

# The Intersection of Gender & Race: Effects on the Incidence of Promotions

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## Abstract

Using administrative data from a large firm in Canada, this empirical paper first explores the determinants of promotions and then looks at the advancement experiences of white women, minority men and minority women relative to white men. Findings show that white men enjoy a comparative advantage over white females, minority males and minority females. Both horizontal segregation (job family) and vertical segregation (job levels) have significant negative implications on the career advancement of race/gender minority groups. Organizations' policies, programs and practices that strive for a transparent promotion process will help ensure fair advancement opportunities for all employees, irrespective of their gender or race.

An employee's rank in an organizational hierarchy not only determines the level of financial rewards (Gerhart & Milkovich, 1989; Baker, Gibbs & Holmstrom, 1994a,b; McCue, 1996; Bognanno, 2001), but also confers other non-pecuniary benefits, such as more autonomy and more opportunities for personal development. Promotions also lead to higher levels of job satisfaction (Berkowitz & Kotowitz, 1993; Francesconi, 2001). Opportunity for career advancement, therefore, is a key determinant of workers' labour market experiences.

The substantial flattening of organizations in the last two decades has eliminated several layers in most organizations' hierarchies. In this new environment, career achievement through a series of lateral moves to increase the employees' breadth of knowledge and experience has become more common than career advancement through the organization hierarchy. Although these lateral moves may be seen as necessary building blocks for career advancement, it is upward mobility that provides significant monetary and non-monetary re-

turns. This paper will first look at the determinants of promotions and then explore the intersection of race and gender on the incidence of promotions. Finally, this paper will assess the proportion of the gross gap in promotion opportunity between white males and white females/minority males/minority females that can be accounted for by differences in levels of productivity-related characteristics including education, age and tenure.

## Previous Empirical Studies

Researchers studying promotions have mostly focused on the effect of gender. A number of studies have found that women were less likely to receive a promotion than men (Cassell, Director & Doctors, 1975; Cabral, Ferber & Green, 1981; Olson and Becker, 1983; Hartmann, 1987; Cannings, 1988; Spurr, 1990; Pergamit & Veum, 1999; Jones & Makepeace, 1996; Chernesky, 2003; Chow & Crawford, 2004; Blau & Devardo 2007). For example, Cassell, Director & Doctors (1975) looked at gender differences in the rate at which workers move up the organizational hierarchy. Based on a sample of 1,330 blue-collar and lower-level, white-collar workers from three companies in the mid-western U.S., they found that a majority of the females experienced post-hire grade promotion discrimination while a very small number of females received grade promotions as rapidly as males.

Olson and Becker (1983), using data from the U.S. Quality of Employment Panel and a promotion measure based on self-reported evaluation of job changes by respondents who did not change employer between 1973 and 1977, found that women, in general, were held to higher promotion standards than were men and, women received fewer promotions than did men with equal measured abilities. More recent studies have also found that women

faced a higher promotion threshold than men (Pekkarinen & Vartiainen, 2006; Lyness & Heilman, 2006). Finally, Blau & Devardo (2007), using data from the Multicity Study of Urban Inequality employer survey, also found that women have lower probabilities of promotion than men.

A few researchers have found "positive" gender effects in promotions. Stewart & Gudykunst (1982) found that females enjoyed more promotions than men in a financial institution in the northeastern United States. Gerhart & Milkovich (1989) found that at lower levels in the organization hierarchy in a manufacturing firm, women received more promotions than men over a 6-year period. Hersch & Viscusi (1996), in their analyses of a sample of employee in a public utility firm, also found that women were promoted more often than men.

Finally, several studies found no gender effect at all (Eberts & Stone, 1985; Lewis, 1986; Elvira & Zatzick, 2002; Booth, Francesconi & Frank, 2003). Eberts & Stone (1985) found significant negative gender differences in promotion to administrative positions in the elementary and secondary public school system in Oregon in the early 1970s, but the effect was no longer significant by the end of the 1970s. Lewis (1986) also found no significant difference in promotion chances by gender among full-time federal white-collar workers.

With regards to race, some studies have found that Blacks or Hispanics were less likely to be promoted than whites (Hartmann, 1987; Pergamit & Veum, 1999; James, 2000) or that minorities were as likely to be promoted (Lewis, 1986; Elvira & Zatzick, 2002). For example, Elvira & Zatzick (2002) looked at data from a financial institution in one U.S. state also found no significant difference in promotion rates between whites and non-whites.



To-date, there are relatively few studies that look at the effects of race and/or gender in both Canada and the United Kingdom. Two studies that utilized Canadian data both found negative gender effects on the probability of promotions. In a survey of managerial employees in a large Canadian corporation, Cannings (1988) found that gender had a significant effect on chances for promotion even after controlling for career-relevant factors. The study found that female managers were only 80% as likely as male managers to be promoted in any given year. Swimmer (1990), studying female clerks in a large public utility, found that women were at a disadvantage when it came to advancement opportunity to junior levels of management. Similarly, two studies in the United Kingdom found negative gender effects. Jones & Makepeace (1996) found that women faced tougher promotion criteria than men in a financial company. Pudney & Shields (2000) found that male nurses were promoted more quickly than female nurses and white nurses were promoted more quickly than non-white nursing staff.

Different data on different industries focusing on different employee populations and employing different methods yielded varied conclusions on the effects of race and gender on promotions. This paper adds to the current body of research and presents empirical findings on the incidence of promotions that cover a wide range of the organizational hierarchy in the Information & Communications Technology sector. This is also one of the very few studies that explores the intersection of race and gender on this very important employment outcome.

