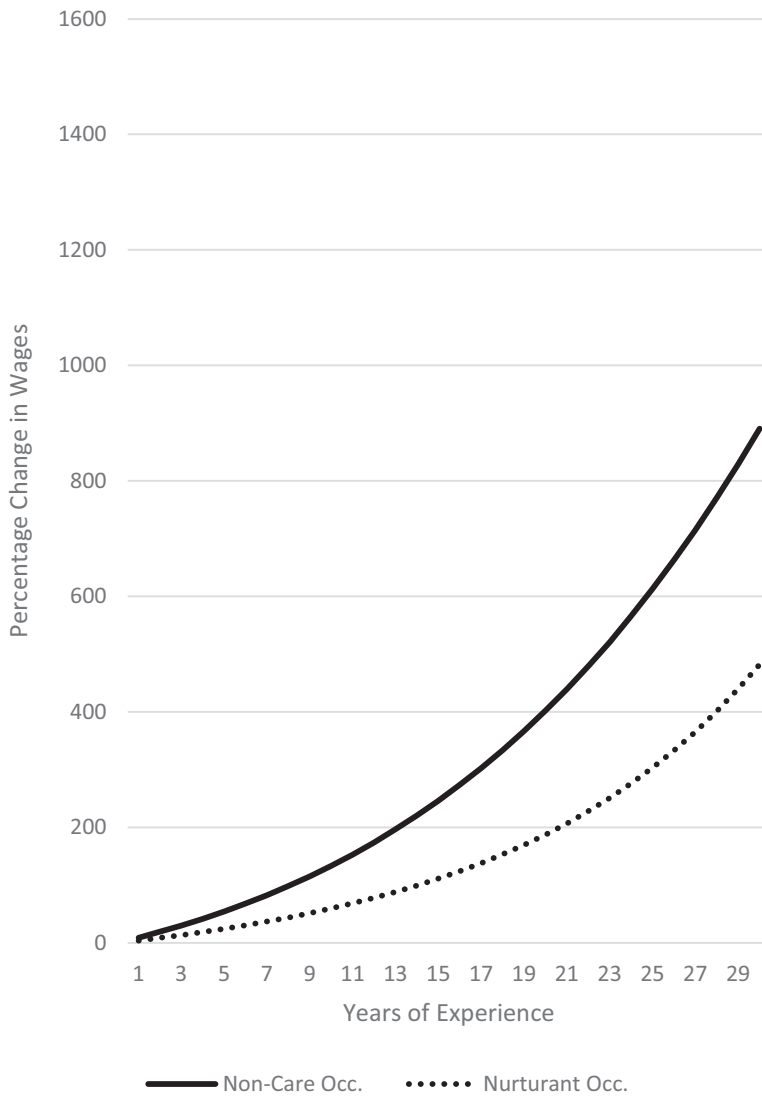


Figure 1b. Women College Graduates' Returns to Experience, by Occupation Type

in non-care work who have comparable individual characteristics and work in jobs requiring the same amount of cognitive skill.

Hypothesis 2 states that workers in occupations achieving the highest levels of social closure, namely the high-education/high-licensing category, should incur no care penalty, or even a wage bonus, when compared to comparable non-care workers. Our results are consistent with Hypothesis 2; we find a wage bonus for care workers in the high-education/high-licensing closure category. This bonus is larger for men (19 percent) than for women (8 percent), but is significant for both. In results not shown, we estimated the effects of each occupation comprising this category and found physicians and surgeons carried the largest wage bonus for women and men, though all other occupations in this category also carried a smaller bonus or no penalty. Also consistent with Hypothesis 2, when care work has lower degrees of occupational closure, it is associated with higher penalties relative to

non-care work. High-education/low-licensing work (largely professors and teachers) is associated with 19 and 23 percent penalties for women and men, respectively. Low-education/high-licensing work (largely less educated medical workers, but also childcare workers), carries penalties of 15 and 6 percent for women and men, respectively. Within this category, in results not shown, we estimated the wage effects of each occupation in this category and found that childcare workers incur the steepest penalties, particularly among women. Finally, the low-education/low-licensing category reduces wages by 6 and 8 percent for women and men. Of the occupations comprising this category, the greatest penalties are borne by domestic workers (non-childcare) (results not shown).

