Performance pay, competitiveness, and the gender wage gap: evidence from the United States

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December 2014

ABSTRACT

Evidence that women are less likely to opt into competitive compensation schemes in the laboratory has generated speculation that a gender difference in competitiveness contributes to the gender wage gap. Using data from the NLSY79 and NLSY97, we show that women are less likely to be employed in jobs using competitive compensation. The portion of the gender wage gap explained by gender segregation in compensation schemes is small in the NLSY79 but somewhat larger in the NLSY97, suggesting an increasing role for competitiveness in explaining the gender wage gap.

Keywords: gender wage gap, competitiveness, performance pay
JEL codes: J16, A12

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I. Introduction

Laboratory findings that women are less likely than men to opt into competitive environments have led to speculation that a gender difference in competitiveness contributes to the gender wage gap (Gneezy et al. 2003, Niederle and Vesterlund 2007). While differences in attitudes toward competition may influence labor market outcomes through their effects on educational and occupational choices (Kleinjans 2009, Buser et al. 2014), there is little evidence that a gender difference in preferences concerning participation in competitive compensation schemes contributes to the gender wage gap.

In an attempt to examine the relevance of competitiveness to the gender wage gap, Manning and Saidi (2010) use an indicator for whether a worker's compensation is based, in part, on performance to proxy for a job's competitiveness as the pay on such jobs is typically determined by relative performance across workers. They find that women in the United Kingdom are only slightly less likely than men to be employed in jobs in which compensation is based on performance, and gender differences in the receipt of performance pay explain only a small portion of the gender wage gap in their data. Given that the experimental literature on competitiveness finds large gender differences in preferences over participation in competitive pay schemes, their findings cast doubt on the importance of gender differences in competitiveness in the labor market.

Using data from the National Longitudinal Surveys of Youth (NLSY) 1979 and 1997 cohorts, we examine whether women in the United States are less likely to receive compensation determined by their performance in competition with their peers and whether gender segregation in the receipt of performance pay explains any of the gender wage gap in the United States. Consistent with the laboratory studies, we find that women are less likely to be employed in jobs using the most competitive forms of performance pay (commissions and bonuses), but this gender difference is nowhere near as large as the analogous gender difference observed in the laboratory. When we include measures of performance pay in standard gender wage regressions, we find that the receipt of performance pay explains a small but possibly increasing portion of the gender wage gap in the United States.

II. Data

The data come from the NLSY79 and NLSY97 cohorts. Respondents in the NLSY79 were asked whether their earnings were based on job performance in 1988, 1989, 1990, 1996, 1998, and 2000. Respondents in the NLSY97 were asked in all survey years (1997-2011) the types of compensation they received, in addition to their base pay. From these questions, we construct indicators for whether an individual received competitive performance pay. In the NLSY79, performance pay included piece-rates, commissions, bonuses, stock options and other performance pay; in the NLSY97, it included commissions, bonuses and incentive pay.[1]

[1] We exclude tips from the analysis because they are not paid by the employer and are typically not earned in competition with co-workers. We also exclude overtime and other compensation (a "catch-all" category in the survey) from the NLSY97 analysis because neither is explicitly based on worker performance.

The summary statistics are reported in table 1. The receipt of performance pay is generally associated with higher wages. Men in the NLSY79 (NLSY97) are more than 6 (2) percentage points more likely to receive performance pay as we define it than women. Women in both samples are less likely to have received each performance pay type except for incentive pay, but the gender difference is most pronounced in the receipt of bonuses with 4.2 (2.2) percentage points fewer women in the NLS79 (NLS97) receiving bonuses than men. Because commissions and bonuses are often won at the expense of other employees when sales cannot be shared and the bonus pool is fixed, we consider them to be more competitive forms of compensation than other types of performance pay. We separately analyze the receipt of different types of performance pay and their effects on the gender wage gap. By contrast, Manning and Saidi (2010) disaggregate their performance pay measure by looking at gender differences in merit pay, piece-rates, and individual-based performance pay, but it is unclear *a priori* which of these compensation schemes is most competitive.

