Moving Up or Falling Behind? Gender, Promotions, and Wages in Canada*

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We estimate that Canadian women working full time are 1.8 percentage points less likely to be promoted, receive fewer promotions, and experience 2.8 percent less wage growth following promotions than similar men. Significant "family gaps" exist among women. Women without children are less likely to have been promoted than similar men but experience similar wage growth following promotions, while women with children are as likely to have been promoted but experience less wage growth following promotions. Weekly hours and overtime hours explain significant fractions of these gender gaps. Though not precisely estimated, gender gaps in promotions also exist among part-time workers.

Introduction

Women struggle to reach the top of the career ladder overall and in particular occupations (e.g., Long, Allison, and McGinnis 1993; Bertrand and Hallock 2001; Matsa and Miller 2011; Goldin and Katz 2012; Smith, Smith, and Verner 2013; Azmat and Ferrer 2017). Likewise, gender differences in earnings *within* establishments appear to grow over the course of the career (Barth, Kerr, and Olivetti 2017; Goldin et al. 2017). Taken together, these findings signal the potential importance of gender differences in *upward mobility via promotions* to gender differences in career outcomes.

In this study, we use a well-defined measure of promotion to provide the first estimates of gender gaps in promotion experiences for a nationally representative sample of Canadian workers between ages 18 and 65 from 2000 to 2004 using data from the Workplace and Employee Survey (WES), a linked employer–employee survey. Women working full time were an estimated 1.8 percentage points less likely to have been promoted between interviews,

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received 0.16 fewer promotions with their current employers, and experienced 2.8 percent less wage growth in the year of a promotion than similar full-time men controlling for worker characteristics, job characteristics, and industry. Thus, we join a large body of research finding that women are less likely to be promoted and enjoy smaller wage returns to promotions than similar men.[1]

In a novel contribution to the literature on gender gaps in promotions, we also report estimates of the gender gaps in promotion experiences among part-time workers. Part-time women were an estimated 4.2 percentage points less likely to have been promoted, received 0.05 fewer promotions with their current employers, and experienced 8.9 percent less wage growth following promotions than similar men. Our sample of part-time workers, however, is one-tenth the size of the full-time sample, and as a result these gender gaps are not precisely estimated. As such, most of our discussion focuses on full-time workers—although we report estimates for both groups of workers and discuss differences where appropriate.

Our primary contribution is to test hypotheses concerning sources of the gender gaps in promotion outcomes using rich information about workers and their employment conditions. First, employers may statistically discriminate against women when making promotion decisions in anticipation of women quitting for family reasons (Becker 1985; Lazear and Rosen 1990). Second, gender differences in hours worked might result in gender differences in promotion rates and the returns to promotions if promotion-track jobs require more hours and human capital acquired through work hours is rewarded more highly following promotions (Gicheva 2013). Third, women may be less likely to be promoted or compensated less generously upon promotion than men if women opt for family-friendly work arrangements as documented in Goldin and Katz (2012) and Goldin (2014) and employers value workers who provide work on-demand and during the employers' preferred hours. Fourth, women may be less likely than men to enter or win promotion contests if women are less competitive than men (Niederle and Vesterlund 2011).

[1] Studies finding that women are less likely to have been promoted include Blau and DeVaro (2007), Cabral, Ferber, and Green (1981), Cannings (1988), Cobb-Clark (2001), Cobb-Clark and Dunlop (1999), Johnston and Lee (2012), Kunze and Miller (2017), McCue (1996), Olson and Becker (1983), Pekkarinen and Vartiainen (2006), and Ransom and Oaxaca (2005). A handful of studies find that women are either more or equally likely to have been promoted relative to similar men (Addison, Ozturk, and Wang 2014a, 2014b; Booth, Francesconi, and Frank 2003; Gerhart and Milkovich 1989; Hersch and Viscusi 1996). Studies finding that women experience smaller wage returns to promotion include Booth, Francesconi, and Frank (2003); Hersch and Viscusi (1996); Johnston and Lee (2012); and van der Klaauw and de Silva (2011). Again, a handful of studies find either that women experience larger or comparable wage returns to promotion relative to men (Addison, Ozturk, and Wang 2014b; Cobb-Clark 2001; Blau and DeVaro 2007; Gerhart and Milkovich 1989; Olson and Becker 1983).

Statistical discrimination models predict that in competitive markets, firms statistically discriminate in promotion decisions but not in the wages paid to promoted workers (e.g., Lazear and Rosen 1990; Bjerk 2008). Employers, however, have less need to statistically discriminate against women who already have children as questions surrounding their labor-force participation conditional on the arrival of children have been answered. Consistent with employers statistically discriminating against women without children in promotion decisions in anticipation of potential quits should they have children, women without children working full time were an estimated 2.7 percentage points less likely to have been promoted than similar men but experienced wage growth following promotions statistically indistinguishable from that of similar promoted men. By contrast, women with children working full time were just as likely to have been promoted but experienced 4.3 percent less wage growth following promotions than similar men—a finding that cannot be rationalized by statistical discrimination. We observe similar family gaps among women working part time.

Turning to the role of hours, gender differences in weekly hours explain as much as a quarter of the gender gap in the probability of promotion and a third of the gender gap in the wage returns to promotion among full-time workers. These findings are consistent with workers who experience higher disutility from work hours (as women might if they value time with family more than men) opting into careers with fewer promotions but also requiring fewer hours. Promoted women who have worked fewer hours than similar promoted men then experience slower wage growth than promoted men if higher-level jobs pay a larger premium for human capital acquired through on-the-job learning (Gicheva 2013). Hours, however, explain none of the gaps among part-time workers as part-time women actually work more hours on average than part-time men.

We find limited evidence that work flexibility contributes to the gender gaps in promotion experiences. Full-time men are actually more likely to work flexible schedules in our sample. Likewise, men and women in our full-time sample are equally likely to work hours that change from week to week, which presumably would be undesirable to women with families. As a result, working flexible or varying hours explains none of the gender gaps in promotion experiences among both full- and part-time workers. At the same time, full-time women in our sample work significantly fewer paid and unpaid overtime hours, which might reflect constraints on women's ability to supply labor at times of the employer's choosing. Controlling for weekly paid and unpaid overtime hours reduces the gender gap in the probability of promotion among full-time workers by nearly a third but explains little of the gender gap in the wage returns to promotion. Firms may consider a worker's ability to supply

work outside of the regular hours when making promotion decisions. Alternatively, overtime hours may serve as a signal of a worker's commitment to the firm—thereby reducing the firm's need to statistically discriminate. Like usual weekly hours, however, overtime hours explain none of the gender gaps among part-time workers as the gender gaps in overtime hours among part-time workers are smaller and not statistically significant.

We also find little evidence that a gender difference in competitiveness contributes to the gender gaps in promotions. Men in our sample are much more likely to work in jobs in which bonuses contribute to compensation—a frequent proxy for the competitiveness of a job (e.g., Manning and Saidi 2010; McGee, McGee, and Pan 2015). Controlling for the receipt of bonuses, however, explains little of the gender gaps in promotion outcomes.

We additionally investigate whether supervisory responsibilities and training participation influence the gender gaps in promotion outcomes. The wage increases associated with promotions are expected to be larger for promotions associated with larger increases in the span of control (Rosen 1982), which we proxy for using the number of workers supervised by a respondent. Full-time (but not part-time) men in our sample supervise significantly more workers than women on average, but this gender difference explains none of the gender gaps in promotions. Similarly, if promotions result in increased job complexity and performance in these jobs is related to prior training, then promotions and the wage growth associated with them may be influenced by prior training. While just as likely to have received training in the previous year, full-time and part-time women had received fewer days of training on average than their male peers. This gender difference, however, explains none of the gender gaps in promotion outcomes.

Far from playing a passive role in firms' promotion decisions, however, workers in many organizations must apply for and otherwise pursue promotions. The WES contains detailed information about workers' views of their employment relationships, which we use to investigate the importance of potential gender differences in "push factors" driving workers to pursue promotions such as a desire for more pay or job (dis)satisfaction. On the one hand, we find no gender differences in full-time workers' desire to work more hours for more pay or their overall satisfaction with their jobs in the initial interview, nor any evidence that women's lower pay satisfaction explains any of the gender gaps in promotion outcomes. On the other hand, we do find evidence of gender differences in the consequences of promotions that may make promotions less attractive to women. Specifically, promoted full-time men—but not promoted women—were more likely than nonpromoted men in the second interview to report working from home and more likely to report that their new jobs led to better hours, promotion opportunities, or bonus

opportunities. Thus promotions may not be as desirable for women as they would be for a similar man, which might lead to a gender difference in the propensity to pursue promotions.

The economics literature on gender gaps in promotion outcomes is also largely silent concerning the role of personnel practices, but behavioral biases in personnel practices may play important roles in these gender gaps. A large literature in psychology and sociology documents that pregnant women and mothers tend to be evaluated as less competent and committed than similar men and childless women in both field and lab settings (Correll, Benard, and Paik 2007; Corse 1990; Cuddy, Fiske, and Glick 2004; Fuegen et al. 2004; Halpert, Wilson, and Hickman 1993). With this in mind, we split our sample into workers whose performance is formally appraised and workers whose performance is not formally appraised. While full-time women in both subsamples are less likely than men to have been promoted, the lower wage returns to promotion for women are driven almost entirely by workers whose performance is formally appraised.

In summary, a number of factors appear to contribute to the difficulties Canadian women experience in climbing the job ladder through promotions. Women without children are less likely than similar men and women with children to be promoted, and gender gaps in overtime hours—which may signal commitment or availability to a firm—account for a large fraction of the gender gap in promotion probabilities. Both findings are consistent with statistical discrimination against women in anticipation of future quits due to family formation. The lower wage returns to promotion, however, experienced by women—particularly those with children—require another explanation. To this end, we find that gender gaps in weekly hours explain a large part of the gender difference in the wage returns to promotion.

In documenting the outsized role of hours in the gender gaps in promotion outcomes, the study contributes to the growing evidence of the importance of work hours to gender gaps more generally while also providing insight into the channels through which work hours affect the gender gaps in labor market outcomes. Goldin (2014), for example, observed that the high-skill occupations with the highest returns to long hours are also the occupations with the largest gender gaps in earnings, while Cortes and Pan (2018) highlighted the potential for reductions in the gender wage gap when cheap labor is available to substitute for home production. Our estimates imply that hours directly influence wages through promotions. Azmat and Ferrer (2017) showed that gender gaps in hours billed account for large portions of the gender gaps in earnings and promotion probabilities among lawyers in the United States. Our study establishes that hours play a significant role in the gender differences in career trajectories and promotions for a representative sample of workers in a wide

variety of occupations. Moreover, by distinguishing between usual weekly hours and usual overtime hours and noting the differences in their effects on promotion outcomes, our findings suggest that work hours likely both result in gender differences in human capital and gender differences in signals sent to employers.

Data

The WES was a longitudinal survey of approximately 6000 Canadian employers and their employees between 1999 and 2006.[2] The target population of employers consisted of all business locations in Canada with paid employees in March of the survey year.[3] A maximum of twenty-four employees were interviewed from each sampled firm in each odd year (1999, 2001, and 2003) and re-interviewed the following year regardless of whether they remained with their initial employer.[4] When properly weighted, the employee sample is representative of the Canadian workforce in the target population of employers; all of our analysis incorporates sample weights from Statistics Canada (2011).