When both licensing and educational credentialing are high, the care work penalty is not only eliminated, but these workers earn a large wage bonus, *net of their educational attainment, work experience, job seniority, and cognitive skills demanded by the occupation*. Clearly, occupational closure at its strongest works to raise the wages of care workers, as past research has shown for other kinds of workers. However, when both dimensions of closure are not high, workers incur care penalties. Licensing requirements appear to raise men's care wages even when education is low, but this is not true among women. While penalties are significant when both education and licensing requirements are low, contrary to expectations, these occupations are not the most penalized among care workers, for either women or men. However, when occupational closure is strongest, wages are highest.

Do the Public Sector and Labor Unions Help Equalize Wages for Care and Non-Care Workers?

Due to the economic pressures facing the care sector, specifically its inability to maximize profits by "speeding up" care provision or to fully charge care beneficiaries due to spillover benefits of care to the broader public, we hypothesize that wage equalizing institutions, such as governments and labor unions, would be able to mitigate the care penalty by putting a floor under the earnings of more vulnerable care workers. Simultaneously, we argue these wage equalizing institutions might reduce bonuses accruing to care workers in high-closure occupations by putting a ceiling on the wages of the highest earners. In our final set of analyses presented in Table 3, we attempt to unpack the interactions between the various types of care work and whether workers are in unionized or public sector jobs.

First, we consider how working in the public sector moderates care penalties to test the interactions posited in Hypotheses 3a and 3b. In Hypothesis 3a we predict that public sector care provision should mitigate penalties for reproductive care workers, but increase penalties for nurturant care workers. Then classifying types of care work by occupational closure, in the parallel Hypothesis 3b, we predict that public sector care provision should mitigate care penalties for workers in low-education/low-licensing occupational closure category, while attenuating care bonuses for those workers in the high-education/high-licensing (i.e., highly skilled medical workers).

On the left side of Table 3, we present the results from models with interaction terms for public sector with (1) nurturant and (2) reproductive work, and in separate regressions listed below with interaction terms for public sector with each of the four categories of care work defined by occupational closure. Like the models in Table 2, these control for fixed effects, human capital, labor supply, and the cognitive skill demanded by the occupation.

Consistent with Hypothesis 3a, performing care in the public sector exacerbates the penalty for male nurturant workers, many of whom are doctors (raising the penalty to 18 percent in the public sector, relative to 12 percent in the private sector), while mitigating the penalty for female reproductive workers (creating a 2 percent bonus in the public sector, relative to a 5 percent penalty in the private sector). However, inconsistent with the hypothesis, public sector provision does not alter the nurturant penalty for women, perhaps because few of them are in jobs that pay enough to be affected by a ceiling. Also inconsistent with the hypothesis, working in the public sector exacerbates rather than reduces the reproductive penalty for men (increasing it from 8 percent in the private sector to

Table 3. Effects of Care on Earnings by Unionization, Public Sector, and Gender from the Human Capital and Skill Model

	<i>Women</i>		<i>Men</i>		<i>Women</i>		<i>Men</i>	
	<i>Public</i>	<i>Private</i>	<i>Public</i>	<i>Private</i>	<i>Union</i>	<i>Non-union</i>	<i>Union</i>	<i>Non-union</i>
Nurturant care (%)	-16.4**	-16.4**	-17.9**	-12.0**	-21.7**	-16.6**	-26.0**	-13.6**
Reproductive care (%)	2.0**	-4.7**	-12.5**	-7.6**	.4*	-4.1**	-8.1**	-8.1**
Subtypes of care by occupational closure								
High-education/ high-licensing (%)	-1.6**	10.0**	-17.1**	30.4**	-5.4**	10.0**	-19.1**	23.6**
High-education/ low-licensing (%)	-22.5**	-16.7**	-20.7**	-25.7**	-27.8**	-17.6**	-34.0**	-22.6**
Low-education/ high-licensing (%)	-3.9**	-16.5**	-6.1**	-6.1**	-8.8**	-15.5**	-6.1**	-6.1**
Low-education/ low-licensing (%)	-6.3**	-6.3**	-11.6**	-7.5**	-6.3**	-6.3**	-8.1**	-8.1**

