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# Variable pay and work hours: does performance pay reduce the gender time gap?

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## Abstract

Using German survey data, we show in worker fixed effects estimates that performance pay is associated with a substantially lower gender hours gap. While performance pay increases the work hours of both men and women, the increase is much larger for women than for men. We argue that our finding likely reflects differences in household production and specialization by gender. Thus, we show that performance pay is not associated with increased hours for men with children in the household. Yet, performance pay is associated with a very large increase in hours for women with children in the household.

## KEYWORDS

performance pay, contracted hours, actual hours, gender

## JEL CLASSIFICATION

D10; J22; J33; M52

## 1 | INTRODUCTION

The gender gap in labour market opportunities plays a key role in the policy debate in many countries (European Commission 2016; United Nations Human Rights Council 2011; United Nations Office at Geneva 2016; World Bank 2012). While education and labour force participation of women have increased, women continue to face various labour market disadvantages. There remains a substantial gender wage gap (Blau and Kahn 2017). Moreover, evidence from various countries shows that there also exists a substantial gender time gap. While the extent of the gender time gap may vary from country to country, the basic point is that women on average work fewer hours than men in all the countries examined (Campana *et al.* 2023; Doan *et al.* 2021; Duval-Hernández *et al.* 2023; Jackman and Lorde 2021; Landivar 2015; Männasoo 2022).

This gives rise to the question of what drives the gender time gap, and which factors contribute to reducing the gap. Our study examines the role of performance pay. The use of performance pay has spread among firms in the USA and in many European countries (Bender and Skatun 2022; Lemieux *et al.* 2009; Zwysen 2021). Performance pay is often thought to induce higher effort as it

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aligns workers' interests to those of the employer (Prendergast 1999). Considering greater work hours as one component of the effort response, a fledgling literature has begun to examine the link between performance pay and work hours. However, as we will make clear, the underlying studies have provided mixed results. This may reflect that the influence of performance pay on working hours is heterogeneous and depends on circumstances and type of worker. Most salient to our topic, those studies have not systematically examined whether the link between performance pay and working hours differs between men and women.

We provide a unique study showing that the link between performance pay and hours of work indeed differs substantially by gender. Using data from the German Socio-Economic Panel (SOEP) and controlling for worker fixed effects, we show that the hours response to performance pay is much larger and more consistent for women than for men. This has not been shown before. Our key finding implies that the gender time gap is substantially smaller among workers receiving performance pay. This finding is consistent with the well-known greater labour supply responsiveness of women, and as such, may reflect continued gender specialization.

To further explore this interpretation, we examine workers with and without children, recognizing that children are associated with increased home production. Within households without children, both men and women modestly increase their hours of work when receiving performance pay. By contrast, within households with children, the work hours of men appear insensitive to the presence of performance pay, whereas the hours of women are highly sensitive to performance pay. This shows that particularly women with children substitute work hours for household production, implying that performance pay particularly lowers the gender time gap among workers with children.

In what follows, Section 2 provides the background discussion. Section 3 introduces our data and methodology. Section 4 presents the empirical results. Section 5 concludes and discusses the implications of our findings.

## 2 | BACKGROUND DISCUSSION

### 2.1 | Previous research on performance pay and work hours

Performance pay measures (either objectively or subjectively) elements of performance and links worker compensation to those measures. At its best, performance pay aligns the interests of workers with those of the firm (Prendergast 1999). Indeed, a series of studies show that performance pay increases productivity (Banker *et al.* 1996; Cadsby *et al.* 2007; Dohmen and Falk 2011; Gielen *et al.* 2010; Heywood *et al.* 2011; Jirjahn 2016; Lavy 2009; Lazear 2000; Paarsch and Shearer 2000; Shaw 2015; Shearer 2004). There is also ample evidence that performance pay is linked to higher wages (Booth and Frank 1999; Green and Heywood 2016; Heywood and Parent 2012; Jirjahn and Stephan 2004; Parent 1999; Pekkarinen and Riddell 2008; Seiler 1984). These findings reflect that performance pay rewards both higher ability and increased effort of workers.