## Data

Differences among firms, industries and the overall economic and market conditions in which they operate will affect their employees' promotion prospects. For example, large established firms may be better able to offer higher rewards, more job security and better career opportunities (Oi, 1990; Brown & Medoff, 2001). By focusing on only one company, factors that may have a significant impact on promotion decisions, including the firm's age, size, in-

dustry, business strategy, compensation policy and career development philosophy, are appropriately controlled for. In other words, within-firm findings will not reflect any unobserved inter-firm differences that are common in national studies. The study of promotions also requires that jobs be ordered and the use of firm-level data ensures that the rankings are consistently determined based on the firm's policies. The firm's administrative records can also provide accurate information on employees' age, job function, salary and their tenure with the firm.

This paper utilizes confidential archived administrative records on non-unionized employees as of year-end 1995 and those who commenced employment with the firm between 1996 and 2000. In this firm, there are ten job levels below the chief executive officer level, eight of which are included in the analyses. Promotion data for the top two levels representing the presidential and vice-presidential level employees were not available. The final dataset contains 22,338 employees.

## Method

To examine the determinants of promotion, a multivariate probit model of promotion was estimated. The dependent variable is a dichotomous variable that takes on a value of "1" if the employee received one or more promotions between 1996 and 2000, and "0" otherwise. The probability that an employee is promoted to a higher job level between one year and a subsequent period is estimated by the following:

$$\Pr(y_j = 1 | X_j) = f(X_j b)$$

where the outcome (or dependent variable) is a dichotomy indicating the incidence of promotion to the next higher job level,  $f$  is the standard normal cumulative distribution and  $b$  is a vector of probit coefficients and  $X$  is the corresponding vector of explanatory variables together with a set of dummy variables to measure the impact of race/gender status on the probability of promotion. The estimates presented in the empirical analysis are maximum likelihood estimates that are most likely to give rise to the pattern of the observations in the data. The estimates reported in the following analyses are marginal

effects, calculated as the derivative of the conditional expectation of the observed dependent variable evaluated at the sample means. These marginal effects reflect the changes in the probability of promotion for an infinitesimal change in the continuous independent variable and for a discrete change in the probability of promotion for dummy independent variables. To explore the differential effects for groups situated at different levels of the organizational hierarchy, analyses are also conducted by partitioning the data into three separate segments: the entry levels, the feeder group and the senior levels.

In addition to the dummy variable approach, this paper will employ a technique similar to the Oaxaca/Blinder decomposition (Oaxaca, 1973; Blinder, 1973) to decompose any gender/racial gap in the probability of promotion between white males and each of the minority groups into two components: an explained component due to differences in productivity-related characteristics and an unexplained component due to the differences in the returns to characteristics. This technique, decomposing the differences in probit models, has been utilized to analyze a variety of phenomena: the decline in unionism (Even & MacPherson, 1990), the impact of unionization on the gender wage gap (Doiron & Riddell, 1994), the propensity to report a crime (MacDonald 1998), labour market participation (Blackaby et al., 1998), attitudes toward foreigners in the European Union (Gang et al., 2002), and the source of the gender gap in promotions (Cobb-Clark, 2001).

## The Dependent Variable

Without controlling for any differences in characteristics, a slightly higher percentage of whites (59.4%) received one or more promotions than non-whites (55.7%), a 3.7 percentage-point differential that is statistically significant at the 1% level. Differentiating by gender, a higher proportion (57.2%) of male employees received one or more promotions, as compared to 54.7% of the female employees, a 2.5 percentage-point differential that is also statistically significant at the 1% level.



The gross promotion rates between white males and the other race/gender minority group are also compared. While the proportion of white females who were promoted was lower than that of white males (58.1% versus 60.0%), the differential is not statistically significant at conventional levels. The promotion gaps between white males and minority males (3.4 percentage-points) and between white males and minority females (7.5 percentage-points) are both significant at the 1% level. This simple comparison of gross promotion rates indicates lower promotion probabilities for both minority females and minority males.

### The Independent Variables

The explanatory variables included in this paper can be classified into four main groups: a set of key independent variables representing race and gender characteristics, a set of supply side variables (human capital variables), a set of demand side variables (structural variables) and a set of control variables.

### Key Independent Variables

Race and gender are the key independent variables. It is important to note at the outset that the race variable only differentiates between whether an employee is a member of a visible minority or not, based on employees' self-identification. To allow the investigation of the inter-relationships between gender and race in addition to their individual effects, four race/gender combination variables were also created: white males, white females, visible minority males and visible minority females<sup>1</sup>. These four race/gender groups may have very different labour market experiences and the creation of these variables will allow us to gauge whether visible minority females experience a "double whammy"; that is, whether they are penalized for being female and for being a member of a visible minority.

### Supply Side Variables

The model also includes a set of conventional human capital and demo-

graphic variables. These variables include tenure, age, education attainment, performance rating and break(s) in service.

**Tenure.** Tenure is included in the model as a proxy for firm-level or specific skill accumulation. In their analyses of promotion for nonunion salaried employees in a manufacturing firm in the United States, Abraham & Medoff (1985) found evidence that seniority had a substantial negative impact on promotion decisions for 60% of the employees, whereas Stewart and Gudykunst (1982) found positive effects of tenure on promotion rates. A logical expectation is that one needs to accumulate enough firm-level skills before (s)he is considered ready to be promoted. However, it is also fair to expect that this effect is not a linear one. Studies have found a negative tenure effect on promotions after the initial years. Tenure is therefore expected to have a positive effect on the probability of promotion initially but will become a burden (negative effect) when tenure reaches a particular point in time.

**Age and Education.** Age and education are included as proxies for general skill accumulation. Conventional beliefs suggest that the probability of promotion increases as one's general skill increases (Prendergast 1993). Rosenbaum (1979) suggested that, as with job tenure, the relationship between age and promotion opportunity exhibits a curvilinear relationship, in the shape of an inverted U. Therefore, one's opportunity for advancement is expected to increase with age up to a certain point and then decrease. However, other studies have found that the incidence of promotion falls with age while education effects are frequently found to be not significant in explaining the incidence of promotion (Lewis, 1986).