Notes: All models include variables from Model 3, the human capital and skill model in Table 2. Non-bolded coefficients, where we observe no statistically significant interaction with union states or public sector, are taken from Model 3 in Table 2 and Table 3.

* $p < .05$ ** $p < .01$ (two-tailed tests)

13 percent in the public sector). Thus, there is a gender divide here, with public sector work lessening the reproductive care penalty for women, but exacerbating both kinds of care penalties for men.

When we divide care work into the four categories delineated by occupational closure, we find that consistent with Hypothesis 3b, public sector care provision turns the high-education/high-licensing wage bonus in the private sector (of 10 percent for women and 30 for men) into a penalty in the public sector (of 2 percent for women and 17 percent for men); this is presumably because the public sector limits pay ceilings, which many in these occupations would otherwise receive. However, results are inconsistent with Hypothesis 3b with respect to the high-education/low-licensing category, where the public sector raises penalties among women (from 17 to 23 percent) but lowers them among men (from 26 to 21 percent). Also contrary to Hypothesis 3b, the public sector fails to help the wages of female workers in the low-education/low-licensing category, and even exacerbates the penalty among men, such that male care workers in the public sector receive a 12-percent penalty, compared with their counterparts in the private sector, who receive an 8-percent penalty.

What can we conclude about the public sector and the wages of care workers? While public sector care provision raises the wages of particularly vulnerable female reproductive care workers, female low-education/high-licensing carers, and male high-education/low-licensing carers, for all other care workers public sector care provision makes the penalties worse or, sometimes, makes no difference. Generally, the public sector's ceiling effects on wages among more highly paid care workers are more consistent than its floor effects under the wages for lowly paid care workers.

Finally, we turn to our examination of care penalties across unionized and nonunionized workers on the right side of Table 3. Here we consider how working in unionized jobs moderates care penalties to test the interactions posited in Hypotheses 4a and 4b. In Hypothesis 4a, we predict that unions should lower penalties for reproductive care workers because these are often the worst paid workers likely to be affected by a floor, while unions should increase penalties for nurturant care workers, because some of them are highly paid professionals likely to be affected by ceilings. Turning to analyses using closure categories, in the parallel Hypothesis 4b, we predict that unions should mitigate care penalties for workers in low-education/low-licensing occupational closure category, while attenuating bonuses for those care workers in the high-education/high-licensing category (i.e., highly skilled medical workers).

To investigate this, we created statistical interactions between labor union membership and the various types of care work. These results are on the right hand side of [Table 3](#). On the top are models testing hypotheses about how nurturant or reproductive care interact, while the bottom section of the table shows care penalties across unionized and nonunionized settings for the four categories of occupational closure among care workers.

Does union membership moderate the impact of care status on earnings? The findings largely parallel those for the public sector above. Women reproductive workers pay no penalty if in a labor union, while their counterparts in nonunion jobs incur a 4 percent penalty. This is consistent with Hypothesis 4a, since raising the floor would especially help reproductive care workers, given their especially low wages. Yet, unions do not alter the penalty among male reproductive workers. Also consistent with Hypothesis 4a is that nurturant workers, both women and men, incur a larger penalty in unionized than nonunionized settings; penalties are of 22 (women) and 26 (men) percent in unionized, but a smaller 17 (women) and 14 (men) percent in nonunionized jobs. This is consistent with the notion that many workers are professionals whose wages are high enough to be lowered by implicit ceilings. In sum, Hypothesis 4a generally is supported.