Our main analysis is based on the pooled 2000, 2002, and 2004 cross-sections of employees between the ages of 18 and 65. We further divide the sample into full-time and part-time workers (i.e., those who worked less than 30 hours per week when first interviewed). We exclude working-age respondents from our samples only if they are not re-interviewed or are unemployed as of the second interview. In a later section of this article, we address the possibility that our estimates may be influenced by our focus on workers who do not attrit from the survey and who remain employed.

The dependent variables are an indicator for whether the worker was promoted between interviews, the number of times the worker had been promoted with the employer as of the second interview, and the change in the worker's log-hourly wage between interviews. Changes in pay and responsibilities are

[2] In 2006 only the employer part of the survey was administered. In the 1999, 2001, 2003, and 2005 surveys, the sample of employers was refreshed with new employers from the Statistics Canada Business Register to maintain a representative cross-section of Canadian firms.

[3] Employers in the Yukon, Nunavut, and Northwest Territories and employers operating in crop production, animal production, fishing, hunting, trapping, private households, religious organizations, and public administration were excluded from the sample. Public administration, which includes establishments primarily engaged in the enactment and judicial interpretation of laws and their pursuant regulations and the administration of programs based on them, accounts for around 6.5 percent of employment in Canada (Statistics Canada, Table 281-0024).

[4] The number of workers interviewed from each firm was proportional to the firm's size except for workplaces with fewer than four employees in which all employees were surveyed.

generally thought to be the distinguishing features of promotions (Pergamit and Veum 1999), and our data identify promotions using precisely these two features. Specifically, workers were asked, "Have you ever been promoted while working for this employer? (By promotion we mean a change in duties/responsibilities that led to both an increase in pay and the complexity or responsibility of the job)." If the date of the most recent promotion is after the date of the first interview or if the worker changed employers between interviews and reported having been promoted with the new employer, then the "promoted" indicator is set to 1 and 0 otherwise. If workers indicated that they had been promoted, they were asked the number of times they had been promoted by their current employer. In a later section of the article, we consider the sensitivity of our estimates to alternative measures of promotion.

Table 1 provides summary statistics for the dependent variables used in our analysis for full-time and part-time men and women as a whole and by promotion status. Unconditionally, women in our sample fare worse than men where promotions are concerned. Only 23.1 (13.7) percent of full-time (part-time) women were promoted between interviews compared to 25.9 (18.0) percent of full-time (part-time) men, and full-time (part-time) women had received 0.27 (0.03) fewer promotions with their employers. Likewise, promoted full-time (part-time) women experienced wage growth on average of only 4.8 (3.3) log points between interviews relative to 7.0 (14.5) log points for promoted full-time (part-time) men.

In our preferred regression specifications, we control for race and immigrant status (using indicators for being a white Canadian-born, a visible minority Canadian-born, a white immigrant, or a visible minority immigrant)[5] , gender, language spoken at home, highest level of schooling, age and its square, years of (actual) full-time labor-market experience and its square, and the year in which the interview took place. We also control for whether the respondent's job is part of a collective bargaining agreement (CBA) or union, whether the worker changed employers between interviews, and fourteen industries of employment. Appendix Tables A1a and A1b provide the summary statistics for the controls.

Both full-time and part-time women in our sample had fewer years of experience and were less likely to be high school dropouts than men—characteristics related to the promotion outcomes we examine. Perhaps more importantly, our sample exhibits significant gender segregation by industry with, for instance, 30 percent of full-time women employed in the education and health-

[5] According to Statistics Canada (2006), the visible minority population in Canada consists mainly of individuals of Chinese, South Asian, Black, Arab, West Asian, Filipino, Southeast Asian, Latin American, Japanese, or Korean descent. Our indicator for visible minority status equals 1 if the worker's parents or grandparents belonged to one of these groups.

TABLE 1

SUMMARY STATISTICS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Full-Time Workers					
	Men			Women		
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Promoted in past year	0.259			0.231***		
# of promotions	1.299	0.743	2.890	1.026***	0.611	2.408***
	(2.071)	(1.551)	(2.504)	(1.608)	(1.254)	(1.866)
Δ in log-hourly wage	0.047	0.040	0.070	0.041	0.039	0.048
	(0.219)	(0.218)	(0.219)	(0.206)	(0.194)	(0.241)
Hourly wage (first interview)	22.81	22.48	23.74	17.94***	17.88	18.13***
	(14.01)	(13.64)	(14.96)	(9.77)	(9.66)	(10.12)
# of observations	25,750	19,150	6600	17,720	13,330	4390
	Part-Time Workers					
	Men			Women		
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Promoted in past year	0.180			0.137		
# of promotions	0.474	0.175	1.832	0.441	0.200	1.957
	(1.058)	(0.710)	(1.295)	(1.049)	(0.695)	(1.520)
Δ in log-hourly wage	0.065	0.047	0.145	0.025*	0.024	0.033*
	(0.337)	(0.330)	(0.357)	(0.274)	(0.272)	(0.281)
Hourly wage (first interview)	15.91	15.68	16.93	16.62	16.90	14.88
	(13.17)	(12.23)	(16.83)	(15.61)	(16.33)	(9.78)
# of observations	920	780	140	3260	2800	460

Notes: Standard deviations given in parentheses. For the tests of equality between Columns 1 and 4 and Columns 3 and 6, The number of observations in each cell have been rounded to the nearest ten to minimize residual disclosure risks. Significance levels: *** $p < 0.01$, * $p < 0.10$.

care industries compared to only 10 percent of men, who were more likely than women to work in the manufacturing, construction, and transportation industries. This gender segregation contributes to gender differences in promotion experiences if women work in industries with flatter job ladders, and this appears to be the case. For example, only 16 percent of workers in the education and health-care industries were promoted between interviews compared to 27 percent of workers in all other industries. Given the over-representation of women in this industry, gender segregation along these lines alone is likely to give rise to significant differences in promotion experiences. In the next section, we consider whether differences in worker characteristics, job characteristics, and industries explain the gender differences in promotion experiences.

The remainder of Appendix Table A1 provides the summary statistics for controls used in our tests of hypotheses concerning the roots of the gender gaps in later sections of the article. We discuss these variables in those sections as appropriate.

Gender Gaps in Promotion Outcomes

We begin by discussing our results regarding gender differences in promotion opportunities.

Probability and number of promotions. Panels A and D of Table 2 report the estimated marginal effects of being female on the probability of being promoted from linear probability models with different sets of controls. Unconditionally in column 1, full-time (part-time) women in our sample are 2.8 (4.3) percentage points less likely to have been promoted between interviews than men; they remain an estimated 3.2 (3.8) percentage points less likely to have been promoted controlling for worker and job characteristics in column 2. In the significantly smaller part-time sample, the gender gaps are never statistically significant at conventional levels—although the *p*-values for the female coefficient estimates are below 0.20 in each specification. Controlling for industries in column 3, the estimated gender gap among full-time workers falls to 1.8 percentage points but remains significant at the 10-percent level. By contrast, controlling for industry has little effect on the estimated gender gap among part-time workers—largely because of the concentration of part-time workers in a small number of industries (e.g., retail). Column 4 adds five indicators for a respondent's occupation, and the gender gaps in promotion probabilities are largely unchanged but no longer statistically significant at conventional levels in either sample. The occupational categories, however, include "managers." Because a managerial position is likely the byproduct of prior promotions, we regard the occupation controls as potentially endogenous and treat column 3 without these controls as our preferred specification throughout the paper.

Finally, men and women may systematically sort into firms with different promotion opportunities. DeVaro and Brookshire ([2007), for example, found that promotions are less common in nonprofit firms in which women are disproportionately employed. Column 5 reports estimates from a specification incorporating firm fixed effects. Full-time women remain an estimated 1.9 percentage points less likely to have been promoted than men—suggesting that gender differences in sorting across firms cannot account for the gender gaps in promotions among full-time workers. Among part-time workers, the gender gap grows to 9 percentage points, suggesting that part-time women may be employed in firms offering more promotion opportunities than their male peers.

Differences in the probability of promotion may understate gender differences in promotion experiences if men and women are promoted with different frequency. We take up this issue in panels B and E of Table 2 by reporting ordinary least squares (OLS) estimates of the marginal effects of being female on the number of promotions received with the employer as of the second

TABLE 2

GENDER AND PROMOTION OUTCOMES

Variable	(1)	(2)	(3)	(4)	(5)
	Full-Time Workers (N=43,470):				
	Panel A: Whether Promoted between Interviews				
Female	–0.028***	–0.032***	–0.018*	–0.017	–0.019
	(0.010)	(0.009)	(0.010)	(0.010)	(0.012)
	Panel B: Number of Promotions with the Employer				
Female	–0.273***	–0.237***	–0.157***	–0.087**	–0.100**
	(0.041)	(0.040)	(0.040)	(0.040)	(0.049)
	Panel C: Log-Wage Growth between Interviews				
Female & promoted	–0.022	–0.025*	–0.028**	–0.031**	–0.028*
	(0.014)	(0.013)	(0.013)	(0.014)	(0.017)
Female & not promoted	–0.000	–0.003	–0.007	–0.010*	–0.009
	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)
Promoted	0.030***	0.026***	0.026***	0.026***	0.025***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
	Part-Time Workers (N = 4180):				
	Panel D: Whether Promoted between Interviews				
Female	–0.043	–0.038	–0.042	–0.037	–0.090
	(0.030)	(0.030)	(0.030)	(0.032)	(0.063)
	Panel E: Number of Promotions with the Employer				
Female	–0.033	–0.057	–0.054	–0.021	–0.071
	(0.061)	(0.065)	(0.065)	(0.066)	(0.126)
	Panel F: Log-Wage Growth between Interviews				
Female & promoted	–0.113*	–0.085	–0.089*	–0.090*	–0.149
	(0.063)	(0.053)	(0.053)	(0.051)	(0.099)
Female & not promoted	–0.023	–0.032	–0.033	–0.036	–0.046
	(0.024)	(0.024)	(0.025)	(0.025)	(0.041)
Promoted	0.098	0.061	0.063	0.062	0.064
	(0.063)	(0.052)	(0.051)	(0.050)	(0.093)
Controls:					
Worker & job characteristics		X	X	X	X
Industry			X	X	
Occupation				X	
Firm effects					X

Notes: Robust standard errors clustered at the firm level are reported in parentheses. Panels A and B (D and E) report the estimated marginal effects of being female among full-time (part-time) workers in linear probability models of the probability of being promoted between interviews and on the number of promotions with the employer estimated using ordinary least squares (OLS), respectively. Panels C and F report coefficient estimates for indicators for being a promoted woman, a nonpromoted woman, and for being a promoted worker from log-wage growth models using OLS. The controls are those listed in Table 1.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

interview. Unconditionally in column 1, full-time women had received 0.27 fewer promotions with their employer than their male peers. This gender gap falls to 0.16 fewer promotions in our preferred specification controlling for worker and job characteristics and industry in column 3. Controlling for occupations in column 4 or incorporating firm fixed effects in column 5 further reduces the gender gap in the number of promotions received among full-time

workers, but even with these controls the gap—slightly less than 10 percent of the mean number of promotions in our sample—remains significant at the 5-percent level.[6] Among part-time workers, we find no evidence of a gender gap in the number of promotions received.