**Performance Rating.** Performance rating is included as a measure to account for an employee's performance and productivity. In this firm, objectives are usually agreed to between the employee and his or her supervisor at the beginning of a performance period, fol-

lowed by an evaluation at the end of the period. Performance ratings, determined by the supervisor in consultation with the employee, are one of the outcomes of the evaluations. Two dummy variables are included in the model: one reflects superior performance and one shows that objectives have been met. Previous research studies have shown that good performance ratings usually increase the chances of promotion or career advancement (Gibbs, 1995; Igbaria & Greenhaus, 1992). In a meritocratic setting, therefore, employees who perform relatively better than others would stand a better chance to be awarded a promotion. Previous studies have found that women and minorities tend to receive lower performance ratings than their male and white counterparts (Greenhaus et al., 1990; Elvira & Town, 2001; Lyness & Heilman, 2006).

**Break in Service.** As the data contain consecutive end-of-year information on all employees, it allows the establishment of a "break in service" variable that identifies whether or not an employee's tenure with the company was continuous during the time period studied. Although the reason for the break cannot be determined by the available data, these breaks can represent a termination/rehire situation or they can be due to a parental or educational leave. A rehire or return from education leave may signal a higher level of skills whereas a return from parental leave might be seen as a depreciation in skills. However, this variable may not be statistically significant as any significant positive effect may cancel out any negative effect, depending on the nature of the breaks. Hewlett (2005) shows that women and men take "breaks" for very different reasons and that these breaks in careers may have a larger negative impact in fast-moving industries such as engineering and technology than in other sectors. Discontinuous labour market experience, especially for women who take time out for child-bearing and child rearing, may have significant negative effects on career advancement as these work interrup-

<sup>1</sup> Declaration of visible minority status in Canada is based on self-identification and some employees have chosen to not self-identify their ethnicity. As such, an "undisclosed" category is included in the analyses in this paper.



tions are associated with skills loss (Edin & Gystavssibm 2008).

### Demand Side Variables

To aid our understanding of the nuances of the promotion process from the firm's perspective, a set of demand side variables that account for how work is structured in this firm is included. These

variables include job family, job level, and the race/gender composition of each job family/level combination.

**Job Family.** Employees in this firm were classified into nine job families based on the functions they perform (see Figure 1). Minorities account for a small percentage of all employees in all job families. The Human Resources

function has a high representation of white females and Customer Service has the highest representation of white males.

**Job Level.** Employees in each job family can be situated at different job levels in the organizational hierarchy based on the complexities and the levels of responsibility of the jobs (see Figure

Figure 1 Distribution of Race/Gender Groups by Job Family

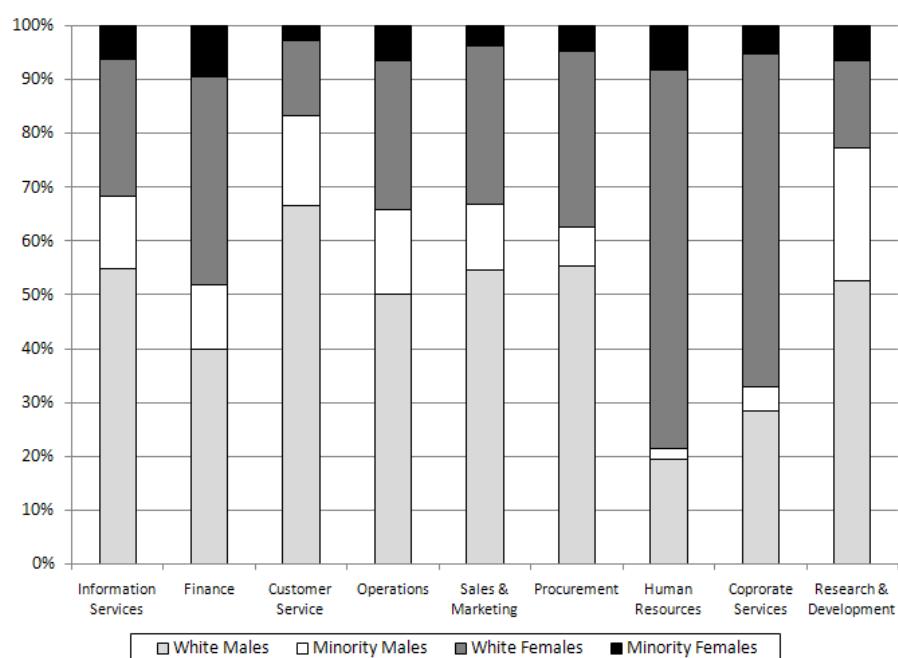
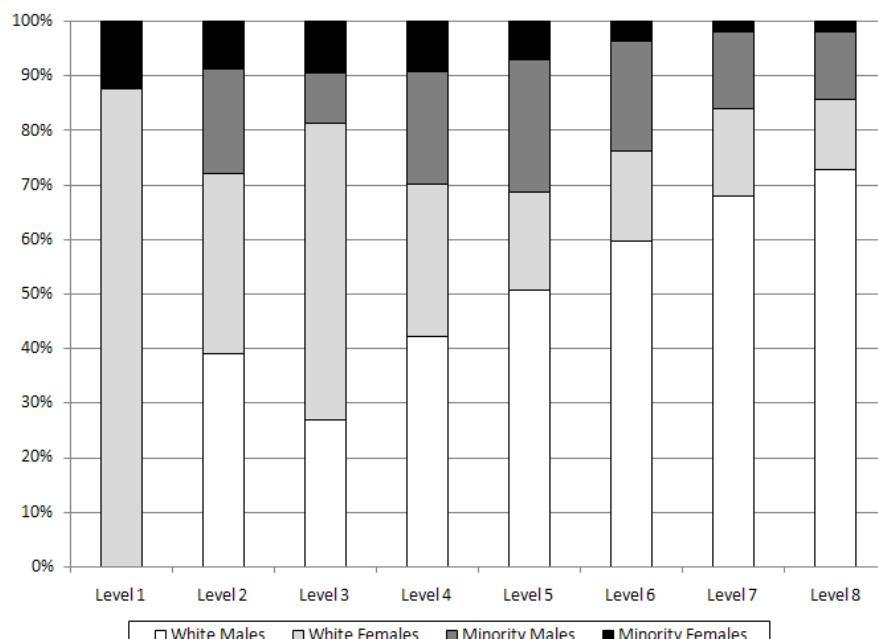