In our models, we also include controls for the respondent's characteristics (highest grade completed, race, work experience, tenure with the current employer, marital status, and presence of children) and characteristics of the respondent's job (industry, occupation, number of employees at the employer, whether the job is in government, and whether the worker's contract is determined by a union or collective bargaining agreement). These controls were chosen to match those used in Manning and Saidi (2010) as closely as possible. The only difference is that Manning and Saidi (2010) incorporate firm effects, which is impossible in the NLSY. The inclusion of firm effects, however, appears to have had little influence on their findings.

III. Findings

Table 2 reports the estimated marginal effects of being female on the probability of receiving different types of performance pay from Probit models. All the models include controls for respondent's characteristics. To avoid issues relating to the potential endogeneity of job choice, we estimate separate models with and without the inclusion of job characteristics.

Compared to Manning and Saidi (2010) who find that women are 1.2 percentage points less likely to receive performance pay conditional on personal and job characteristics and 5.3 percentage points less likely to receive performance pay conditional only on personal characteristics, women in the NLSY79 (NLSY97) are 3.9 (2.5) percentage points less likely to receive performance pay conditional on personal and job characteristics and 6.3 (2.9) percentage points less likely conditional on only personal characteristics. Across well-defined performance pay-types, we find that women in both cohorts and in all specifications are especially less likely to receive bonuses—arguably the most competitive of our performance pay measures. By contrast, our estimates indicate that, conditional on personal and job characteristics, women are actually more likely than men to earn compensation through a piece rate—arguably the least competitive of our performance pay measures.

Manning and Saidi (2010) estimate that the contribution of performance pay to the gender wage gap is at most 0.5 percentage points. To examine whether the gender differences in the receipt of competitive performance pay in table 2 translate to gender differences in wages, we estimate log-wage models with and without each performance pay indicator. Columns (1) and (2) of Table 3

report the coefficient on the female dummy (i.e., the gender wage gap) without and with controls for each performance pay type, respectively. Column (3) reports the coefficient on the performance pay indicator in the latter regression. All the models include controls for respondent characteristics. Columns (4) to (6) follow a similar structure and report estimates from models that include potentially endogenous job controls. [2] The receipt of performance pay explains a small but non-zero portion of the gender wage gap. Controlling only for personal characteristics, performance pay explains 0.6 (0.9) log points or 2.9 (6.2) percent of the gender wage gap in the NLSY79 (NLSY97). Adding job controls, the receipt of performance pay explains 0.4 (0.8) log points or 2.4 (12.1) percent of the gender wage gap in the NLSY79 (NLSY97).

In both cohorts, the receipt of the most competitive forms of compensation explains a non-trivial portion of the gender wage gap. The receipt of commissions and/or bonuses explains 0.7 (0.9) log points of the gender wage gap without controls for job characteristics in the NLSY79 (NLSY97). Overall, the evidence in table 3 indicates that competitiveness explains a similar (larger) fraction of the gender wage gap in the United States in the NLSY79 (NLSY97) relative to what Manning and Saidi (2010) found in the United Kingdom. One reason why performance pay contributes more to explaining the gender wage gap in the more recent cohort may be due to the fact that earnings from performance pay are more closely tied to observed and unobserved worker productivity than earnings from other forms of compensation (Lemieux et al. 2009). As a consequence of their higher propensity to work on jobs using competitive performance pay, men may have disproportionately benefited from the well-documented increase in the returns to skill (Juhn et al. 1993). Indeed, as observed in the pay-type coefficients in table 3, the relationship between performance pay and wages is stronger for the NLSY97.