However, it is an open question whether performance pay has an influence on workers' hours. From a theoretical viewpoint, there can be opposing influences. On the one hand, greater hours may be viewed as one component of workers' effort response to performance pay. On the other hand, increased worker effort does not necessarily mean an increase in hours. It could reflect working faster, harder or smarter rather than simply working longer. Taking the standard labour supply model into account, the increased earnings opportunities associated with performance pay involve both a substitution and an income effect. Depending on which of the two effects dominates, workers may increase or decrease their hours. Workers will respond with greater hours only if the substitution effect dominates, but not if the income effect dominates.

Only a relatively small number of empirical studies have examined the link between performance pay and work hours. These provide mixed results. Studies of agricultural workers in

California find that piece rates increase productivity without additional hours, which the authors attribute to working harder and smarter (Billikopf and Norton 1992; Billikopf 1995). Similarly, for Florida, Ku (2019, p. 132) presents evidence that for piece-rate agricultural workers, ‘hours worked are not really the workers’ choice variable whereas effort or work intensity is’.

By contrast, Fehr and Goette (2007) find evidence of a positive hours response for bicycle messengers in Zurich, Switzerland. An increase in the commission rate paid to the messengers (i.e. a higher intensity of performance pay) leads them to increase their work hours. Examining teachers in the USA, Jones (2013) shows that the type of performance pay plays a role. Teachers’ hours tend to increase with individual performance pay, but not with group performance pay. DeVaro (2022) uses UK linked establishment–worker data to show that performance pay increases the likelihood of working long hours, but only if the cut-off is modest (35–39 hours). This result might best be summarized as performance pay increasing the likelihood of working full-time instead of part-time.

The literature also provides mixed results as to the question of whether worker sorting plays a role in the link between performance pay and work hours. Green and Heywood (2023) illustrate with individual data from the UK that large initial hours estimates are greatly attenuated by worker fixed effects estimates that hold worker sorting constant. By contrast, using US survey data, Artz and Heywood (2024) find a substantial hours response to performance pay even in worker fixed effects estimation.

Most salient to our topic, the studies on performance pay and work hours have paid almost no attention to possible gender differences. In the US study, Artz and Heywood (2024) just briefly describe that they could not find meaningful differences by gender in the hours response to performance pay. Yet, there remain reasonable theoretical expectations that such differences could exist, and it is useful to identify these expectations.

## 2.2 | Performance pay and gender

A series of experimental studies suggest that women’s and men’s efforts respond similarly to different variants of performance pay across a wide range of contexts (Bandiera *et al.* 2021). However, the hours response to performance pay was not among the effort measures examined. Different hours responses can be expected if one considers traditional gender roles. These gender roles involve women being disproportionately responsible for household and family tasks even when they work. While men are primary earners, women are secondary earners who are less attached to the labour market. Home specialization has been thought to make women’s labour supply more responsive to outside earnings. Traditional gender roles lead women to substitute among work, home production and leisure, whereas men substitute primarily between work and leisure. A series of studies for the USA and Europe indeed find that the labour supply of women is much more sensitive to wages at both the extensive and intensive margins (Bargain and Peichel 2016; Heckman 1993; Killingsworth and Heckman 1986; Smith 1980). Thus, to the extent that performance pay increases earnings opportunities, women are likely to respond with more additional hours than would men. This can be particularly expected when there are children in the household, increasing women’s responsibility for family.

One may question whether such asymmetric gender roles remain in recent times. Over the last decades, the wage labour supply elasticities of women have declined in the USA and Europe, implying smaller gender differences in labour supply (Bargain and Peichl 2016). This may indicate a change in gender roles. However, even though gender asymmetries have decreased, they have not completely disappeared. Fortin (2005, 2015) finds that traditional gender role attitudes still play a role in women’s labour force participation. Time use studies show that women on average spend much more time on childcare and homecare than men even when they work (Bredtmann 2014; Craig and Mullan 2010; Ferrant *et al.* 2014; Garcia *et al.* 2011;

Sellach and Libuda-Köster 2017). Reflecting their disproportionate responsibility for household production, women experience more psychological strain from combining work and family than men (Deutscher Gewerkschaftsbund 2017; Klünder and Meier-Gräwe 2017; Ross and Mirowsky 1988). Finally, there is evidence that the well-known gender gap in job burnout is largely driven by women with traditional views of their role in society (Artz *et al.* 2022). Thus, to the extent that asymmetric gender roles still exist, they can be expected to lead to differential hours responses to performance pay.