Figure 2 Distribution of Race/Gender Groups by Job Level





2). The proportion of white females is higher in the lower job levels, and decreases significantly at the higher levels in the organizational hierarchy. The opposite is true for white males: they are more likely to be situated in the top half of the organization hierarchy. The representation of racial minorities is quite low throughout the organizational hierarchy. Conventional wisdom suggests that it is increasingly difficult to be promoted as one rises up the organizational hierarchy as there are fewer positions available at more senior levels. Accordingly, if white males are more often situated at higher job levels, then the probability of promotion for white males should be lower than the other race/gender groups if promotion decisions are made fairly. For this reason, job level is included as an explanatory variable in the model.

Previous research has suggested that because men are more likely to be situated at higher levels of the organizational hierarchy, analyzing promotion data across all organizational levels may produce the spurious result that females are more likely to be promoted (Konrad & Cannings, 1997). To explore the differential effects for groups situated at different levels of the organizational hierarchy, these eight levels have been partitioned into three categories: levels 1 to 3 are defined as the entry level; levels 4 and 5 are combined as the feeder group while the remaining three levels are collectively grouped into the senior level employees. The ideal case is to

partition the data by each job level, however, the relatively small sample size at each job level made it difficult to conduct statistical tests for any gender or racial differentials in career advancement opportunity. As discussed earlier, the probability of promotion is expected to decrease as one rises up the organizational hierarchy. This effect should apply to the different race/gender groups equally in a non-discriminatory environment.

**Race/Gender Job Composition.** The mix of incumbents in jobs may also contribute to differential treatment in promotions (Gerhart & Milkovich, 1989; Maume, 1999; Barnett, Baron & Stuart, 2000). To capture the effect of race/gender composition on the probability of promotion, three new variables are created: percent white female, percent visible minority male and percent visible minority female for each of the job family/level combinations. Finally, control variables to account for the year of promotion and the region where each employee worked are included.

Table 1 presents the descriptive statistics for selected explanatory variables by race/gender groups. White males and white females, on average, are slightly older than the visible minorities and have accumulated a slightly longer average tenure. A higher proportion of visible minorities possess university education than white males and white females. The average job level for white males is 5.5, followed by 5.1 for minority males, and 4.6 for both white

and minority females. The average salary for white males is highest at \$68,400, followed by minority males at \$64,000 and both female groups at \$54,300.

Although about 14% of the full sample received the highest performance rating (i.e., exceed rating), the proportion of whites that received an "exceed" rating was higher than in the minority groups. Of white males and white females, almost one in five received the highest performance rating; whereas, the proportions for minority males and minority females who received "exceed" ratings were only 13% and 11% respectively. This is in line with the observation by Greenhaus et al. (1990) that nonwhites received lower job performance ratings that may indirectly affect their promotability. However, it is difficult to ascertain to what extent this difference reflects true differences in performance and the impact of discrimination. Finally, the proportion of employees with a break in service was very small — 0.4% of white males, 0.1% of white females and 0.3% of minority groups had a break in service. The small number of employees with breaks may not allow the assessment of the impact of work interruption on the incidence of promotion.

Table 1 Means and Proportions for Selected Variables by Race/Gender Groups

	Overall	White Males	White Females	Minority Males	Minority Females	The Undisclosed
Proportion Promoted	56.5%	60.0%	58.1%	56.7%	52.6%	52.7%
Age [in years]	35.7	37.1	37.3	35.9	34.4	33.7
Tenure [in years]	7.0	9.6	8.6	6.4	5.3	4.1
Proportion with University Degrees	57.7%	57.1%	41.3%	77.4%	68.5%	57.1%
Job Level	5.1	5.5	4.6	5.1	4.6	4.9
Annual Salary [in \$'000]	61.8	68.4	54.3	64.0	54.3	58.3
With "Exceeded" Performance Rating	13.9%	17.2%	18.7%	13.1%	11.4%	8.9%
With Break in Service	0.3%	0.4%	0.1%	0.3%	0.3%	0.4%
% White Female	22.9	18.6	35.7	18.1	26.7	23.0
% Minority Male	19.6	19.4	15.0	22.6	20.1	20.6
% Minority Female	6.4	5.2	7.0	6.4	8.2	7.0
No. of Observations	22,338	7,689	3,388	2,826	901	7,534
[%]	100.0%	34.4%	15.2%	12.7%	4.0%	33.7%