IV. Discussion

In the laboratory, Niederle and Vesterlund (2007) and Dargnies (2012) find that women are 38 and 33 percentage points, respectively, less likely to opt into competitive tournaments than their male peers. In the NLSY cohorts, we observe significantly less gender segregation in the receipt of competitive performance pay in the labor market than in the laboratory, and this gender difference accounts for a small portion of the gender wage gap. Questions for future research naturally follow. First, why is there a large difference in the importance of competitiveness in the laboratory and the labor market? One possibility is that while in the lab subjects choose between environments fully characterized by differences in competitiveness, in real life workers choose between jobs with many characteristics. When faced with different work conditions, preferences over competitiveness may not be the primary motivation driving choices in the labor market. Further investigation of gender differences in preferences over work conditions seems warranted. Second, is performance pay a good proxy for the competitiveness of a job? While competition in the laboratory can be defined by compensation schemes, workers in many jobs compete for the next job, for the terms of the next contract, or for limited work opportunities. Indeed, the

[2] If women opt out of some highly paid jobs because they rely more on competitive pay schemes, the inclusion of job characteristics might understate the extent to which gender differences in competitiveness contribute to the gender wage gap. On the other hand, controlling for job characteristics might ameliorate omitted variable concerns in the log-wage regressions that compensation practices may be correlated with unobserved job characteristics that influence earnings. Comparing the estimates with and without the inclusion of job characteristics provides lower and upper bound estimates of the effects.

correlation between the receipt of performance pay and the reported competitiveness of a job as measured in Occupational Information Network (O*NET) data is only 0.2 in our NLSY samples. If performance pay is a poor proxy for the degree of competition on a job, then our findings and those of Manning and Saidi (2010) may understate the importance of competitiveness in the explaining the gender wage gap. Finally, in the labor market women may be constrained in the ability to compete by domestic responsibilities given that highly competitive jobs may require long hours and other sacrifices (Goldin 2014). Future research must take care not to conflate gender differences in the ability to compete in the labor market with gender differences in preferences for competition.

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Table 1: Summary statistics for the estimation samples

	NLSY79 sample					
	Men			Women		
		Performance pay?			Performance pay?	
	All	No	Yes	All	No	Yes
Performance pay	0.234			0.171		
Commissions	0.049		0.207	0.029		0.168
Bonuses	0.151		0.645	0.109		0.636
Stock options	0.026		0.110	0.014		0.080
Piece-rate	0.027		0.117	0.024		0.138
Other performance pay	0.027		0.114	0.020		0.115
Log-hourly wage	2.533	2.488	2.677	2.337	2.316	2.443
	[0.615]	[0.598]	[0.648]	[0.598]	[0.588]	[0.633]

	NLSY97 sample					
	Men			Women		
		Performance pay?			Performance pay?	
	All	No	Yes	All	No	Yes
Performance pay	0.172			0.149		
Commissions	0.045		0.259	0.038		0.258
Bonuses	0.123		0.712	0.101		0.681
Incentive pay	0.028		0.165	0.028		0.188
Log-hourly wage	2.417	2.344	2.77	2.311	2.255	2.628
	[0.612]	[0.571]	[0.677]	[0.550]	[0.518]	[0.616]

Note: Standard deviations in brackets. There are 18,199 (15,629) person-year observations for men (women) in the NLSY79, and 15,395 (14,548) person-year observations for men (women) in the NLSY97. Wages were deflated to 1998 dollars using the CPI for urban consumers before taking logs. In both samples, observations were restricted to workers over age 18 who were working and not enrolled in school in the week of their interview and who had no missing values for the pay type and control variables described in the text.