Of course, a differential hours response may also depend on whether the earnings opportunities associated with performance pay differ for men and women. On the one hand, there are concerns that the discretionary nature of the evaluations underlying performance pay implies that superiors' prejudices towards women will enter the process of performance measurement, resulting in a gender bias (Maas and Torres-González 2011). On the other hand, performance pay may help women to overcome statistical discrimination so that they can improve their earnings opportunities. Statistical discrimination occurs when employers have imperfect information about individual workers' productivity and, therefore, use information about a group's productivity to pay them (Arrow 1973; Phelps 1972). Improving information about individual worker productivity reduces the necessity to use group information (Lozano *et al.* 2023). Performance pay may be an opportunity for women to prove to their employers that they are not less productive than men. This provides an additional incentive to work longer hours under performance pay.<sup>1</sup>

### 3 | DATA AND VARIABLES

Our empirical analysis uses data from the SOEP, a large representative longitudinal survey of private households in Germany (Goebel *et al.* 2019). Routine socioeconomic and demographic questions are asked annually. Different 'special' topic questions appear in specific waves. Information on performance pay is available in the waves 2004, 2008, 2011 and 2016. We pool the four waves for our panel data analysis. The analysis focuses on workers aged 18–60 years. This reflects the typical working-age population in Germany. We exclude apprentices, interviewees reporting zero working hours, and marginally employed individuals (monthly earnings of below 450 euros). These employees are unlikely to face a choice of sorting into performance pay. Furthermore, as we focus mainly on worker fixed effects regressions, our estimation sample removes any observation that appears in only one wave.

Table 1 provides the definitions and descriptive statistics of our key variables. Building from Cornelissen *et al.* (2011) and Grund and Sliwka (2010), our dummy for individual performance pay is equal to 1 if an employee is subject to regular and formalized performance appraisal, and the performance appraisal has consequences for the employee's earnings. In our sample, 28% of employees receive performance pay.

Gender is the key topic of our study. Slightly less than half the employees in our sample are women. As the gender dummy is a time-invariant variable, we cannot include it in the fixed effects regressions. To provide some first insights into the extent of the gender time gap in our data, we run some initial random effects regressions with the combined sample of male and female workers that include the time-invariant dummy for women. In all subsequent estimates, we focus solely on fixed effects regressions. We provide separate estimations for men and women to examine if the link between performance pay and working hours depends on the worker's gender. These separate estimations provide insights into the question of whether performance pay reduces the gender gap in working hours. Alternatively, we use the combined sample of male and female workers, and include an interaction term between the gender dummy and the time-varying variable for performance pay.

We consider two dependent variables—the log of the contracted weekly hours, and the log of the actual weekly hours. The latter variable also accounts for overtime hours. Table 2 provides

**TABLE 1** Definitions and descriptive statistics of the key variables.

Variable	Definition	Mean	S.D.
Woman	Dummy equals 1 if the worker is a woman.	0.48	0.50
Performance pay	Dummy equals 1 if the worker faces a regular performance appraisal that has consequences for his or her earnings.	0.28	0.45
$\ln(H_C)$	Natural log of the number of working hours per week stipulated in the worker's contract, excluding any overtime. The interviewee answers the question: 'How many hours per week are stipulated in your contract (excluding overtime)?'	3.54	0.28
$\ln(H_A)$	Natural log of the number of working hours per week the worker actually works, including any overtime. The interviewee answers the question: 'How many hours do you generally work per week, including any overtime?'	3.63	0.30

Notes: Number of observations is 14,630. Definitions and descriptive statistics for all other variables are in Appendix Table A1.

**TABLE 2** Mean comparisons.

Variable	Performance pay	No performance pay	Difference ( <i>t</i> -statistic)
	Mean (S.D.)	Mean (S.D.)	
<i>Panel A: Men and women</i>			
$\ln(H_C)$	3.59 [37.03] (0.21)	3.52 [34.94] (0.30)	0.08 (15.00)***
$\ln(H_A)$	3.70 [41.51] (0.24)	3.61 [38.55] (0.32)	0.09 (16.80)***
Number of observations	4103	10,527	14,630
<i>Panel B: Men</i>			
$\ln(H_C)$	3.66 [38.86] (0.10)	3.65 [38.79] (0.14)	0.01 (1.70)*
$\ln(H_A)$	3.77 [43.89] (0.15)	3.75 [43.25] (0.18)	0.02 (4.55)***
Number of observations	2530	5033	7563
<i>Panel C: Women</i>			
$\ln(H_C)$	3.49 [34.09] (0.29)	3.39 [31.41] (0.36)	0.10 (10.25)***
$\ln(H_A)$	3.59 [37.69] (0.30)	3.48 [34.25] (0.37)	0.11 (11.22)***
Number of observations	1573	5494	7067