Turning to analyses to test Hypothesis 4b regarding how union status interacts with types of care work classified by closure, we find stronger evidence of unions causing a ceiling effect among highly educated and highly paid workers than for a floor effect among less educated and low paid workers. Consistent with Hypothesis 4b, high-education/high-licensing care workers earn wage bonuses in nonunionized settings of 10 (women) and 24 (men) percent [Per [Table 3](#), should this be “28 (men) percent?”], but incur significant penalties in unionized workplaces of 5 (women) and 19 (men) percent. Similarly, high-education/low-licensing care workers pay larger penalties if unionized of 28 (women) and 34 (men) percent than if nonunionized, with penalties of 18 (women) and 23 (men) percent. Unions do raise the wages of women in low-education/high-licensing care occupations, where the care penalty is smaller if unionized, of 9 percent relative to 16 percent in nonunionized jobs. However, contrary to Hypothesis 4b, unions fail to mitigate care penalties for the least closed occupations in the low-education/low-licensing category. In sum, the predictions of Hypothesis 4b with respect to wage ceilings on more closed occupations show greater support than the prediction of wage floors under less closed care occupations, with the exception of women in low-education/high-licensing occupations.

Overall, our hypotheses regarding how unionization and public sector work affect the wages of care relative to non-care workers received mixed support. Our hypotheses were based on past scholarship suggesting that unionization acts a means of reducing wage inequality across occupations ([Card 1996, 2001](#)), raising wages at the bottom, and lowering the wages in high earning occupations, and that the public sector may work similarly to depress wages at the top and raise them at the bottom. Our findings support these notions in that nurturant care workers, many of whom are medical professionals, do better (relative to non-care workers) in the nonunionized than union jobs (true for both men and women), and in the private rather than public sector (true only for men). Thus, the ceiling-reducing effects on nurturant care are present for all groups for whom they were predicted, except for women nurturant care workers; perhaps they are an exception because fewer of them are in highly paid enough jobs to be affected by a ceiling. Consistent with the floor raising thesis, some of the lowest paid workers, women reproductive care workers, benefit (relative to non-care workers) from working in the public sector or in unionized jobs. In both settings, these institutions not only eliminate the penalty associated with reproductive care work, but turn it into a small bonus. Similarly, women in low-education/high-licensing occupations incur smaller penalties in the public sector and in unionized jobs. However, contrary to our hypotheses, unions and the public sector do not uniformly help all reproductive and less occupationally closed care workers. Male reproductive care workers do not do better (relative to non-care workers) in public than private sector jobs, or in unionized than in nonunion jobs; perhaps this is because they are not in low enough paying jobs to be affected by a floor on the lowest wages. Also contrary to our hypotheses, neither men nor women

in low-education, low-licensing care work do better (relative to non-care workers) in unionized than nonunion jobs or in the public than private sector.

CONCLUSION

Past scholarship has established a care work wage penalty for nurturant and reproductive occupations (Barron and West 2013; Budig and Misra 2010; Duffy 2005, 2007, 2011; England et al. 2002). Moreover, past research has shown that care workers are polarized among the highest paid (physicians) and lowest paid (childcare and domestic workers) employees (Barron and West 2013; Dwyer 2013; England et al. 2002). The mechanisms producing penalties for nurturant and reproductive care workers have been less systematically investigated. Our study extended past scholarship along three lines. First, we analyzed nurturant and reproductive care workers together to test whether explanations for lower wages among nurturant workers could also account for low wages among reproductive care workers. Second, we delineated nurturant and reproductive care workers by the degree of occupational closure achieved using educational credentials and license requirements to see if employment in these occupations mattered for the care penalty. Finally, we considered how wage-equalizing institutions, namely the government and labor unions, could minimize wage disparities associated with care work. From these investigations, we draw implications for care scholars and policy makers.