Wage returns to promotion. To investigate gender differences in the wage returns to promotion, we estimate by OLS the log-wage growth model:

$$\Delta w_i = \alpha_0 NPF_i + \alpha_1 P_i + \alpha_2 PF_i + X_i\Theta + e_i \qquad (1)$$

where Δw_i is the change in log-wages between interviews for worker i, NPF_i is an indicator for being a nonpromoted female, P_i is an indicator for being promoted between interviews, PF_i is an indicator for being a promoted female, X_i is a vector of controls, and e_i is the error term. The omitted category is a man who is not promoted between interviews.

Panels C and F of Table 2 reports the estimated gender differences in the wage returns to promotion for specifications of (1) with different sets of controls.[7] Unconditionally in column 1, full-time (part-time) women experienced 2.2 (11.3) percent less wage growth following a promotion compared to their male counterparts. Controlling for worker characteristics, job characteristics, and industry in columns 2 and 3 has little effect on this gender gap: promoted full-time (part-time) women experienced an estimated 2.8 (8.9) percent less wage growth between interviews than similar promoted full-time (part-time) men—whose wages increased by 2.6 (6.3) percent relative to nonpromoted men—in our preferred specification in column 3. Likewise, the gender gap in the wage returns to promotion is little changed by the addition of controls for occupation and firm effects in columns 4 and 5, respectively.

In all of our models of promotion outcomes in Table 2, we fail to reject the equality of the full-time and part-time gender gaps—though this is in part due to the lack of statistical power in the smaller part-time sample. The most notable difference in the point estimates for part-time and full-time workers lies in

[6] We estimate both the probability and number of promotions models by OLS in order to incorporate firm effects in column 5. Appendix Table A2 reports the estimated marginal effects for the models in columns 1 to 4 using Probit and Poisson estimators, respectively. In all specifications, these estimates are similar to those reported in Table 2, and thus we use the linear estimators throughout the paper.

[7] Different specifications have been used in the literature to estimate the relationship between promotions and the change in log-wages. In addition to the regressions in Table 2, we also estimated first-difference models including changes in worker characteristics among the controls as in Cobb-Clark (2001) and models allowing the returns to worker characteristics to depend on whether one was promoted given that the marginal productivities of skills may be different in the new position. In each of these specifications, however, the estimated gender differences in the wage returns to promotion unexplained by the controls were similar to those reported in Table 2.

the wage returns to promotion with the wages of promoted part-time women falling further behind those of their promoted male peers than do the wages of promoted full-time women. This difference, however, stems largely from the lower wage levels among part-time workers. As a consequence, part-time workers experience faster wage growth in percent terms. Indeed, promotions are associated with 6.6 percent faster wage growth for part-time men.

Understanding the Gender Gaps in Promotion Outcomes

Helping women keep up with men in climbing the job ladder requires an understanding of the promotion dynamics that hinder women's upward mobility. In this section, we consider whether statistical discrimination against women and gender differences in hours worked, job flexibility, competitiveness, supervisory responsibilities, and training contribute to the gender gaps in promotion experiences documented in the previous section.

Family gap in promotion experiences. Lazear and Rosen (1990) model employers who—uncertain about workers' valuation of nonmarket activities and thus their propensity to quit—promote fewer women under the assumption that women place a higher value on nonmarket activities. We note that employers likely face less uncertainty concerning the value attached to nonmarket activities and homecare by women with children. These employees have already revealed their commitment to the employer (and thus their propensity to quit) in the presence of children. Women without children, however, may face the same choices should they become mothers in the future. As such, statistical discrimination may be more relevant to promotion decisions involving women without children.[8]

Bjerk (2008), by contrast, assumes that employers never directly observe productivity but instead observe a series of signals from the worker's history. These signals may take the form of performance on work tasks but also impressions made in social activities. If women send fewer signals to employers, employers may promote women at lower rates than their male peers. Women with children may be more constrained in their ability to send ability signals to employers than other women. If women with children participate in fewer outside social activities or generally engage in fewer signaling activities

[8] Our interest in the role of families in promotion decisions is further motivated by evidence of the important role for families and fertility decisions in gender differences in earnings (e.g., Lundberg and Rose 2000; Phipps, Burton, and Lethbridge 2001; England et al. 2016; Budig, Misra, and Boeckmann 2012) and in promotion outcomes specifically (e.g., Kunze 2015; Addison, Ozturk, and Wang 2014a; Azmat and Ferrer 2016).

than women without children—which seems plausible given the difference in time constraints faced by the two groups—then statistical discrimination may be more relevant to promotion decisions involving women with children.

Importantly, both models—despite their different assumptions about the uncertainty faced by employers—predict that promoted workers will be paid similarly regardless of gender. Thus, neither model of statistical discrimination predicts that women would experience less wage growth following promotions than similar men.[9]

In Table 3a, we report estimates similar to those in Table 2 distinguishing between women with and without children working full time. Women without children are 2.7 percentage points less likely to have been promoted than similar men controlling for worker and job characteristics and industry in column 3, while women with children are not significantly less likely than men to have been promoted.[10] Results reported in panel B however suggest that while women with children seem to fare better in terms of probability of promotion, both women with and without children are promoted less frequently (receive 0.17 and 0.14 fewer promotions, respectively) compared to their male counterparts. Therefore, there seems to exist factors other than statistical discrimination based on women's fertility decisions that drive gender differences in promotion outcomes. Finally, examining differences in wage returns to promotion, we find that compared to our estimates in panel A the "family gap" is reversed in the wage growth associated with promotions. More specifically, promoted women without children experience 1.4 percent less wage growth following promotions than similar promoted men, but this gender gap is not statistically significant. By contrast, promoted women with children experience a statistically significant 4.3 percent less wage growth than promoted men.

Similar family gaps exist among part-time women. Women without children are less likely to have been promoted than similar men and women with children, but women with children experience less wage growth following promotions than similar men and women without children. While the magnitudes of the family gaps among women in Tables 3a and 3b are economically meaningful, we note, however, that we fail to reject the equality of the coefficients for women with and without children at conventional levels in all specifications.

Nevertheless, the estimates in Tables 3a and 3b are consistent with Lazear and Rosen's (1990) prediction that employers statistically discriminate in promotion decisions against women who have not yet had children. Neither

[9] Lazear and Rosen's (1990) model suggests that, if anything, promoted women may experience faster wage growth as a promoted woman would presumably be more productive than a similar man on average.

[10] Kunze (2015), by contrast, found that women with children were less likely than other women to move up the job ladder.

TABLE 3A

FAMILY GAPS AMONG WOMEN IN PROMOTIONS (FULL-TIME WORKERS)

Variable	(1)	(2)	(3)	(4)	(5)
	Panel A: Whether Promoted between Interviews				
Female with children	–0.026**	–0.022*	–0.007	–0.006	–0.007
	(0.012)	(0.012)	(0.013)	(0.013)	(0.016)
Female without children	–0.030**	–0.040***	–0.027**	–0.025**	–0.029**
	(0.012)	(0.011)	(0.011)	(0.011)	(0.014)
p-value	0.793	0.199	0.136	0.152	0.132
	Panel B: Number of Promotions with the Employer				
Female with children	–0.244***	–0.225***	–0.142***	–0.080*	–0.110*
	(0.049)	(0.048)	(0.048)	(0.047)	(0.059)
Female without children	–0.298***	–0.248***	–0.170***	–0.093**	–0.091*
	(0.048)	(0.046)	(0.047)	(0.046)	(0.054)
p-value	0.283	0.650	0.572	0.794	0.729
	Panel C: Log-Wage Growth between Interviews				
Female with children & promoted	–0.046*	–0.040*	–0.043*	–0.046*	–0.043
	(0.025)	(0.024)	(0.024)	(0.024)	(0.028)
Female without children & promoted	–0.000	–0.011	–0.014	–0.018	–0.016
	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
Female with children & not promoted	–0.001	–0.000	–0.004	–0.008	–0.006
	(0.006)	(0.006)	(0.006)	(0.006)	(0.008)
Female without & not promoted	0.000	–0.005	–0.009	–0.012*	–0.011
	(0.006)	(0.007)	(0.007)	(0.007)	(0.009)
Promoted	0.030***	0.026***	0.026***	0.026***	0.025***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
p-value	0.077	0.234	0.234	0.251	0.313
Controls:					
Worker & job characteristics		X	X	X	X
Industry			X	X	
Occupation				X	
Firm effects					X

Notes: Robust standard errors clustered at the firm level are reported in parentheses. The estimation sample includes 43,470 observations. See the notes for Table 2 describing the regressions reported in panels A, B, and C. In panels A and B, the *p*-value reported is for the Wald test of equality of the coefficient estimates for the female with children and female without children indicators, while in panel C the *p*-value is for the test of equality of the coefficients for promoted women with and without children.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Lazear and Rosen's nor Bjerk's (2008) model of statistical discrimination, however, can account for why women with children experience less wage growth following promotions than men and other women.

The role of hours. Promoted, full-time men in our sample worked on average just over 41 hours per week, while promoted women worked 38.5 hours. If workers "learn-by-doing," promoted men may be more skilled than similar promoted women when not controlling for hours worked. Furthermore, if the returns to skill increase with the complexity of one's work,

TABLE 3B

FAMILY GAPS AMONG WOMEN IN PROMOTIONS (PART-TIME WORKERS)

Variable	(1)	(2)	(3)	(4)	(5)
	Panel A: Whether Promoted between Interviews				
Female with children	–0.029	–0.016	–0.020	–0.017	–0.065
	(0.031)	(0.034)	(0.034)	(0.035)	(0.072)
Female without children	–0.059*	–0.053*	–0.057*	–0.051	–0.119*
	(0.032)	(0.032)	(0.032)	(0.033)	(0.066)
p-value	0.135	0.130	0.121	0.148	0.201
	Panel B: Number of Promotions with the Employer				
Female with children	0.001	0.001	–0.002	0.026	–0.024
	(0.068)	(0.076)	(0.076)	(0.077)	(0.156)
Female without children	–0.070	–0.095	–0.090	–0.054	–0.093
	(0.068)	(0.069)	(0.069)	(0.070)	(0.128)
p-value	0.241	0.134	0.166	0.208	0.567
	Panel C: Log-Wage Growth between Interviews				
Female with children & promoted	–0.121*	–0.095	–0.101*	–0.099*	–0.158
	(0.067)	(0.059)	(0.059)	(0.057)	(0.111)
Female without children & promoted	–0.102	–0.075	–0.077	–0.080	–0.144
	(0.068)	(0.058)	(0.058)	(0.057)	(0.115)
Female with children & not promoted	–0.021	–0.039	–0.040	–0.041	–0.059
	(0.026)	(0.027)	(0.028)	(0.028)	(0.042)
Female without & not promoted	–0.025	–0.028	–0.028	–0.033	–0.039
	(0.027)	(0.025)	(0.026)	(0.026)	(0.043)
Promoted	0.098	0.061	0.063	0.062	0.064
	(0.063)	(0.052)	(0.051)	(0.050)	(0.093)
p-value	0.707	0.688	0.658	0.717	0.898
Controls:					
Worker & job characteristics		X	X	X	X
Industry			X	X	
Occupation				X	
Firm effects					X

Notes: Robust standard errors clustered at the firm level are reported in parentheses. The estimation sample includes 4180 observations. See the notes for Table 2 describing the regressions reported in panels A, B, and C. In panels A and B, the *p*-value reported is for the Wald test of equality of the coefficient estimates for the female with children and female without children indicators, while in panel C the *p*-value is for the test of equality of the coefficients for promoted women with and without children.