Notes: The means of the contracted hours  $H_C$  and the actual hours  $H_A$  are shown in square brackets.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

simple mean comparisons to examine how workers with and without performance pay differ in their working hours. The comparisons with the combined sample of male and female workers in the last column of panel A show that workers receiving performance pay indeed work significantly more hours. Workers on performance pay have approximately 8.3% more contracted and 9.4% more actual work hours than workers who are not on performance pay.<sup>2</sup> However, the combined sample of male and female workers hides a far richer pattern.

The separate comparisons for men and women in panels B and C of Table 2 make it clear that performance pay plays a much more pronounced role in hours differences among women

than among men (again focusing on the last column). For female workers, performance pay is associated with 10.5% more contracted hours and 11.6% more actual hours. This reflects 2.7 more contracted and 3.4 more actual hours. By contrast, for male workers, performance pay is associated with only 1.0% more contracted and 2.0% more actual hours. This implies a negligible increase in contracted hours and roughly 40 more minutes of actual hours. Altogether, this pattern provides initial evidence that performance pay has a much stronger influence on the working hours of women than on the working hours of men, and hence reduces the gender hours gap. For workers without performance pay, the gap amounts to 7.4 contracted and 9.0 actual hours. For workers with performance pay, the gap is only 4.8 contracted and 6.2 actual hours. At issue is whether this pattern of findings also holds in multivariate regressions controlling for other factors.

The SOEP allows including a rich set of control variables in the regressions. Appendix Table A1 shows the definitions and descriptive statistics. Variables for a permanent contract, tenure, work experience, firm size, occupation, industry and public versus private sector employment capture work-related factors. Furthermore, we include variables for years of schooling, age, marital status, number of children and size of the household to account for the sociodemographic background. We also control for risk attitude and personality traits (locus of control and the Big Five). Finally, a regional dummy for East Germany and variables for the year of observation are included. In the initial random effects estimates, we also control for (time-invariant) migration background.

## 4 | RESULTS

### 4.1 | Initial estimates

Table 3 presents the key initial estimates on the combined gender sample. Control variables are included but suppressed to save space. The determinants of the logs of the contracted and actual weekly hours are estimated first using random effects (RE) and then fixed effects (FE) regressions. The two models differ in their distributional assumptions. The random effects model requires that the individual-specific component of the error term is uncorrelated with the explanatory variables. Consequently, we show it only initially to measure the gender time gap and for comparison, but otherwise focus on the fixed effects model throughout the paper. The fixed effects model allows for any correlations between the individual-specific component of the error term and the explanatory variables. It accounts for possible endogeneity that is due to unobserved time-invariant factors. Thus, the fixed effects model better addresses possible self-selection of workers on unobserved time-invariant factors.

Performance pay is a significantly positive determinant of hours in all regressions. Considering the random effects regressions, performance pay is associated with 2.3% more in contracted hours and 2.7% more in actual hours.<sup>3</sup> Adding workers whom we observe for only one year to the estimation sample does not change the pattern of results.<sup>4</sup> The fixed effects regressions examine the consequences of a change in the independent variables on changes in hours of work for a given worker. These within-worker estimates show only a modest attenuation of the role of performance pay. As a worker moves into a job with performance pay, their contracted and actual hours increase around 2% (1.8% and 2.1%). These significant results suggest that the link between performance pay and hours is not simply driven by a self-sorting of workers with a high propensity of working more hours into performance pay. The fixed effects results make clear that increased hours stand as one effort dimension that responds to performance pay.<sup>5</sup>

As the variable for gender is time-invariant, we cannot include it in the fixed effects, but only in the random estimations. These estimations show a large gender time gap. The coefficients imply 18.2% fewer contracted hours and 19.7% fewer actual hours for women. Again, adding singleton observations to the estimation sample does not change this pattern of results.

TABLE 3 Initial estimates.