Table 2 Determinants of Promotion by Race/Gender Group

	Overall		White Males		White Females		Minority Males		Minority Females	
	dF/dx	Std.Err.	dF/dx	Std.Err.	dF/dx	Std.Err.	dF/dx	Std.Err.	dF/dx	Std.Err.
[White Males]										
White Females	-0.0454 **	0.0121								
Minority Males	-0.0788 **	0.0123								
Minority Females	-0.1612 **	0.0192								
Undisclosed	-0.0974 **	0.0096								
[High School or Less]										
Post HS / College	0.0909 **	0.0119	0.0756 **	0.0214	0.0649 *	0.0263	0.0973	0.0508	0.0781	0.0819
Undergraduate Degrees	0.1119 **	0.0120	0.0648 **	0.0228	0.0847 **	0.0298	0.0481	0.0487	0.1694 *	0.0731
Graduate Degrees	0.0963 **	0.0135	0.0688 **	0.0254	0.1082 **	0.0378	0.0709	0.0501	0.1002	0.0823
Undisclosed	0.0962 **	0.0160	0.0904 **	0.0285	0.0878 *	0.0332	0.0899	0.0648	0.0267	0.1042
Age [in years]	-0.0089 *	0.0039	-0.0089	0.0072	-0.0124	0.0095	-0.0015	0.0123	0.0199	0.0227
Age Squared	-0.0001 *	0.0001	-0.0001	0.0001	0.0000	0.0001	-0.0002	0.0002	-0.0005	0.0003
Tenure [in years]	0.0136 **	0.0017	0.0079 **	0.0027	0.0045	0.0045	0.0223 **	0.0062	0.0493 **	0.0149
Tenure Squared	-0.0006 **	0.0001	-0.0004 **	0.0001	-0.0002	0.0002	-0.0011 **	0.0003	-0.0021 **	0.0007
Break in Service	-0.1346 *	0.0626	-0.2002 *	0.0936	-0.2032	0.2910	-0.3448	0.1516	-0.0193	0.3192
[Levels 1 & 2]										
Level 3	-0.5527 **	0.0133	-0.6016 **	0.0228	-0.6397 **	0.0368	-0.6412 **	0.0148	-0.6950 **	0.0284
Level 4	-0.4005 **	0.0255	-0.3245 **	0.0611	-0.5673 **	0.0461	-0.5553 **	0.0772	-0.6246 **	0.0786
Level 5	-0.7400 **	0.0175	-0.6534 **	0.0467	-0.7215 **	0.0374	-0.8241 **	0.0609	-0.9328 **	0.0284
Level 6	-0.7516 **	0.0110	-0.7433 **	0.0351	-0.7105 **	0.0263	-0.8168 **	0.0361	-0.7326 **	0.0302
Level 7	-0.7481 **	0.0067	-0.8101 **	0.0190	-0.7174 **	0.0159	-0.7592 **	0.0216	-0.6467 **	0.0231
Level 8	-0.6479 **	0.0043	-0.7137 **	0.0098	-0.6361 **	0.0101	-0.6528 **	0.0132	-0.5709 **	0.0199
Annual Salary (\$'000)	0.0145 **	0.0005	0.0148 **	0.0009	0.0089 **	0.0015	0.0225 **	0.0018	0.0224 **	0.0035
<u>Performance Rating</u>										
Exceeded	0.2904 **	0.0097	0.2631 **	0.0166	0.3058 **	0.0247	0.2897 **	0.0281	0.2157 **	0.0693
Achieved	0.1648 **	0.0101	0.1370 **	0.0185	0.1946 **	0.0283	0.1717 **	0.0297	0.0907	0.0584
[Research & Development]										
Information Technology	0.0627 **	0.0185	0.0559	0.0309	0.0926 *	0.0427	-0.0746	0.0740	0.0426	0.1128
Finance	0.1438 **	0.0261	0.1075 *	0.0481	0.1109 *	0.0511	-0.0045	0.1190	0.2166	0.1372
Customer Service	0.1166 **	0.0204	0.2130 **	0.0251	0.0625	0.0569	0.1392	0.0685	-0.1964	0.1413
Operations	0.0001	0.0187	0.1145 **	0.0272	-0.0992 *	0.0439	0.0640	0.0674	-0.2044	0.1107
Sales & Marketing	0.1730 **	0.0158	0.1436 **	0.0265	0.1330 **	0.0366	0.0030	0.0712	0.2399 *	0.1032
Procurement	0.0828 **	0.0264	0.1272 **	0.0391	0.0360	0.0585	0.0054	0.1246	-0.0543	0.1633
Human Resources	0.2440 **	0.0319	-0.0163	0.1150	0.2443 **	0.0516	-0.4038	0.2086	0.3285	0.1404
Corporate Services	-0.0025	0.0375	-0.1033	0.0833	-0.0072	0.0611	0.0204	0.2010	-0.1143	0.2113
<u>Job Composition</u>										
Percent White Female	-0.0007	0.0009	0.0066 **	0.0019	-0.0013	0.0017	0.0087	0.0045	-0.0071	0.0049
Percent Minority Male	-0.0055 **	0.0015	0.0007	0.0025	-0.0008	0.0035	-0.0147 **	0.0056	-0.0194 *	0.0090
Percent Minority Female	0.0035	0.0022	0.0084	0.0043	-0.0034	0.0043	0.0338 **	0.0096	-0.0039	0.0116
[Ontario]										
The Maritimes	-0.0444	0.0399	-0.1035	0.0721	-0.2346 **	0.0712	-	-	-	-
Quebec	0.0032	0.0138	-0.0540 **	0.0202	-0.0004	0.0329	0.0817	0.0480	0.0639	0.0916
The Prairies	-0.0262 *	0.0121	0.0178	0.0196	-0.0563	0.0292	-0.0517	0.0401	-0.0052	0.0743
British Columbia	-0.1687 **	0.0333	-0.1600 **	0.0538	-0.1693 *	0.0822	-0.1843 *	0.0760	-0.2279	0.1252
Others	0.2088 **	0.0289	0.2102 **	0.0398	-0.0234	0.1103	0.3731 **	0.0359	0.0728	0.1604
[Promoted in 1996]										
Promoted in 1997	0.2417 **	0.0117	0.2478 **	0.0190	0.2593 **	0.0300	0.2763 **	0.0312	0.2217 **	0.0674
Promoted in 1998	0.0430 **	0.0121	0.0490 *	0.0198	0.0626 *	0.0287	-0.0149	0.0345	0.0998	0.0650
Promoted in 1999	0.0145	0.0122	-0.0032	0.0201	0.0597 *	0.0290	0.0191	0.0344	0.0187	0.0651
Promoted in 2000	0.0510 **	0.0118	0.0525 **	0.0197	0.1317 **	0.0270	0.0233	0.0347	0.1074	0.0655
Observed Prob.	0.5654		0.6001		0.5817		0.5666		0.5250	
Predicted Prob.	0.5784		0.6227		0.5956		0.5889		0.5233	
No. of Observations	22,338		7,689		3,383		2,824		899	
LR Chi-sq	5244.02 (43)		1894.01 (39)		642.23 (38)		789.01 (37)		332.89 (37)	
Log Likelihood	-12670.12		-4227.54		-1978.40		-1537.84		-455.57	
Pseudo R-sq	0.1715		0.1830		0.1396		0.2042		0.2676	