Significance level: * $p < 0.10$.

then the wage returns to promotion would be larger for men than for women without controlling for hours. This observation is at the heart of Gicheva's (2013) model, which further assumes that workers sort into promotion-track and non–promotion-track jobs based on their observed ability and unobserved preferences for leisure or nonmarket activities. Because promotion-track jobs require longer hours, hours worked should also be related to promotion probabilities.

Assessing the contribution of weekly hours to the gender gap in the wage returns to promotion, however, is complicated by the fact that weekly hours

may be endogenous if they are a function of prior promotion outcomes.[11] Appendix Table A3 reports coefficient estimates for various controls used in our analysis from regressions in which the dependent variables are an indicator for having been promoted by the employer as of the first interview and the number of times the respondent had been promoted by the employer as of the first interview. Among full-time workers, usual week hours appear to be uncorrelated with prior promotions, but paid and unpaid overtime hours are both positively and significantly correlated with prior promotions. Among part-time workers, both usual weekly hours and paid overtime hours are positively and significantly correlated with prior promotions.

Table 4 reports the estimated gender gaps controlling for hours. Column 1 repeats the OLS estimates for full-time workers from our preferred specification in column 3 of Table 2. Adding weekly hours to the controls in column 2 in panel A reduces the gender gap in the probability of promotion from 1.8 percentage points to 1.4 percentage points, and the gender gap is no longer statistically significant at conventional levels. That weekly hours account for approximately 20 percent of the gender gap in promotion probabilities is consistent with Azmat and Ferrer's (2017) finding that hours billed explain more than a third of the gender gap in promotion probabilities among lawyers and with Gicheva's (2013) assumption that promotion-track jobs require longer hours that women opt out of. While our estimates may suffer from some endogeneity bias, they nevertheless suggest that work hours matter for promotion probabilities across a wider variety of occupations in a representative sample of workers.

Controlling for usual weekly hours has the smallest effects in the models of the number of promotions received in panel B for full-time workers. Given that some promotions with the employer may have been received long before the first interview, the total number of promotions received may be less sensitive to the hours worked at the time of first interview.

Panel C considers the role of usual weekly hours in the gender gap in the wage returns to promotion. Adding weekly hours in column 2, the estimated gender gap in the wage returns to promotion among full-time workers falls to 1.8 percent from 2.8 percent in column 1, and the gender gap is no longer statistically significant. Thus the estimates in Table 4 are consistent with

[11] In addition, hourly wages in the WES are constructed using respondents' reported weekly hours. Measurement error in usual weekly hours will affect the change in log-hourly wages between interviews, leading to a positive "division bias" when including weekly hours as a control in the log-wage growth models (Borjas 1980). In an earlier version of the paper, however, we instrumented for the respondent's weekly hours using the hours of a similar, same-gender coworker—which are presumably unaffected by measurement error in the respondent's hours. While this instrument is unlikely to satisfy the necessary exclusion restriction for a valid instrument, the coefficient estimates were similar to those reported in Table 4, leading us to infer that the "division bias" in our sample is not particularly severe.

TABLE 4

ROLE OF WEEKLY HOURS IN THE GENDER GAPS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Full-Time Workers (N = 43,470):[			Part-Time Workers (N = 4180):		
	Panel A: Whether Promoted between Interviews					
Female	–0.018*	–0.014	–0.009	–0.042	–0.042	–0.041
	(0.010)	(0.010)	(0.010)	(0.030)	(0.030)	(0.031)
Weekly hours		0.001	0.001		0.001	0.001
		(0.001)	(0.001)		(0.001)	(0.001)
Paid overtime hours			0.005***			0.004
			(0.001)			(0.005)
Unpaid overtime hours			0.003***			0.003
			(0.001)			(0.003)
	Panel B: Number of Promotions with the Employer					
Female	–0.157***	–0.153***	–0.127***	–0.054	–0.060	–0.057
	(0.040)	(0.042)	(0.042)	(0.065)	(0.066)	(0.066)
Weekly hours		0.002	0.001		0.008*	0.008*
		(0.004)	(0.004)		(0.004)	(0.004)
Paid overtime hours			0.005			0.036**
			(0.004)			(0.016)
Unpaid overtime hours			0.030***			0.009
			(0.004)			(0.008)
	Panel C: Log-Wage Growth between Interviews					
Female & promoted	–0.028**	–0.018	–0.016	–0.089*	–0.090*	–0.093*
	(0.013)	(0.013)	(0.013)	(0.053)	(0.053)	(0.052)
Female & not promoted	–0.007	0.005	0.006	–0.033	–0.035	–0.036
	(0.006)	(0.006)	(0.006)	(0.025)	(0.025)	(0.025)
Promoted	0.026***	0.026***	0.025***	0.063	0.062	0.064
	(0.007)	(0.007)	(0.007)	(0.051)	(0.051)	(0.051)
Weekly hours		0.005***	0.005***		0.002*	0.002*
		(0.001)	(0.001)		(0.001)	(0.001)
Paid overtime hours			0.004***			0.007*
			(0.001)			(0.004)
Unpaid overtime hours			–0.002***			–0.004*
			(0.001)			(0.002)

Notes: Standard errors clustered at the firm level are reported in parentheses. All of the regressions control for worker characteristics, job characteristics, and industry; see the notes for Table 2. Columns 1 to 3 report estimates using the full-time worker sample, while columns 4 to 6 report estimates for the part-time worker sample. Columns 1 and 4 repeat the estimates from column 3 of Table 2. Columns 2 and 5 report OLS estimates controlling for usual weekly hours; unpaid and paid overtime hours are added as controls in columns 3 and 6.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Gicheva's (2013) model in which a gender gap in the wage returns to promotion emerges because full-time women work fewer hours and human capital is more highly valued following promotions.

In addition to their usual weekly hours, respondents also reported the average number of hours spent each week working paid and unpaid overtime; these average overtime hours are included in usual weekly hours. As such, longer overtime hours should not result in more human capital through

learning-by-doing conditional on usual weekly hours. Instead, overtime hours may serve as a signal of commitment to the firm or of a worker's ability to provide labor on demand when required. Like usual weekly hours, significant gender gaps exist in the number of overtime hours worked. Full-time women worked only 1.8 (0.6) hours of unpaid (paid) overtime per week compared to 2.4 (1.7) hours per week for men.

Adding paid and unpaid overtime hours to the controls in column 3, the gender gap in promotion probabilities among full-time workers falls by more than a third relative to that in column 2 to 0.9 percentage points. The reduction in the gender gap conditional on overtime hours is consistent with employers using overtime hours to infer a worker's commitment or ability to provide labor on demand when making decisions. Overall, this reinforces our impression from a previous section that statistical discrimination against women may be important in promotion decisions.

Overtime hours explain much less of the gender gap in the wage returns to promotions. The estimated gender gap among promoted full-time workers is little changed at 1.6 percent controlling for paid and unpaid overtime hours. This too is consistent with overtime hours signaling a worker's commitment or ability to provide hours on demand but not necessarily increasing one's productivity conditional on usual weekly hours.[12]

Hours clearly play a much smaller role in promotion outcomes in part-time employment. Part-time women actually work more weekly hours than part-time men, and the gender differences in overtime hours among part-time workers are not significant. As such, controlling for weekly hours and overtime hours in the part-time sample has no effect on the models of promotion outcomes in columns 5 and 6 of Table 4.

Flexible and stable schedules. In light of the importance of hours worked, Goldin (2014) emphasized the potential for flexible work arrangements to ameliorate gender differences in labor-market outcomes. The persistence of gender gaps, however, suggests that employers may not value work flexibility in the same way employees might or that many production technologies are not amenable to flexible labor hours. In a compensating differentials framework, workers may have to sacrifice pay for flexibility. Here we consider whether workers trade flexibility for promotion opportunities or wage growth associated with promotions.

Specifically, we proxy for flexible work arrangements using an indicator for whether the respondent works a fixed number of hours at times chosen by the

[12] Kato, Ogawa, and Owan (2016) proposed a model in which workers signal commitment to the firm by working long hours, and firms in turn use this information to make training and subsequent promotion decisions.

employee. Controlling for flexible hours in column 2 of Table 5 has no effect on any of the gender gaps in our preferred specification (reported in column 1) in either the full-time or part-time samples.

Alternatively, women may avoid jobs in which the hours vary from week to week, while employers might value workers who can make themselves available for varying hours and either promote them with greater frequency or reward them with faster wage growth. Column 3 adds to the controls an indicator for working varying hours, and again we find no appreciable effects on the gender gaps in either sample.

Competitiveness. If women prefer to avoid competition, they may avoid jobs in which competitive promotions play an important role in career trajectories and thus may be less likely to be promoted. We proxy for the competitiveness of the respondent's job using an indicator for whether the respondent worked for bonuses given that performance pay is the real-world analog of the competitive compensation schemes women have been shown to avoid in the lab. The means in Appendix Tables A1a and A1b indicate that full-time (but not part-time) men in our sample are indeed significantly more likely than full-time women to work in jobs with competitive compensation. Controlling for the receipt of bonuses in column 4 of Table 5, however, has little effect on the gender gaps in promotion outcomes in either sample. The gender gap in the probability of promotion in the full-time sample falls as hypothesized to 1.6 percentage points but remains statistically significant.

Supervisory responsibility. The pay increases associated with promotions should be increasing in the span of control enjoyed by a promoted worker (e.g., Rosen 1982). In the first interview, men in our full-time (but not in our part-time) sample report supervising significantly more workers than women. If the number of workers supervised proxies for the span of control that workers enjoy upon promotion, then the wage growth following promotions should be positively correlated with the number of workers supervised, and the gender gap in the wage growth associated with promotions may be partly attributed to the gender difference in supervisory responsibility. Column 5 of Table 5 adds the number of workers supervised (standardized within our sample to minimize the influence of outliers) as a control. While supervisory responsibility is positively correlated with all of the promotion outcomes, the gender gaps are unchanged by this additional control.