The first goal of our study was to understand whether the mechanisms argued to partially explain the low wages of nurturant workers could be extended to explain wages of reproductive workers. Broadly, we found that these mechanisms were more powerful explanators of the low wages of reproductive workers relative to nurturant workers. By adding person fixed effects to our models, we showed that negative selection on stable factors accounted for a large portion (62 to 76 percent) of the reproductive care wage differential, but did nothing to explain nurturant care workers' wages. Indeed, the negative effect of nurturant care on wages only emerged in models that controlled for stable selection factors, indicating positive selectivity into nurturant care occupations on unmeasured factors that would predict higher earnings. That the reproductive care effect on wages is smaller in fixed-effects models indicates that preferences, or more likely other stable factors, such as low cognitive skills or being in a group that faces discrimination, give rise to lower wages among reproductive workers.

Similarly, we found that arguments about measured human capital, labor supply, or the cognitive requirements of care jobs are better at explaining why reproductive more than nurturant care workers have low wages. Reproductive care workers have lower education and experience, and work in jobs demanding relatively less cognitive skill, and this explains a reasonable share of their wage gap relative to non-care workers. By contrast, nurturant care workers score higher than the average non-care worker, explaining why the nurturant care penalty is larger with human capital measures included in the model; the absolute pay of these jobs is similar to non-care jobs on average, but after adjusting for the human capital of the workers and cognitive skill requirements of jobs, their pay is much less relative to non-care work than we would expect. We are first to examine whether returns to experience might vary between care and non-care workers; we found that, among those with a college degree, nurturant workers receive lower wage returns to experience than non-care workers. These lowered returns may be due to the limits on achieving efficiencies in the care sector for more qualified and experienced workers. The reduced benefit for higher qualifications is one process that may be producing the care penalty among experienced workers, and creating overqualified and underpaid nurturant care workers.

Past research argued that nurturant care work pays less than non-care work in part because the jobs are feminized, and jobs with a higher percent female pay less to both men and women. We investigated whether this also explains part of the low pay of reproductive care workers. In one sense the claim holds for both types of care work; after controls for all the factors discussed above, the negative effect of both nurturant and reproductive care work become smaller after gender composition of jobs

is controlled. However, the reduction in the already small penalty for women in reproductive care is negligible.

In summary, the arguments that care penalties result from negative selection on stable and human capital factors, or from working in less cognitively skilled or more feminized occupations, explain very little of the gap in wages between nurturant care and non-care workers, but explain a large share of the analogous gap involving reproductive care workers. In past literature on the nurturant care penalty, these explanations were raised in the literature, but research often showed that they explained little of relevant gaps (England et al. 2002). We find, however, that they do explain a large part of the gap between reproductive care and non-care workers. Yet, net of all these factors, while nurturant care work shows a greater care penalty, reproductive shows one as well.

We next considered whether, through occupational closure along educational credentials and licensing requirements, some care workers receive fewer penalties, or even wage bonuses. We find systematic evidence that occupational closure mechanisms can raise the wages of care workers. Working in the high-education/high-licensing care category is associated with wage *bonuses* of 8 to 23 percent for women and men, respectively. These bonuses are net of human capital, and so do not simply reflect the higher qualifications of the worker; moreover, these bonuses are net of average occupational cognitive demands, and so do not simply reflect the higher average educational requirements of nurturant occupations. Thus, care work in occupations that have the strongest educational and professional licensing requirements, namely the health care occupations of physicians, surgeons, other doctors, and other medical highly skilled occupations pay bonuses over non-care work. Less closed care occupations incur wage penalties, in the range of 6 to 18 percent for women and 7 to 23 percent for men. Our findings here are consistent with past studies of social closure raising the wages of British medical workers (Barron and West 2013), highly skilled male health care workers (Dill et al. 2016), and advantaged care workers across OECD countries (Lightman 2017). We extend this scholarship by showing that occupational closure among a broader array of care workers, including both women and men, raises wages even with detailed controls for individual human capital. Contrary to our hypotheses regarding occupational closure, however, is that the least closed care occupations (low-education/low-licensing) do not incur the largest care penalties.