Reference categories in square brackets. \*\*, \* denote significance at p&lt;0.01 and p&lt;0.05 respectively.



## Empirical Results

Table 2 presents the estimates from the probit model of promotion for all employees in the sample. The first column of Table 4 reports the marginal effects on the probability of promotion for the full sample. Even after controlling for an extensive list of supply side, demand side and control variables, white females, minority males and minority females were all less likely to receive promotions than white males. White females were 4.5% less likely to be promoted than comparable white males and minority males 7.9% less likely. Minority females were 16% less likely than similar white males to receive promotions. The model was also estimated excluding those whose race/gender status cannot be identified. The results are substantially the same.

Most of the independent variables included in the model exhibited the expected patterns of influence. For example, employees with higher levels of education attainment are significantly more likely to be promoted. Tenure had a significant inverted U-shaped relationship with the probability of receiving a promotion: a positive effect reaching a maximum at around 11 years and declining thereafter. Break in service reduced the probability of promotion by 13%. The likelihood of promotion also decreased as one moved up the organizational hierarchy, confirming the common belief of the increasing difficulty in climbing the corporate ladder. In line with meritocratic principles, employees who performed well relative to others stood a better chance of promotion. Higher salaries were also positively and significantly related to higher promotion probability. In terms of the effect of race/gender job composition, only the variable percent minority male had significant negative effect on the promotion probability in this overall model. Percent white female had an insignificant negative effect whereas percent minority female had an insignificant positive effect on the likelihood of receiving a promotion.

Older employees seem to be significantly less likely to be promoted, and the probability further decreases the older one gets. This may potentially indicate that ageism exists in this organi-

zation. In summary, all race/gender groups were significantly less likely than white males to be promoted even after controlling for an extensive list of factors that affect the promotion probability in the overall model.

## Decomposition Analyses

The dummy approach used in the analyses so far only allows for a constant shift in the probability of promotion and constrains the coefficients of the explanatory variables to be the same for each of the four race/gender groups. Results from likelihood ratio tests show that the effects of the explanatory variables (as a group) are indeed different from that for white males. In other words, treating each race/gender group as a distinct group and allowing for variation in the regression coefficients will allow us to further investigate the potential differences in probability of promotion and potential sources of the differences. Separate regressions are therefore estimated in order to account for any differences in the promotion mechanisms for each of the race/gender groups. The rest of Table 2 presents the maximum likelihood estimates from the probit model of promotion by race/gender group.

Education is a strong positive predictor of promotion of white males and white females. In general, higher educational attainment increases one's likelihood of being promoted. For the minority group, education is not significantly related to the probability of promotion. This may potentially reflect that minorities' education credentials are not be fully recognized by their employers (Tomaskovic-Devey, Thomas & Johnson, 2005). As visible minorities are more likely to be immigrants who may have obtained their credentials in their home countries, arguments can be made that the undervaluation is due to the fact that these credentials were not seen as comparable to Canadian standard. However, Li (2008) found that while male immigrants enjoy and earnings advantage, visible minority men actually suffered an earnings disadvantage.

Age is not a significant predictor of promotion for any group. The effect of tenure on promotion probability takes on the shape of an inverted U for all

race/gender groups but the effect is not significant for white females. Break in service seems to have a negative effect on the probability of promotion but is only significant for white males. On average, a white male employee who had a break in service was 20% less likely to be promoted than a white male whose service with the company had been continuous.

The effect of job composition on the likelihood of promotion is also quite different for the four race/gender groups. Percent white female has a significant positive effect on the promotion probability for white males. White males are 6.6% more likely to receive a promotion with every 10% increase in the percent white female in the job composition. This may be an indication of a phenomenon which some researchers have called the "glass escalator" effect, where men are more likely to be promoted in female-dominated occupations (Williams 1995). On the other hand, percent white female has a negative, though not significant, effect on the likelihood of promotions of both white and minority females. Finally, percent white female increases the probability of promotion of minority males, but the effect is not statistically significant at conventional levels.

Percent minority male significantly lowers the promotion probability for white females and both minority groups, but is only significant for the minority groups. A 10% increase in percent minority male of a job decreases the probability of promotion for minority males and minority females by 15% and 19% respectively. However, its effect on the probability of promotion of white males is positive, though not significant. Percent minority female in job composition has a significant positive effect on the probability of promotion of minority males. A 1% increase in percent minority female significantly increases minority males' chances for promotion by 3%.