Table 2: Probit estimates of marginal effect of being female on whether performance pay received

	NLSY79 sample		NLSY97 sample	
	(1)	(2)	(3)	(4)
	Outcome: Performance Pay			
Female	-0.063***	-0.039***	-0.029***	-0.025***
	[0.006]	[0.007]	[0.007]	[0.007]
	Outcome: Commissions			
Female	-0.019***	-0.015***	-0.007*	-0.016***
	[0.003]	[0.003]	[0.004]	[0.004]
	Outcome: Bonuses			
Female	-0.044***	-0.037***	-0.025***	-0.018***
	[0.005]	[0.005]	[0.005]	[0.005]
	Outcome: Stock Options			
Female	-0.011***	-0.008***		
	[0.002]	[0.002]		
	Outcome: Piece-rate			
Female	-0.003	0.011***		
	[0.002]	[0.003]		
	Outcome: Other performance pay			
Female	-0.007***	-0.006***		
	[0.002]	[0.002]		
	Outcome: Incentive Pay			
Female			-0.002	-0.0002
			[0.003]	[0.003]
Controls:				
Individual characteristics	Yes	Yes	Yes	Yes
Job characteristics	No	Yes	No	Yes

Note: The sample sizes are 33,828 and 29,943 for the NLSY79 and NLSY97, respectively. Each row reports the marginal effect of being female on the probability of receiving the type of performance pay specified in each panel. The standard errors reported in brackets are robust to heteroskedasticity at the respondent level. * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level.

Table 3: Estimated relationships between performance pay types and the gender wage gap

	A. Gender wage gap in the NLSY79					
Pay type:	Without pay type indicator	With pay type indicator	Pay type coefficient	Without pay type indicator	With pay type indicator	Pay type coefficient
	(1)	(2)	(3)	(4)	(5)	(6)
Performance pay		-0.202***	0.106***		-0.162***	0.093***
		[0.009]	[0.009]		[0.009]	[0.008]
Commissions		-0.207***	0.074***		-0.164***	0.099***
		[0.009]	[0.020]		[0.009]	[0.019]
Bonuses		-0.202***	0.136***		-0.161***	0.113***
		[0.009]	[0.010]		[0.009]	[0.009]
Commissions +	-0.208***	-0.201***	0.124***	-0.166***	-0.160***	0.113***
bonuses	[0.009]	[0.009]	[0.010]	[0.009]	[0.009]	[0.009]
Stock options		-0.205***	0.269***		-0.163***	0.224***
		[0.009]	[0.022]		[0.009]	[0.021]
Piece-rate		-0.208***	0.020		-0.166***	0.022
		[0.009]	[0.024]		[0.009]	[0.024]
Other performance pay		-0.208***	0.014		-0.166***	-0.005
		[0.009]	[0.021]		[0.009]	[0.020]
	B. Gender wage gap in the NLSY97					
Pay type:	Without pay type indicator	With pay type indicator	Pay type coefficient	Without pay type indicator	With pay type indicator	Pay type coefficient
Performance pay		-0.136***	0.301***		-0.058***	0.292***
		[0.010]	[0.012]		[0.010]	[0.012]
Commissions		-0.142***	0.329***		-0.059***	0.386***
		[0.010]	[0.026]		[0.011]	[0.026]
Bonuses	-0.145***	-0.137***	0.288***	-0.066***	-0.062***	0.255***
	[0.010]	[0.010]	[0.013]	[0.011]	[0.011]	[0.012]
Commissions +		-0.136***	0.305***		-0.057***	0.299***
bonuses		[0.010]	[0.013]		[0.010]	[0.012]
Incentive pay		-0.144***	0.271***		-0.066***	0.226***
		[0.010]	[0.025]		[0.011]	[0.025]
Controls:						
Individual characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Job characteristics	No	No	No	Yes	Yes	Yes

Note: The sample sizes are 33,828 and 29,943 for the NLSY79 and NLSY97, respectively. Each row reports the coefficient on the female dummy in a log-wage regression without controlling for the performance pay type associated with the row (Columns (1) and (4)), the coefficient on the female dummy controlling for the specified performance pay type (Columns (2) and (5)), and the coefficient of the specified performance pay type in the latter regression (Columns (3) and (6)). Columns (1) to (3) include controls for individual characteristics while Columns (4) to (6) include controls for individual and job characteristics. The standard errors reported in brackets are robust to heteroskedasticity at the respondent level. * - significant at the 10% level, ** - significant at the 5% level, *** - significant at the 1% level.