Training. Women—particularly those with competing family responsibilities—may be less likely to invest in human capital through on-the-job

TABLE 5

POTENTIAL SOURCES OF THE GENDER GAP IN PROMOTION OUTCOMES

Variable	(1)	(2)	(3)	(4)	(5)	(6)
		Additional Controls:				
		Flexible Hours	Varying Hours	Bonuses	Workers Supervised	Training Received
		Full-time workers (N=43,470):				
		Panel A: Whether Promoted between Interviews				
Female	–0.018*	–0.018*	–0.018*	–0.016*	–0.017*	–0.018*
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
		Panel B: Number of Promotions with the Employer				
Female	–0.157***	–0.147***	–0.160***	–0.143***	–0.140***	–0.160***
	(0.040)	(0.041)	(0.040)	(0.040)	(0.041)	(0.040)
		Panel C: Log-Wage Growth between Interviews				
Female & promoted	–0.028**	–0.027**	–0.027**	–0.029**	–0.028**	–0.028**
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Female & not promoted	–0.007	–0.007	–0.006	–0.008	–0.007	–0.007
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Promoted	0.026***	0.026***	0.026***	0.028***	0.026***	0.026***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
		Part-Time Workers (N = 4180):				
		Panel D: Whether Promoted between Interviews				
Female	–0.042	–0.041	–0.044	–0.042	–0.041	–0.038
	(0.030)	(0.030)	(0.031)	(0.031)	(0.030)	(0.029)
		Panel E: Number of Promotions with the Employer				
Female	–0.054	–0.055	–0.064	–0.053	–0.051	–0.051
	(0.065)	(0.065)	(0.065)	(0.065)	(0.065)	(0.065)
		Panel F: Log-Wage Growth between Interviews				
Female & promoted	–0.089*	–0.088*	–0.085	–0.088*	–0.089*	–0.093*
	(0.053)	(0.052)	(0.053)	(0.053)	(0.053)	(0.053)
Female & not promoted	–0.033	–0.033	–0.030	–0.034	–0.033	–0.032
	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)	(0.025)
Promoted	0.063	0.062	0.064	0.062	0.063	0.064
	(0.051)	(0.051)	(0.052)	(0.051)	(0.051)	(0.051)

Notes: Robust standard errors clustered at the firm level are reported in parentheses. Column 1 reports the estimates from our preferred specification in column 3 of Table 2. Column 2 adds to the specification in column 1 an indicator for whether the respondent works flexible hours. Column 3 adds to the controls in column 1 an indicator for whether the respondent's hours vary from week to week. Column 4 adds to the controls in column 1 an indicator for whether the respondent receives bonuses as part of their compensation. Column 5 adds to the controls in column 1 a standardized measure of the number of workers supervised by the respondent. Column 6 adds to the controls in column 1 an indicator for whether the respondent received training (whether through the employer or not) in the previous 12 months and the number of days of training received.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

training and other employer-sponsored training or may be less likely to be offered such training by their employers (e.g., Duncan and Hoffman 1979; Olsen and Sexton 1996; Royalty 1996). If the returns to human capital are higher in post-promotion jobs, a gender gap in training could lead to gender gaps in the wage returns to promotion (rather than simply a gender gap in wage growth). The means in Appendix Tables A1a and A1b indicate that

while both full-time and part-time women were more likely to have participated in training, they had received fewer days of training in the 12 months prior to the first interview than similar men. Column 6 of Table 5 adds to our preferred specifications an indicator for whether the worker received any training (from the employer or not) in the previous 12 months and the number of days of training received. Controlling for the receipt of training, however, has no appreciable effects on the gender gaps in Table 5 in either sample.

"Push" Factors, Promotion Consequences, and Appraisal Biases

In this section, we consider the role of workers and personnel practices in promotion decisions. Specifically, we investigate whether gender differences exist in initial job conditions that "push" workers to pursue promotions. Alternatively, the "push" factors may stem from workers being forward-looking, and we evaluate whether gender differences exist in the consequences of promotions that may lead men and women to differ in their propensity to seek promotions. Finally, we consider whether the use of formal performance appraisals is related to the gender gaps in promotion outcomes in light of evidence that women and particularly mothers tend to be evaluated less favorably than similar men.

"Push" factors. In many firms, workers must actively apply for and seek promotions. Women may differ from men in the "push" factors that drive workers to pursue promotions. That is, workers who are less satisfied with their current job or who place a higher value on the benefits of promotions are more likely to pursue promotions. Appendix Tables A1a and A1b provides the means for indicators for whether a respondent reports in the first interview wanting to work more hours for more pay, whether the respondent is satisfied with his/her pay, and whether the respondent is satisfied overall with his/her job. Perhaps not surprisingly in light of the evidence of gender gaps in pay, both part-time and full-time women were significantly less likely than men to report being satisfied with their pay. Part-time men were also more likely to report a desire to work more hours than part-time women. Both a desire for more pay and the (presumably related) desire for more hours might make workers more inclined to pursue promotions. At the same time, men and women in both samples were equally likely to report being satisfied overall with their current jobs.

Columns 2, 3, and 4 of Table 6 add to the controls an indicator for the desire to work more hours, an indicator for being satisfied with one's pay, and

an indicator for being satisfied with one's job, respectively. The gender gaps in promotion outcomes, however, are not affected by any of these controls in either the full-time or part-time sample.

Promotion consequences. Alternatively, workers may be forward-looking when considering whether to pursue promotions. If promotions have undesirable consequences, women may be dissuaded from pursuing them. In this section, we consider how being promoted affects various aspects of work arrangements for men and women.

Specifically, we regress indicators for whether a respondent worked flexible hours; whether the respondent worked at home; whether the respondent reported better hours, better promotion opportunities, or better bonus opportunities on a new job; the change in the respondent's log-weekly hours; and the change in the number of employees supervised by the respondent on indicators for being a promoted worker, a promoted female, and a nonpromoted female. These dependent variables are measured in the second interview, and the regressions reported in Table 7 additionally control for worker and job characteristics and industry measured in the first interview. When the dependent variable is whether the respondent worked a flexible schedule or worked at home, we also control for whether the respondent reported working a flexible schedule or working at home in the first interview. Respondents only indicated whether their new job offered better hours, promotion opportunities, or bonus opportunities if they changed jobs between interviews; only 7210 of the 47,651 respondents in the full- and part-time samples report changing jobs between interviews.

The estimates in Table 7 suggest that promotions may have different implications for promoted men and women. For full-time and part-time men, being promoted increases the probability of working at home and reporting that one's new job comes with better hours, better promotion opportunities, and better bonus opportunities. By contrast, the only significant effect of promotions on both full-time and part-time women is an increase in the probability of reporting better promotion opportunities. While these are hardly estimates of causal effects, the estimates are consistent with the notion that promotions may be more attractive to men than to women. Whether these gender differences in the consequences of promotions dissuade women from pursuing promotions is an intriguing but difficult question that we leave for future research.

Appraisal biases. A conclusion one reaches from the preceding analysis is that—apart from the significant role played by hours—the gender gaps in promotion outcomes are difficult to explain through the traditional lens of models

TABLE 6

"PUSH FACTORS" AND APPRAISAL BIASES

	(1)	(2)	(3)	(4)	(5)	(6)
		Additional Controls				
		More Hours	Satisfied with Pay	Satisfied with Job	Appraised Formally	No Formal appraisal
			Full-Time Workers (N = 43,470):			
			Panel A: Whether Promoted between Interviews			
Female	–0.018*	–0.017*	–0.018*	–0.018*	–0.019	–0.016
	(0.010)	(0.010)	(0.010)	(0.010)	(0.013)	(0.015)
			Panel B: Number of Promotions with the Employer			
Female	–0.157***	–0.159***	–0.152***	–0.158***	–0.134**	–0.187***
	(0.040)	(0.041)	(0.041)	(0.041)	(0.052)	(0.060)
			Panel C: Log-Wage Growth between Interviews			
Female & promoted	–0.028**	–0.028**	–0.028**	–0.028**	–0.041**	–0.004
	(0.013)	(0.013)	(0.013)	(0.013)	(0.018)	(0.014)
Female & not promoted	–0.007	–0.007	–0.007	–0.007	–0.015**	0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.010)
Promoted	0.026***	0.026***	0.026***	0.026***	0.021**	0.029***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.011)
			Part-Time Workers (N = 4180):			
			Panel D: Whether Promoted between Interviews			
Female	–0.042	–0.038	–0.041	–0.042	–0.033	–0.047
	(0.030)	(0.030)	(0.030)	(0.030)	(0.043)	(0.039)
			Panel E: Number of Promotions with the Employer			
Female	–0.054	–0.050	–0.050	–0.054	–0.053	–0.065
	(0.065)	(0.064)	(0.065)	(0.065)	(0.097)	(0.085)
			Panel F: Log-Wage Growth between Interviews			
Female & promoted	–0.089*	–0.086*	–0.088*	–0.088*	–0.062	–0.117
	(0.053)	(0.052)	(0.053)	(0.052)	(0.064)	(0.082)
Female & not promoted	–0.033	–0.032	–0.034	–0.033	–0.038	–0.018
	(0.025)	(0.025)	(0.025)	(0.025)	(0.027)	(0.041)
Promoted	0.063	0.062	0.062	0.063	0.035	0.103
	(0.051)	(0.051)	(0.051)	(0.051)	(0.065)	(0.078)

Notes: Robust standard errors clustered at the firm level are reported in parentheses. Column 1 reports the estimates from our preferred specification in column 3 of Table 2. Column 2 adds to the specification in column 1 an indicator for whether the respondent reported a desire to work more hours in the first interview. Column 3 adds to column 1 an indicator for whether the respondent reported being satisfied with their pay in the first interview. Column 4 adds to column 1 an indicator for whether the respondent reported being satisfied overall with their job in the first interview. Column 5 restricts the sample to respondents who report that their performance was appraised through a formal process. Column 6 reports the estimates for respondents whose performance was not appraised through a formal process.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

focused on human capital, signaling, and compensating differentials. One possibility is that the human resource practices of firms may disadvantage women in internal promotion decisions.

As discussed in the introduction, a large literature documents gender differences in the way workers are evaluated—particularly in the way mothers are evaluated. In columns 5 and 6 of Table 6, we split the sample into two groups: workers whose performance is appraised through a formal process

TABLE 7

GENDER DIFFERENCES IN PROMOTION CONSEQUENCES

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable						
	Flexible Hours	Work at Home	Better Hours	Better Promotion Opportunity	Better Bonus Opportunity	Δ in Log-Weekly Hours	Δ in # of Employees Supervised
	Full-Time Workers (N = 43,470):						
Female & promoted	–0.024	–0.030*	–0.073*	0.058	–0.049	0.002	0.069
	(0.021)	(0.017)	(0.043)	(0.040)	(0.040)	(0.006)	(0.074)
Female & not promoted	–0.028**	–0.038***	0.023	–0.012	0.053	–0.020***	0.023
	(0.013)	(0.010)	(0.036)	(0.039)	(0.036)	(0.005)	(0.015)
Promoted	0.016	0.038***	0.054	0.145***	0.086**	0.003	0.032
	(0.015)	(0.013)	(0.038)	(0.038)	(0.036)	(0.005)	(0.022)
	Part-Time Workers (N = 4180):						
Female & promoted	–0.063	–0.046	–0.044	0.046	–0.260**	–0.116	–0.003
	(0.088)	(0.058)	(0.102)	(0.106)	(0.101)	(0.079)	(0.027)
Female & not promoted	–0.012	–0.055**	0.054	0.085	–0.034	–0.138***	0.003
	(0.039)	(0.023)	(0.091)	(0.089)	(0.071)	(0.046)	(0.004)
Promoted	0.060	0.033	0.189*	0.411***	0.282***	0.064	0.043*
	(0.086)	(0.056)	(0.108)	(0.107)	(0.109)	(0.081)	(0.023)

Notes: Robust standard errors clustered at the firm level are given in parentheses. The regressions in columns 1, 2, 6, and 7 use the full samples of full-time and part-time workers, while the regressions in columns 3, 4, and 5 are restricted to workers who change jobs (either with the initial employer or by changing employers) between interviews who were asked whether various job characteristics were better in their new positions. Each column reports coefficient estimates from OLS regressions of the indicated dependent variable on the indicators for being a promoted female, a nonpromoted female, and a promoted worker as well as worker characteristics, job characteristics, and industry. All of the dependent variables are measured in the second interview. The dependent variables in columns 1 and 2 are indicator variables for whether the respondent works flexible hours and whether the respondent works from home, respectively. We additionally control for whether the respondent worked flexible hours in the first interview in column 1 and whether the respondent worked at home in the first interview in column 2.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

(column 5) and workers whose performance in not appraised through a formal process (column 6). The estimated gender differences for the two groups are not statistically different at conventional levels in any of the panels, but we note that the point estimates are quite different in panel C. Full-time women who are formally appraised experience 4.1 percent less wage growth following promotions than similar men; full-time women who are not formally appraised experience only 0.4 percent less wage growth following promotions than similar men. No similar pattern, however, emerges among part-time workers. It is unclear why appraisal biases might matter more when performance is formally appraised than when it is (presumably) informally appraised. Nevertheless, we note the striking difference in the gender gaps in the wage returns to promotion in the full-time subsamples and suggest that this issue deserves further attention from economists.