To further understand the gaps in promotion probabilities, decomposition analyses as described in the methodology section were performed using white males as the reference group for the full sample and for each of the three partitions. This methodology allows the partition of these overall gaps into an "explained" component and an "unex-



Table 3 Summary of Results from Various Probit Decompositions

	Reference Group = White Males					
	White Females		Minority Males		Minority Females	
	Gap	%	Gap	%	Gap	%
<b>Overall Sample</b>						
Differences in Predicted Probabilities	0.03	(100%)	0.03	(100%)	0.10	(100%)
Due to Differences in Productivity-Related Characteristics	0.01	(43%)	-0.04	(35%)	-0.07	(30%)
Due to Differences in Returns	0.02	(57%)	0.07	(65%)	0.17	(70%)
<b>Job Levels 1 to 3</b>						
Differences in Predicted Probabilities	0.22	(100%)	-0.02	(100%)	0.47	(100%)
Due to Differences in Productivity-Related Characteristics	0.15	(69%)	-0.11	(55%)	0.29	(60%)
Due to Differences in Returns	0.07	(31%)	0.09	(45%)	0.19	(40%)
<b>Job Levels 4 to 5</b>						
Differences in Predicted Probabilities	0.07	(100%)	0.09	(100%)	0.15	(100%)
Due to Differences in Productivity-Related Characteristics	0.02	(32%)	0.01	(8%)	0.02	(10%)
Due to Differences in Returns	0.05	(68%)	0.08	(92%)	0.14	(90%)
<b>Job Levels 6 to 8</b>						
Differences in Predicted Probabilities	-0.09	(100%)	0.04	(100%)	0.01	(100%)
Due to Differences in Productivity-Related Characteristics	-0.06	(63%)	0.00	(7%)	-0.32	(49%)
Due to Differences in Returns	-0.03	(37%)	0.04	(93%)	0.33	(51%)

plained" component. The main findings are summarized in Table 3.

The decomposition results for the overall sample presented in Table 3 show that relative to white males, white females and minority males are predicted to be about 3% less likely to be promoted, while minority females are almost 10% less likely to receive a promotion in the overall sample. About two-thirds of the gender/racial differences in promotion probability for the minority groups are explained by differences in coefficients (or returns). Differences in productivity-related characteristics account for about one-third of the differences in promotion rates. Taking into account the productivity-related characteristics of the male and female minority groups, their probability of promotion would have improved by 4% and 7% respectively. However, this "advantage" is not enough to compensate for the lower rates at which their attributes are being rewarded, relative to white males. The difference in promotion rates between white females and white males is almost evenly split between differences in coefficients (or returns) and differences in their productivity-related characteristics.

The decomposition results by partitions provide further information on the

promotion process for the various groups. White females in the entry group are predicted to be 22% less likely to be promoted compared to white males. The situation is much worse for minority females who are 47% less likely than white males to receive a promotion, while minority males are 2% more likely to be promoted than white males at these job levels. Only about one-third of the differences in promotion probabilities between white males and both female groups in this segment of the organizational hierarchy are explained by differences in coefficients (or returns). The majority of the difference is explained by differences in productivity-related characteristics, i.e., the promotion gap can be significantly reduced if the female groups can increase their levels of productivity-related characteristics. In this segment of the organizational hierarchy, the difference in promotion rates between white males and minority males are about evenly split between differences in returns and differences in productivity-related characteristics. Given the level of productivity-related characteristics of the minority males, their promotion probability would have been 11 percentage-points higher, but the effect is almost totally eliminated by the differences in

the rates of return to their productivity-related characteristics as compared to white males.

For employees in the feeder group, white females and minority males are predicted to be 7% and 9% less likely to be promoted as compared to white males. The situation for minority females improved from the previous sample. At these levels, minority females are only 15% less likely than white males to receive a promotion. About one-third of the difference in promotion probability between white male and white female employees in this segment is explained by differences in productivity-related characteristics (32%); the majority of the difference is explained by differences in coefficients (68%). The picture for the minority groups is quite different. About 90% of the gap can be accounted for by differences in coefficients. This means that employees in these job levels are not very different in terms of their levels of productivity-related characteristics but the attributes possessed by minority groups are not rewarded at the same rate as those of white males.

At the senior levels, white female employees are predicted to be 9% more likely to receive a promotion than white males. Two-thirds of the 9% can be at-



tributed to white females' higher levels of productivity-related characteristics and the balance to higher returns to their productivity-related characteristics. Minority males and minority females still suffer some disadvantages, but to a lesser extent than those in the middle levels (4% and 1% respectively). The decomposition results show that the 4% disadvantage experienced by minority males is almost exclusively due to differential returns to productivity-related characteristics. In other words, minority males at these levels are "the same" as white males in terms of their attributes, however, they do not receive the same rate of return in opportunity for advancement that white males do. Finally, the results for minority females show that although the differential in promotion rate is small (1%), the decomposition results show that minority females possess a higher level of productivity-related characteristics than their white male counterparts and that given their level of productivity-related characteristics, they should be 32% more likely to be promoted than their white male counterparts. This advantage is completely eliminated as their productivity-related characteristics are not valued in the same way as those of white males.

Cobb-Clark (2001), using data from the National Longitudinal Survey of Youth to investigate the role of gender in the promotion process, found that the gender gap in promotions could be explained by the differential returns to productivity-related characteristics. The

analyses breaking down the organizational hierarchy into partitions contained in this paper showed that this finding is most pronounced for female employees situated at the middle levels of the organizational hierarchy. The gap in promotions between white males and the female groups at the lower rungs of the organization is more likely as a result of differences in productivity-related characteristics or attributes possessed by the minority groups as compared to white males. On the other hand, the disadvantage suffered by minority males (as compared to white males) can be explained almost exclusively by differential returns.

### Limitations

There are a number of data limitations that have inhibited the potential to better understand the promotion mechanisms in organizations. First, information on employees who have terminated their employment during the time period studied is not available. To the extent that those who left differ from those in the sample analyzed, the results may be biased by the attrition rate. For example, if white males are more likely than other race/gender groups to leave the firm after being promoted, the findings on the differences will be overstated. Booth et al. (2003) concluded that women have a higher propensity than men to quit after promotion though the difference is not statistically significant; and that women who were not promoted were also more likely to quit than their

male counterparts.

Table 4 shows the gross termination rates by gender and/or race for those who had been promoted and those who had not. A cursory inspection of these raw rates did not show any specific differences among the four race/gender groups. In general, those who did not receive a promotion are more likely to quit than those who were promoted.