Finally, we considered whether wage-equalizing institutions, the government and labor unions, could offset the economic pressures on profitability in the care sector to raise wages of care workers. We found some evidence of wage equalizing effects of these institutions with respect to the wages of care workers, with floor effects for lower paid care workers and ceiling effects on highly paid care workers, although there were a number of exceptions.

We found a striking divergence by gender in these associations. The groups most helped by labor unions and the public sector are female reproductive care workers and, among the occupational closure categories, female low-education/high-licensing workers. Both of these occupational groups contain childcare workers whose care penalty, in analyses not shown, is dramatically lessened if in the public sector or unionized. We found no floor effects of unions and few floor effects of the public sector among men. We found pervasive ceiling effects of public sector and unions on the wages of nurturant care workers, high-education/high-licensing care workers and high-education/low-licensing care workers, with greater consistency in these ceiling effects for men. Wage equalizing institutions appear to offset the gains made by occupational closure for these care workers. Contrary to predictions, we found that the public sector exacerbated the care penalty for men in reproductive and low-education/low-licensing care occupations. In conclusion, union membership and the public sector are effective at raising the wages of some of the least paid care workers, but collective bargaining and government jobs erode the gains from occupational closure based on education and licensing. Overall, wage-equalizing institutions are a mixed bag for reducing care penalties, despite raising wages generally.

Care workers are heterogeneous and so are the mechanisms producing care penalties. Subgroups of care workers have been variously successful at raising wages through occupational closure, with

credentialing and licensing being most successful in medical occupations. Some of our results suggest that the most disadvantaged care workers benefit more from unionization and public sector provision, because these mechanisms increase the care penalty of more advantaged care workers, despite raising pay levels generally. Policies and activism that target low-wage care workers, particularly labor unions, may be most successful in addressing the very large wage penalties they incur for performing socially important work; such efforts have been successful in some states, such as California, New York, Oregon, and Washington (Stacey 2011). However, care workers do not always see the value of unionizing and sometimes question whether it is possible for the work of care to translate into a fair wage (Stacey 2011). While they care about wages and benefits, care workers are also motivated by the relational aspects of care provision, which results in a concomitant call for better working conditions and higher care quality (Stacey 2011). This makes care recipients their potential allies (Delp and Quan 2002), though the desire for autonomy by care recipients and the invisibility of care provision strains this alliance (Rivas 2004). Building coalitions among these allies, organizing workers, and strengthening the public provision of care are all critical in ensuring the continued supply of this socially important form of labor.

APPENDIX

Table A1. 1980 and 2000 Occupations Codes for Nurturant Care, Reproductive Care, and Care by Occupational Closure Level

1980 Codes	1980 Occupation Names	2000 Codes	2000 Occupation Names	NUR Care	REP Care
<i>High-Education/High-Licensing</i>					
84	Physicians	306	Physicians and surgeons	x	
		300	Chiropractors	x	
85	Dentists	301	Dentists	x	
87	Optometrists	304	Optometrists	x	
96	Pharmacists	305	Pharmacists	x	
106	Physician assts	311	Physician assts	x	
88	Podiatrists	312	Podiatrists	x	
95	Registered nurses	313	Registered nurses	x	
		314	Audiologists	x	
99	Occupational therapists	315	Occupational therapists	x	
103	Physical therapists	316	Physical therapists	x	
105	Therapists, n.e.c	320	Radiation therapists	x	
		321	Recreational therapists	x	
98	Inhalation therapists	322	Respiratory therapists	x	
104	Speech therapists	323	Speech-language pathologists	x	
105	Therapists, n.e.c	324	Therapists, all other	x	

(continued)

Table A1. 1980 and 2000 Occupations Codes for Nurturant Care, Reproductive Care, and Care by Occupational Closure Level (continued)