Robustness

In this section, we discuss the sensitivity of our main findings to our sample selection rules, the measures of promotions used, and the potential endogeneity of some controls.

Sample selection: Attrition. Our samples exclude respondents who are either not re-interviewed or who are unemployed when re-interviewed. If attritting from our sample is correlated with unobserved characteristics related to promotion outcomes and a gender difference in attrition exists, then our estimates may suffer from a selection bias.

Column 1 of Table 8 reports the marginal effects of being female on the probability of attrition where the dependent variable equals 1 if a worker observed in the first interview either attrits from the WES or is unemployed when re-interviewed in the full-time and part-time samples. The estimation samples include all 61,150 respondents interviewed in the odd-years of the WES. Controlling for worker characteristics, job characteristics, and industry and estimating the model by OLS, full-time (part-time) women were an estimated 1.7 (6.7) percentage points less likely to attrit from our samples than similar men.

One approach to deal with the potential for selection bias would be to use instruments correlated with the attrition process but unrelated to promotion outcomes to estimate selection-corrected models. Unfortunately, few if any variables meetings these requirements exist in the WES. Instead, we note that respondents need not be re-interviewed to examine gender differences in the probability and number of promotions. Observing a respondent twice is only necessary to estimate the log-wage growth models.

In the first interview, respondents indicated whether they had ever been promoted with their employer and the number of promotions received with their employers. Columns 2 and 3 of Table 8 report the marginal effects of being female from linear models of the probability of having ever been promoted and the number of promotions received as of the first interview, respectively, in both the full- and part-time samples. Controlling for worker characteristics, job characteristics, and industry, full-time women were 2.3 percentage points less likely to have ever been promoted and had received 0.16 fewer promotions with their employers than similar men relative to estimates of 1.8 percentage points and 0.16 fewer promotions in the longitudinal sample used in Table 2. As such, we conclude that attrition likely has little effect on our inferences concerning the gender gaps in the probability and number of promotions among full-time workers.

Among part-time workers, women were actually more likely to have been promoted and had received more promotions as of the first interview than

TABLE 8

ADDRESSING SAMPLE SELECTION CONCERNS

Variable	(1)	(2)	(3)	(4)
		Dependent Variable		
	Attrits from Sample after First Interview	Promoted as of First Interview	# of Promotions Received as of First Interview	Log-Hourly Wage in the First Interview
		Full-Ttime Workers		
Female	–0.017*	–0.023**	–0.159***	
	(0.010)	(0.011)	(0.042)	
Attrits				–0.029***
				(0.010)
		Part-Time Workers		
Female	–0.067**	0.034	0.069	
	(0.032)	(0.024)	(0.052)	
Attrits				–0.031
				(0.023)

Notes: Robust standard errors clustered at the employer level are given in parentheses. The estimation samples include all 61,150 workers who were interviewed in 1999, 2001, and 2003 regardless of whether they were re-interviewed the following year. Column 1 reports the estimated marginal effect of being female on the probability of attriting from the survey between interviews. Columns 2 and 3 report the estimated marginal effects of being female on the probability of having been promoted with the employer as of the first interview and the number of promotions received as of the first interview, respectively. Column 4 reports the estimated marginal effect of being a future "attriter" on log-hourly wages as of the first interview. All specifications reported in this table control for worker characteristics, job characteristics, and industry.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

similar men. While neither estimate is significant, one possible explanation is that promotions are a route to full-time employment among men—particularly in light of the evidence in Appendix Table A1b that part-time men are much more likely than part-time women to desire more hours and in Table 7 that promotions lead to better and more hours among part-time men. This would result in a negatively selected sample of part-time men as the men who continue to work part time may be those who are less able to secure promotions to full-time employment.

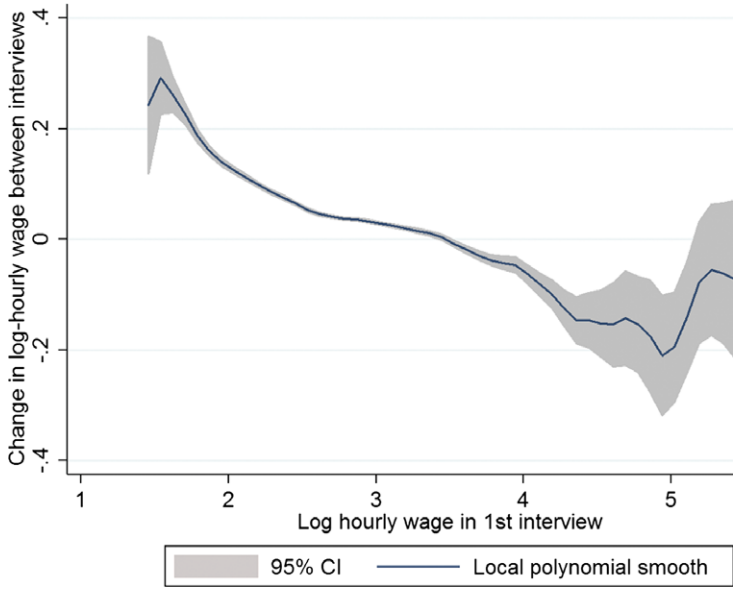
Similarly examining the robustness of the log-wage growth estimates is impossible given that the log-wage growth estimates rely on the longitudinal component of the WES. Instead, we argue that the evidence from the first interview suggests that the gender gaps in log-wage growth among promoted and nonpromoted workers would have been *larger* had men and women been equally likely to attrit. Column 4 of Table 8 reports the marginal effect of being an attriter (i.e., someone who does not contribute a wage observation in the second interview) on the log-hourly wage in the first interview conditional on worker characteristics, job characteristics, and industry. Full-time (part-time) workers who are not observed in the longitudinal sample earned an estimated 2.9 (3.1) percent less in the first interview than respondents in our final sample.

Figure 1 displays a local polynomial smooth of the relationship between log-hourly wages in the first interview and log-wage growth between interviews for workers in our final samples who report hourly wages in both interviews. Clear from Figure 1 is that respondents with lower wages at the first interview experienced faster log-wage growth than respondents reporting higher wages in the first interview. If the same relationship holds among attritters, then our estimates of the gender gap in wage growth following promotions would likely be biased downward as men with lower log-wages in the first interview who would likely experience significant wage growth in the following year are underrepresented in our final sample.

Measurement: Number of promotions between interviews. A potential concern regarding our log-wage growth estimates is that women may experience

FIGURE 1

RELATIONSHIP BETWEEN FIRST INTERVIEW WAGES AND WAGE GROWTH BETWEEN INTERVIEWS



Notes: The sample used to produce the figure includes observations from the 47,651 respondents who report hourly wages in both interviews. The figure displays a local polynomial smooth of the relationship between log-hourly wages in the first interview and the change in log-hourly wages between interviews as well as a 95-percent confidence interval. [Color figure can be viewed at wileyonlinelibrary.com]

less wage growth following a promotion than men because they experience fewer promotions between interviews. If promoted men on average receive more promotions between interviews than promoted women, this could produce the gender gap in wage growth between interviews among promoted workers even if no difference in the returns to promotion exists. Columns 2 and 5 in Table 9 report estimates similar to those in Table 2 restricting our sample to full-time and part-time workers, respectively, who were either not promoted or who had received only one promotion between interviews. Once-promoted full-time (part-time) women experience 2.9 (5.5) percent less wage growth than similar once-promoted full-time (part-time) men conditional on worker characteristics, job characteristics and industry.

Measurement: Promotions. Cobb-Clark (2001) demonstrated the sensitivity of gender gap estimates in promotion models to different measures of promotions using the NLSY79. Promotion is associated in some workplaces with a change in job title and related duties, while in others it is associated with an increase in pay grade and does not necessarily involve a change in job title or duties (Petersen, Spilerman, and Dahl 1990). Studies inferring promotions using changes in job titles or hierarchical levels (e.g., Booth, Francesconi, and Frank 2003; Cassidy, DeVaro, and Kauhanen 2016; Kunze 2015) may inadvertently classify "lateral" moves in which job titles change as promotions or miss promotions within job titles or broadly defined hierarchical levels.[13] On the other hand, studies relying on self-reported promotions such as ours may include movements up a pay scale among promotions. While WES respondents were asked about promotions that included both changes in pay and responsibilities, respondents may nevertheless indicate that they have been promoted even when these are pro forma promotions.

To assess the sensitivity of our estimates to the measure of promotions, we define two types of promotions: promotions in which the respondent also reported changing jobs between interviews and promotions in which the respondent indicated that he/she remained in the same job as in the first interview. Columns 3 and 6 in panel A of Table 9 report the estimated gender gaps in the probability of promotion using the more restrictive definition of a promotion requiring a job change in the full- and part-time samples, respectively. In this specification, full-time women are no less likely to have been promoted than similar men, while part-time women are 5.2 percentage points less likely to have been promoted to positions in new jobs than similar part-time men—a gender gap that is significant at the 5-percent level. The former finding may

[13] See van der Klaauw and da Silva (2011) for discussion of using hierarchical levels to measure promotions.