Second, the measure of the race variable is quite broad and does not indicate "ethnicity". This poses a limitation as numerous researchers have found that the experience among racial minority groups is not homogeneous, especially in research related to earnings differentials (Pendakur & Pendakur, 1998; Hum & Simpson, 1999; Stelcner, 2000, Christofides & Swidinsky, 2002).

Third, the dataset lacks variables that measure the impact on non-market opportunities and activities on the likelihood of promotion. Economists have often explained the lower promotion rates for women by their relative advantage in non-market roles (Lazear & Rosen, 1990), either by way of less investment or by turning down advancement opportunities. Women's specialization in household activities is the usual argument for the differential treatments received by men and women in employment outcomes. An additional argument is that women tend to interrupt their careers for child bearing and child rearing, which may affect their intent to further accumulate their human capital. However, Winter-Ebmer et al.

Table 4 Proportion Terminated by Promotion Status

	Promoted				Promoted		
	Yes	No	Overall		Yes	No	Overall
Males	0.24 (0.42) [9,264]	0.39 (0.49) [6,919]	0.30 (0.46) [16,183]	Females	0.20 (0.40) [3,365]	0.38 (0.48) [2,790]	0.28 (0.45) [6,155]
Whites	0.22 (0.41) [6,582]	0.40 (0.49) [4,495]	0.29 (0.45) [11,077]	Non-whites	0.26 (0.44) [2,076]	0.43 (0.49) [1,651]	0.33 (0.47) [3,727]
White Males	0.22 (0.42) [4,614]	0.40 (0.49) [3,075]	0.29 (0.46) [7,689]	White Females	0.21 (0.40) [1,968]	0.40 (0.49) [1,420]	0.29 (0.45) [3,388]
Minority Males	0.27 (0.45) [1,602]	0.42 (0.49) [1,224]	0.34 (0.47) [2,826]	Minority Females	0.22 (0.42) [474]	0.43 (0.50) [427]	0.32 (0.47) [901]

Note: Standard deviation in parentheses. Number of observations in square brackets.



(1997), using data from the Austrian micro-census, have shown that only a minor part of the unequal gender distribution in job positions is explained by discontinuous labor market experience, as measured by past and expected future employment interruptions. In addition, the inclusion of the break(s) in service variable may have helped mitigate the issue.

Marital status is another important determinant of labour force participation and hours of work that may have an effect on promotion opportunity. However, one study has shown that marital status has no significant effect on the promotion of clerical workers after their work experience has been adequately controlled for (Ferber & Birbaum, 1981).

The models considered here also exclude certain unobservable measures of individual attributes. For example, the willingness to sacrifice one's career for family reasons may be stronger in women and racial minorities. In other words, they may be more likely to forego promotion opportunities to avoid increased responsibilities on the job that interfere with taking care of their families. The analyses could therefore be improved if gender and racial differences in the incidence of being offered promotions are observed versus observing the actual incidence of promotion that captures the combined outcome of the offer and the acceptance of promotion.

Finally, since the dataset contains only employees at one firm, in one particular industry, the results will likely not be generalizable to the overall Canadian labour force. However, the detailed analyses, made possible by the firm-level dataset, allow us to gain a better understanding of the mechanisms of the promotion process and may help shed light on the labour market experiences of women and minorities in large Canadian firms.

## Conclusion

Controlling for a wide range of variables, white females, visible minority males and visible minority females are less likely to receive a promotion than comparable white males. Education, age, tenure, break in service, salary level and performance ratings are

all significant determinants of promotion for the overall sample. Age and promotion opportunity are negatively related. Tenure exhibits the predicted inverted U-shaped relationship with promotion and performance and promotion are positively related to the incidence of promotion. A break in service with the firm has a negative impact on the likelihood of promotion. Salary level is positively related to promotability, that is, employees with higher salary levels are more likely to be promoted.

Partitioning the overall sample into three job level groups shows that most of the explanatory variables in the models by segments of the organizational hierarchy exhibit similar signs to those in the overall sample except for tenure, break in service and job composition. For employees at lower job levels, tenure and promotion have a U-shaped relationship. For employees in job levels 4 and above, tenure and promotion take on an inverted U relationship. The negative effect of a break in service is only significant for employees at the senior levels of the organizational hierarchy. Finally, the racial and gender composition of jobs have significant negative effects on the probability of promotion for employees situated at the middle levels of the hierarchy. The higher the representation of white females, minority males or minority females in a job, the lower the probability of receiving a promotion for the minority groups in those jobs. The reverse is true for white males.

The decomposition exercise sheds further light on the promotion gap between white males and each of the three minority race/gender groups. Given their characteristics, the minority groups should have enjoyed higher promotion probability, but differential returns negate the positive effect. The reasons for white females' lower promotion probability are split between their lower levels of productivity-related characteristics and differential returns compared to their white male counterparts. The lower promotion probability for white and minority females at the lower job levels is mostly due to their lower levels of productivity-related characteristics. For women and minorities at the lower job levels, focusing on skills development should help alleviate and mitigate

the disadvantage. Whereas the disadvantage experienced by the minority groups at the middle levels are mostly as a result of differential returns, the picture at the senior levels is quite different for the different groups. For white females, their higher level of productivity-related characteristics and higher level of returns contributed to their higher promotion probability. The disadvantage suffered by minority males is almost exclusively due to differential returns. Finally, the positive effect of minority females' higher level of productivity-related characteristics was completely eliminated by the differential returns. Considering the high level of productivity-related characteristics possessed by a majority of the women and visible minority employees at higher job levels, systemic barriers must have existed in the company's policies, programs and practices. Identifying these barriers and striving towards a transparent promotion process, will not only benefit these disadvantaged groups but also allow all employees an equal opportunity to advance.

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