1980 Codes	1980 Occupation Names	2000 Codes	2000 Occupation Names	NUR Care	REP Care
89	Health diagnosing practitioners, n.e.c	326	Health diagnosing and treating practitioners, all other	x	
204	Dental hygienists	331	Dental hygienists	x	
<i>High-Education/Low-Licensing</i>					
113-149; 153; 154	Professors; postsecondary teachers	220	Postsecondary teachers	x	
155	Preschool & kindergarten teacher	230	Preschool and kindergarten teachers	x	
156	Elementary & middle school teachers	231	Elementary and middle school teachers	x	
157	Secondary school teachers	232	Secondary school teachers	x	
158	Special education teachers	233	Special education teachers	x	
159	Teachers, n.e.c.	234	Other teachers and instructors	x	
174	Social workers	201	Social workers	x	
176	Clergy	204	Clergy	x	
164	Librarians	243	Librarians	x	
<i>Low-Education/High-Licensing</i>					
457	Barbers	450	Barbers		x
458	Hairdressers and cosmetologists	451;452	Hairdressers, hairstylists, and cosmetologists; misc. personal appearance workers		x
406; 468	Childcare workers, private household/except private household	460	Childcare workers	x	
163	Counselors, educ. & vocational	200	Counselors	x	
		340	Emergency medical technicians and paramedics	x	

(continued)

Table A1. 1980 and 2000 Occupations Codes for Nurturant Care, Reproductive Care, and Care by Occupational Closure Level (continued)

1980 Codes	1980 Occupation Names	2000 Codes	2000 Occupation Names	NUR Care	REP Care
208	Health technologists and technicians, n.e.c	341	Health diagnosing and treating practitioner support technicians	x	
207	Licensed practical nurses	350	Licensed practical and licensed vocational nurses	x	
677	Optical goods workers	352	Opticians, dispensing	x	
		354	Other healthcare practitioners and technical occupations	x	
447	Nursing aides, orderlies, and attendants	360	Nursing, psychiatric, and home health aides	x	
99	Occupational therapists aides	361	Occupational therapist assistants and aides	x	
103	Physical therapists	362	Physical therapist assistants and aides	x	
469	Personal service occupations	363	Massage therapists	x	
445	Dental assistants	364	Dental assistants	x	
446	Health aides, except nursing	365	Medical assistants and other healthcare support occupations	x	
<i>Low-Education/Low-Licensing</i>					
467	Welfare service aides	202	Social service specialists	x	
177	Religious workers	205	Directors, religious activities & educ.	x	
		206	Religious workers, all other	x	
387	Teachers' aides	254	Teacher assistants	x	
		255	Other education, training, and library workers	x	

(continued)

Table A1. 1980 and 2000 Occupations Codes for Nurturant Care, Reproductive Care, and Care by Occupational Closure Level (continued)

<i>1980 Codes</i>	<i>1980 Occupation Names</i>	<i>2000 Codes</i>	<i>2000 Occupation Names</i>	<i>NUR Care</i>	<i>REP Care</i>
448	Supervisors, cleaning and building service workers	420	First-line supervisors/managers of housekeeping and janitorial service		x
453	Janitors and cleaners	422	Janitors and building cleaners		x
403;748	Launderers and ironers; Laundering and dry cleaning machine operators	830	Laundry and dry cleaning workers		x
439	Kitchen workers, food preparation	405	Combined food preparation and serving workers, including fast food		x
444	Misc. food preparation occupations	403;414;416	Food preparation workers; Dishwashers; Food preparation and serving related workers, all other		x
438	Food counter, fountain, and related occupations				x
443	Waiters and waitresses' assistants	406;412; 413	Counter attendants, cafeteria, food concession, and coffee shop; food servers non-restaurant; dining room and cafeteria attendants		x
405;449	Housekeepers & butlers; maids & housemen	423	Maids & house-keeping cleaners		x
407	Private household cleaners & servants				x

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