TABLE 9

ADDRESSING MEASUREMENT CONCERNS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Full-Time Workers (N = 43,470):			Part-Time Workers (N = 4180):		
	Panel A: Whether Promoted between Interviews					
Female	–0.018*	–0.011	–0.001	–0.042	–0.022	–0.052**
	(0.010)	(0.009)	(0.005)	(0.030)	(0.029)	(0.023)
	Panel B: Number of Promotions with the Employer					
Female	–0.157***	–0.113***		–0.054	0.010	
	(0.040)	(0.035)		(0.065)	(0.056)	
	Panel C: Log-Wage Growth between Interviews					
Female & promoted	–0.028**	–0.029*		–0.089*	–0.055	
	(0.013)	(0.016)		(0.053)	(0.061)	
Female & not promoted	–0.007	–0.007		–0.033	–0.033	
	(0.006)	(0.006)		(0.025)	(0.025)	
Promoted	0.026***	0.024***		0.063	0.054	
	(0.007)	(0.008)		(0.051)	(0.057)	
	Panel D: Log-Wage Growth by Promotion Type					
Female & promoted-new job			–0.018			–0.228**
			(0.027)			(0.101)
Female & promoted-same job			–0.025			0.046
			(0.016)			(0.045)
Female & not promoted			–0.007			–0.032
			(0.006)			(0.025)
Promoted-new job			0.070***			0.125
			(0.019)			(0.080)
Promoted-same job			0.012*			–0.013
			(0.006)			(0.039)

Notes: Robust standard errors clustered at the employer level are given in parentheses. Columns 1 and 4 repeat estimates from column 3 of Table 2 controlling for worker and job characteristics and industry. Columns 2 and 5 report estimates from the same specification restricting the sample to workers who were promoted either 0 or 1 times between interviews (i.e., excluding workers promoted more than once between interviews). In panel A, columns 3 and 6 report the estimated marginal effect of being female on the probability of being promoted and working in a new job. Columns 3 and 6 of panel C report estimates from log-wage growth models in which the returns to promotions and the gender gaps in the returns to promotion are allowed to depend on whether the promoted worker remains in the same job as in the first interview.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

indicate that full-time women are employed in occupations with fewer within-job/position promotion opportunities. The latter finding is consistent with our supposition that part-time men pursue promotions to new jobs—possibly in pursuit of more hours.

Columns 3 and 6 of panel D report coefficient estimates from log-wage growth models that allow both the returns to promotions with and without job changes and the gender gaps in the returns to these promotions to differ. In both the full- and part-time samples, the wage growth associated with promotions to new jobs is much larger than the wage growth associated with promotions in the same job. Full-time women who experience promotions of either type experience less wage growth following the promotion than similar men,

though neither difference is statistically significant at conventional levels. By contrast, the lower wage returns to promotions among part-time women are entirely driven by lower returns to promotions to new jobs.

Thus we join Cobb-Clark (2001) in noting the sensitivity of our estimates to the definition of promotions used.[14] Nevertheless, we argue that the definition of promotions used in the question asked of WES respondents is consistent with the agreed-upon definition of promotions in the literature, and that it is unclear why the more restrictive definition of promotions requiring a job change would be a better measure of promotions. An accountant, for instance, can be promoted to take the lead on particular accounts while remaining an accountant—albeit one with greater responsibilities and pay.

Endogeneity of controls. Earlier sections of this article use a number of additional controls to investigate potential sources of the gender gaps in promotion outcomes. As discussed in the context of weekly hours, some of these additional controls are potentially endogenous insofar as they may be functions of prior promotion decisions and thus correlated with unobserved factors influencing promotion outcomes. To assess the importance of these endogeneity concerns, we regress each additional control on an indicator for whether the respondent had been promoted with the employer as of the first interview as well as worker characteristics, job characteristics, and industry. We then similarly regress each additional control on the number of times the respondent had been promoted as of the first interview as well as our standard controls.

Appendix Table A3 reports the coefficients from separate regressions of the indicator for having been promoted as of the first interview and the number of times promoted as of the first interview with each control used in an earlier section as the dependent variable. Almost all of these additional controls—overtime hours; whether a respondent worked flexible hours, at home, or varying hours; whether bonuses were part of a respondent's compensation; the number of employees supervised; whether and how much training a respondent received; the desire to work more hours; satisfaction with pay and with a job; and whether formal performance appraisals were used to evaluate a respondent—are highly correlated with prior promotion outcomes. In light of these correlations, we urge caution in interpreting the findings in earlier sections as they include endogenous controls. Notably though, we found little evidence that these controls explain any of the gender gaps in promotion outcomes except for overtime hours. The inability of these additional controls to account for the gender gaps is due in many cases to the fact that we simply

[14] We obtain estimates similar to those in Table 9 if we instead require that promoted workers indicated that their main activity (but not necessarily their job) changed between interviews.

do not observe gender differences in the controls themselves or the gender difference in the controls goes in an unexpected direction as the means in Appendix Tables A1a and A1b demonstrate.

The most important observation, however, to make about the coefficients reported in Appendix Table A3 is that we find no significant evidence that family formation decisions or weekly hours are correlated with prior promotion outcomes among full-time workers. This is reassuring given that the study's most important contributions are to document both the family gaps among women in promotion outcomes and the outsized role played by hours in the gender gaps in promotion outcomes among full-time workers.

Conclusion

Evidence that the gender gaps in earnings grow over the course of workers' careers necessitates an improved understanding of gender differences in career trajectories. In this study, we show that women in Canada are less likely to have been promoted and experience less wage growth following promotions than similar men. Indeed, a woman in Canada needs to be promoted just to experience the same wage growth in a year as a nonpromoted man. Investigating these gender gaps in promotion, we reach two important conclusions. First, we show that women's promotion experiences depend to a large extent on whether they have children. Women without children are less likely to have been promoted than similar men but enjoy similar wage returns to promotion. By contrast, women with children are just as likely as similar men to have been promoted but experience smaller wage returns to promotion.

Second, we show that work hours play important roles in the gender gaps in promotion experiences among full-time but not part-time workers. The gender gap in work hours accounts for more than 20 percent of the gender gap in promotion probabilities and more than a third of the gender gap in the wage returns to promotion. Overtime hours, on the other hand, appear to serve a signaling role as they explain a third of the gender gap in promotion probabilities conditional on usual weekly hours while contributing little to the gender gap in the wage returns to promotion. Our findings with respect to hours lend support to the notion that flexible work arrangements could reduce the gender differences in career trajectories as others have speculated (Anderson, Binder, and Krause 2003; Goldin 2014).

While our findings shed important light on the roots of the gender gaps in promotion experiences, we note that the gender gaps nevertheless remain largely unexplained in our analysis. The wage growth penalty following promotions faced by women with families may be rooted in behavioral factors. For

instance, promoted women may be less willing to negotiate over raises than men (Babcock and Laschever 2003). This could be due to identity costs generated by social norms or stereotypes that consider "asking" as pushy or "out-of-role" behavior by women (Heilman 2001; Heilman and Okimoto 2007; Inzlicht 2011). Results from recent studies suggest however that at least in the modern workplace women are equally likely to ask for promotions and raises (Artz, Goodall, and Oswald 2018), especially when they face similar opportunities to negotiate relative to their male peers (Stevens and Whelan 2019). Alternatively, promoted women may strive to adhere to gender norms so as not to "out-earn" their spouses (Bertrand, Kamenica, and Pan 2015), or promoted women and their partners may be solving a collective labor-supply decision that results in women seeking smaller promotions. We leave these intriguing questions—which unfortunately cannot be addressed with data from the WES—for future research.

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APPENDIX

TABLE A1A

SUMMARY STATISTICS FOR FULL-TIME WORKERS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
		Men			Women	
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Has children (for family gap)	0.534	0.546	0.499	0.462***	0.461	0.466
Visible minority native	0.015	0.016	0.014	0.019	0.020	0.015
White immigrant	0.110	0.110	0.110	0.098	0.097	0.102
Visible minority immigrant	0.083	0.088	0.068	0.082	0.089	0.058
Language at home French	0.242	0.252	0.216	0.212**	0.222	0.178**
Language at home other	0.084	0.089	0.068	0.086	0.095	0.055
MA, PhD, or MD	0.048	0.048	0.045	0.043	0.043	0.045
Other graduate degree	0.022	0.023	0.018	0.025	0.025	0.026
Bachelor's degree	0.135	0.129	0.155	0.137	0.136	0.140
Some university	0.085	0.078	0.104	0.097*	0.094	0.106
College/vocational diploma	0.159	0.158	0.163	0.232***	0.225	0.255***
Some college/vocational	0.269	0.276	0.250	0.230***	0.228	0.238
High school graduate	0.165	0.162	0.173	0.163	0.169	0.144*
Less than high school[a]	0.117	0.126	0.093	0.072***	0.080	0.047***
Age	41.38	42.24	38.91	41.24	42.11	38.34
	(10.13)	(9.99)	(10.13)	(10.31)	(10.24)	(10.01)
Years of work experience	19.82	20.53	17.78	17.13***	17.64	15.43***
	(10.52)	(10.53)	(10.22)	(9.79)	(9.84)	(9.46)
Job part of a CBA or union	0.269	0.290	0.209	0.260	0.284	0.180
Changed employers	0.091	0.103	0.057	0.084	0.094	0.050
Industry:						
Forestry, mining, resources[a]	0.026	0.025	0.031	0.009***	0.006	0.016***
Labor-intensive manufacturing	0.062	0.065	0.055	0.053	0.058	0.038**
Primary product manufacturing	0.064	0.065	0.062	0.016***	0.015	0.017***
Secondary product manufacturing	0.057	0.055	0.063	0.025***	0.025	0.027***
Capital-intensive manufacturing	0.081	0.082	0.076	0.035***	0.034	0.037***
Construction	0.074	0.070	0.085	0.014***	0.014	0.014***
Transportation & warehousing	0.149	0.150	0.146	0.076***	0.071	0.090***
Communication & other utilities	0.029	0.029	0.030	0.014***	0.013	0.017***
Retail & consumer services	0.169	0.170	0.166	0.222***	0.218	0.236**
Finance & insurance	0.032	0.030	0.037	0.072***	0.064	0.101***
Real estate & leasing operations	0.016	0.016	0.017	0.017	0.017	0.016
Business services	0.106	0.100	0.123	0.114	0.107	0.138
Education & health services	0.099	0.110	0.067	0.299***	0.327	0.207***
Information & cultural industries	0.035	0.033	0.044	0.035	0.031	0.046
Managers	0.185	0.184	0.188	0.113***	0.103	0.144**
Professionals	0.141	0.133	0.163	0.200***	0.209	0.170
Technical trades	0.520	0.525	0.505	0.333***	0.335	0.323***

TABLE A1A (cont.)

Variable	(1)	(2) Men	(3)	(4)	(5) Women	(6)
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Marketing/sales	0.025	0.025	0.0250	0.072***	0.072	0.070***
Clerical/administrative	0.065	0.067	0.059	0.231***	0.225	0.253***
Other occupation[a]	0.065	0.067	0.060	0.052**	0.054	0.040**
Usual weekly hours	41.19	41.18	41.22	38.02***	37.85	38.56***
	(6.05)	(6.195)	(5.62)	(4.57)	(4.54)	(4.67)
Unpaid overtime hours per week	2.45	2.377	2.67	1.83***	1.74	2.14*
	(5.42)	(5.364)	(5.56)	(4.34)	(4.30)	(4.46)
Paid overtime hours per week	1.70	1.617	1.94	0.60***	0.55	0.76***
	(3.95)	(3.930)	(4.01)	(2.21)	(2.02)	(2.74)
Works flexible hours	0.383	0.377	0.403	0.323***	0.318	0.339***
Works varying hours	0.104	0.106	0.095	0.086***	0.087	0.079
Receives bonuses	0.250	0.232	0.299	0.188***	0.173	0.240***
# of workers supervised	0.037	0.0192	0.086	–0.056***	–0.060	–0.044***
(standardized)	(1.162)	(1.201)	(1.044)	(0.399)	(0.431)	(0.268)
Received training	0.340	0.317	0.409	0.380***	0.368	0.422
Days of training past year	2.51	1.98	4.01	2.32	2.10	3.08
	(12.92)	(10.37)	(18.26)	(12.32)	(11.34)	(15.12)
Would prefer more hours	0.189	0.180	0.215	0.179	0.174	0.193
Satisfied with pay	0.792	0.792	0.794	0.733***	0.730	0.743***
Satisfied with job overall	0.911	0.903	0.931	0.911	0.907	0.925
Performance appraised formally	0.563	0.542	0.625	0.604***	0.586	0.666*
Promoted & changed job	0.058	0	0.227	0.055	0	0.242
Promoted in same job	0.200	0	0.773	0.175***	0	0.758
Works at home	0.282	0.278	0.295	0.252***	0.241	0.288
Better hours on new job	0.393	0.409	0.367	0.404	0.457	0.307
Better promotion opportunities	0.480	0.458	0.516	0.486	0.442	0.565
Better bonus opportunities	0.329	0.294	0.386	0.335	0.339	0.326
Δ in log-weekly hours	–0.011	–0.0117	-0.008	–0.032***	–0.039	–0.012
	(0.163)	(0.170)	(0.142)	(0.193)	(0.206)	(0.143)
Δ in # of workers supervised	–0.014	–0.0241	0.014	0.019*	0.001	0.081
(standardized)	(1.109)	(1.129)	(1.048)	(1.186)	(0.422)	(2.344)

Notes: Standard deviations given in parentheses. For the tests of equality between Columns 1 and 4 and Columns 3 and 6, The controls also include dummies for the year of the observation (2000, 2002). [a] indicates an omitted category in a regression. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A1B

SUMMARY STATISTICS FOR PART-TIME WORKERS

Variable	(1)	(2)	(3)	(4)	(5)	(6)
		Men			Women	
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Has children (for family gap)	0.277	0.293	0.206	0.520***	0.512	0.574***
Visible minority native	0.045	0.039	0.073	0.027	0.031	0.008
White immigrant	0.088	0.089	0.087	0.091	0.094	0.068
Visible minority immigrant	0.087	0.098	0.038	0.053	0.058	0.026
Language at home French	0.240	0.251	0.191	0.196	0.198	0.179
Language at home other	0.086	0.094	0.051	0.053	0.054	0.046
MA, PhD, or MD	0.055	0.049	0.080	0.024**	0.024	0.019
Other graduate degree	0.039	0.026	0.098	0.019	0.020	0.012*
Bachelor's degree	0.126	0.109	0.199	0.144	0.139	0.171
Some university	0.120	0.130	0.073	0.116	0.114	0.130
College/vocational diploma	0.155	0.157	0.148	0.258***	0.263	0.227
Some college/vocational	0.220	0.241	0.124	0.219	0.212	0.266***
High school graduate	0.174	0.169	0.195	0.157	0.164	0.115
Less than high school[a]	0.113	0.119	0.083	0.063*	0.064	0.061
Age	37.93	39.18	32.26	40.06**	40.59	36.75**
	(13.76)	(13.98)	(11.11)	(11.47)	(11.48)	(10.91)
Years of work experience	15.04	16.17	9.88	12.59**	12.77	11.49
	(13.90)	(14.31)	(10.47)	(10.12)	(10.17)	(9.79)
Job part of a CBA or union	0.318	0.340	0.216	0.309	0.322	0.232
Changed employers	0.227	0.192	0.388	0.141***	0.143	0.132***
Industry:						
Forestry, mining, resources, communication, utilities, construction, transportation & warehousing[a]	0.163	0.175	0.109	0.064***	0.067	0.044
Manufacturing	0.039	0.036	0.054	0.023*	0.024	0.018
Retail & consumer services	0.351	0.339	0.407	0.341	0.329	0.411
Finance & insurance	0.032	0.028	0.045	0.036	0.031	0.065
Real estate & leasing operations	0.026	0.027	0.021	0.020	0.021	0.018
Business services	0.076	0.070	0.100	0.056	0.053	0.075
Education & health services	0.282	0.298	0.208	0.433***	0.446	0.350*
Information & cultural industries	0.032	0.026	0.055	0.027	0.029	0.020
Managers & professionals	0.186	0.176	0.230	0.231	0.234	0.211
Technical trades	0.393	0.425	0.246	0.291***	0.283	0.342
Marketing/sales	0.171	0.156	0.234	0.233	0.236	0.213
Clerical/administrative	0.113	0.098	0.179	0.168**	0.168	0.173
Other occupation[a]	0.138	0.144	0.111	0.077**	0.079	0.061
Usual weekly hours	18.11	18.25	17.47	19.05*	19.00	19.34
	(7.05)	(7.11)	(6.76)	(6.58)	(6.65)	(6.16)
Unpaid overtime hours per week	0.70	0.61	1.14	0.48	0.48	0.42
	(3.57)	(3.18)	(4.94)	(2.26)	(2.29)	(2.02)
Paid overtime hours per week	0.24	0.25	0.18	0.19	0.18	0.26
	(1.93)	(2.08)	(0.99)	(1.11)	(1.06)	(1.37)

TABLE A1B (cont.)

Variable	(1)	(2) Men	(3)	(4)	(5) Women	(6)
	All	Not Promoted	Promoted	All	Not Promoted	Promoted
Works flexible hours	0.361	0.377	0.288	0.384	0.384	0.386
Works varying hours	0.366	0.369	0.352	0.304	0.312	0.256
Receives bonuses	0.102	0.107	0.081	0.080	0.077	0.103
# of workers supervised	–0.108	–0.110	–0.102	-0.109	–0.112	–0.095
(standardized)	(0.075)	(0.064)	(0.110)	(0.057)	(0.051)	(0.084)
Received training	0.351	0.339	0.403	0.361	0.341	0.487
Days of training past year	2.17	1.34	5.93	0.82	0.78	1.07
	(14.68)	(12.45)	(21.85)	(3.64)	(3.70)	(3.22)
Would prefer more hours	0.399	0.376	0.504	0.318**	0.314	0.340*
Satisfied with pay	0.774	0.796	0.673	0.719*	0.717	0.733
Satisfied with job overall	0.880	0.887	0.852	0.898	0.896	0.912
Performance appraised formally	0.478	0.461	0.554	0.499	0.490	0.555
Promoted & changed job	0.099	0	0.549	0.035***	0	0.256***
Promoted in same job	0.081	0	0.451	0.102	0	0.744
Works at home	0.128	0.138	0.082	0.155	0.145	0.222***
Better hours on new job	0.655	0.608	0.739	0.622	0.620	0.631
Better promotion opportunities	0.481	0.346	0.726	0.451	0.397	0.665
Better bonus opportunities	0.382	0.283	0.562	0.238*	0.241	0.223**
Δ in log-weekly hours	0.343	0.314	0.474	0.181***	0.173	0.235**
	(0.618)	(0.611)	(0.634)	(0.512)	(0.513)	(0.500)
Δ in # of workers supervised	0.008	-0.0002	0.045	0.006	0.001	0.035
(standardized)	(0.113)	(0.092)	(0.174)	(0.110)	(0.075)	(0.227)

Notes: Standard deviations given in parentheses. For the tests of equality between Columns 1 and 4 and Columns 3 and 6, The controls also include dummies for the year of the observation (2000, 2002). [a] indicates an omitted category in a regression. See Table 1 for sample sizes. Some industry categories in the table have been consolidated to minimize residual disclosure risks. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A2

PROBIT AND POISSON ESTIMATES

Variable	(1)	(2)	(3)	(4)
	Full-time workers (N=43,470):			
	Panel A: Whether Promoted between Interviews (Probit Marginal Effects)			
Female	–0.028***	–0.032***	–0.018*	–0.017*
	(0.010)	(0.009)	(0.010)	(0.010)
	Panel B: Number of Promotions with the Employer (Poisson Marginal Effects)			
Female	–0.276***	–0.231***	–0.155***	–0.092**
	(0.042)	(0.040)	(0.040)	(0.039)
	Part-time workers (N=4,180):			
	Panel C: Whether Promoted between Interviews (Probit Marginal Effects)			
Female	–0.041	–0.036	–0.041	–0.037
	(0.027)	(0.026)	(0.025)	(0.026)
	Panel D: Number of Promotions with the Employer (Poisson Marginal Effects)			
Female	–0.032	–0.056	–0.049	–0.017
	(0.059)	(0.060)	(0.060)	(0.061)
Controls:				
Worker & job characteristics		X	X	X
Industry			X	X
Occupation				X

Notes: Robust standard errors clustered at the firm level are given in parentheses. Panels A and C report marginal effects from Probit regressions of the probability of being promoted between interviews. Panels B and D report marginal effects from Poisson regressions of the number of promotions received with the current employer.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

TABLE A3

ADDRESSING ENDOGENEITY CONCERNS

	(1)	(2)	(3)	(4)
	Full-Time Workers (N = 43,470)		Part-Time Workers (N = 4,180)	
	Dependent Variable		Dependent Variable	
	Promoted as of First Interview	# of Times Promoted as of First Interview	Promoted as of First Interview	# of Times Promoted as of First Interview
Coefficient Estimates For:				
Has children	–0.005	0.001	0.001	0.020*
	(0.010)	(0.003)	(0.029)	(0.011)
Weekly hours	0.032	0.008	1.335***	0.619***
	(0.123)	(0.032)	(0.495)	(0.184)
Unpaid overtime hours/week	0.825***	0.298***	0.000	–0.009
	(0.109)	(0.039)	(0.132)	(0.048)
Paid overtime hours/week	0.206***	0.010	0.241**	0.230**
	(0.065)	(0.015)	(0.100)	(0.115)
Flexible hours	0.025**	0.008***	0.037	0.040**
	(0.011)	(0.003)	(0.039)	(0.017)
Works at home	0.090***	0.029***	0.025	0.016
	(0.010)	(0.003)	(0.031)	(0.017)
Varying hours	–0.031***	–0.005***	–0.058*	–0.031**
	(0.006)	(0.002)	(0.034)	(0.015)
Bonuses	0.099***	0.034***	0.058***	0.021**
	(0.009)	(0.003)	(0.022)	(0.010)
# of employees supervised	0.101***	0.045***	0.025***	0.012***
	(0.013)	(0.007)	(0.005)	(0.003)
Received training	0.058***	0.020***	0.074**	0.020
	(0.011)	(0.003)	(0.037)	(0.016)
# of days of training	0.615**	0.166**	0.000	0.027
	(0.274)	(0.067)	(0.257)	(0.111)
Wants to work more hours	–0.012	–0.006***	–0.011	–0.022
	(0.009)	(0.002)	(0.035)	(0.014)
Satisfied with pay	0.048***	0.017***	0.049	0.038***
	(0.009)	(0.002)	(0.034)	(0.012)
Satisfied with job overall	0.035***	0.010***	0.058***	0.029***
	(0.006)	(0.001)	(0.019)	(0.006)
Performance appraisal	0.151***	0.042***	0.115***	0.058***
	(0.011)	(0.003)	(0.037)	(0.016)

Notes: Robust standard errors clustered at the firm level are given in parentheses. Columns 1 and 3 report coefficient estimates for the variable specified in each row from a regression of an indicator for whether the worker had been promoted as of the first interview on the variable in the row as well as worker and job characteristics and industry. Columns 2 and 4 report coefficient estimates for the variable specified in each row from a regression of the number of times the worker had been promoted with the employer as of the first interview on the variable in the row as well as worker and job characteristics and industry.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.