	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_A)$
	RE	FE	RE	FE
Performance pay	0.023 (0.004)***	0.018 (0.005)***	0.026 (0.005)***	0.021 (0.005)***
Woman	-0.208 (0.006)***	—	-0.220 (0.007)***	—
Control variables	Included	Included	Included	Included
Overall/within R <sup>2</sup>	0.301	0.077	0.320	0.077
Number of observations	14,630	14,630	14,630	14,630
Number of employees	5332	5332	5332	5332

Notes: The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours. The full results are shown in Appendix Table A3.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

Appendix Table A3 provides the full results of the initial regressions. Many of the control variables emerge with significant coefficients, with a series of results being remarkably robust across estimation models. Workers on permanent contract, with more years of experience, with greater education and in larger firms work more hours. Workers who are married, have children in the household or are more agreeable work fewer hours on average. Some controls, such as age, public sector employment, locus of control and residence in East Germany, take significant coefficients only in the random effects regressions, perhaps reflecting small within-worker variation.

## 4.2 | Differential hours responses to performance pay by gender

At issue is whether working hours of men and women respond differently to performance pay. To address this question, the first four columns of Table 4 show separate fixed effects estimations by gender. While performance pay is associated with significantly more contracted and actual hours for both men and women, there are large quantitative differences in this association by gender. For men, the hours response is small at a 1% increase. For women, the hours response is much larger. Women on performance pay work 3.0% more contracted hours and 3.6% more actual hours.

The final two columns of Table 4 present fully gender interacted fixed effects estimations on the combined sample of men and women, that is, estimations that interact all of the explanatory variables with the gender dummy. Both the variable for performance pay and the interaction of performance pay with the gender dummy take significantly positive coefficients, implying that the influence of performance pay is stronger for women than for men. The estimated magnitudes are virtually identical to those obtained by the separate regressions for men and women.

## 4.3 | The moderating role of children

Having confirmed a differential hours response to performance pay by gender, we now explore in more detail where that arises. The demands of performance pay jobs likely require women to reallocate hours that would have been used in home production. Again, women retain far greater home production responsibilities. We take children in the household as an indicator of the presence of home production for which women are disproportionately responsible.<sup>6</sup> At the same time, children have been repeatedly shown to be associated with increased labour force attachment for men. Thus, for men with children, the demands of a performance pay job may

**TABLE 4** The moderating role of gender.

	Men		Women		Men and women	
	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_C)$	$\ln(H_A)$
Performance pay	0.009 (0.005)**	0.011 (0.006)*	0.030 (0.010)***	0.035 (0.010)***	0.009 (0.005)**	0.011 (0.006)*
Woman $\times$ Performance pay	—	—	—	—	0.020 (0.011)*	0.024 (0.011)**
Control variables	Included	Included	Included	Included	Included	Included
Within R <sup>2</sup>	0.056	0.058	0.139	0.145	0.124	0.123
Number of observations	7563	7563	7067	7067	14,630	14,630
Number of employees	2739	2739	2593	2593	5332	5332

*Notes:* Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours. The final two columns also include interactions of gender with the control variables.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

**TABLE 5** Gender and existence of children in the household splits.

	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_C)$	$\ln(H_A)$
<i>Panel A</i>	<i>Men with children</i>		<i>Men without children</i>	
Performance pay	-0.004 (0.006)	0.001 (0.008)	0.014 (0.006)**	0.014 (0.007)*
Control variables	Included	Included	Included	Included
Within R <sup>2</sup>	0.043	0.048	0.107	0.095
Number of observations	2696	2696	3896	3896
Number of employees	1050	1050	1512	1512
<i>Panel B</i>	<i>Women with children</i>		<i>Women without children</i>	
Performance pay	0.062 (0.022)***	0.070 (0.024)***	0.017 (0.010)*	0.019 (0.010)*
Control variables	Included	Included	Included	Included
Within R <sup>2</sup>	0.124	0.138	0.063	0.065
Number of observations	2087	2087	4052	4052
Number of employees	836	836	1573	1573

*Notes:* Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

not differ substantially from the labour market effort that they already put forth. Altogether, we anticipate larger gender differences in response to performance pay when children are present.

Table 5 continues the gender split seen earlier, but also further splits the sample by whether children are present in the household. Panel A contrasts men with and without children in their household. For men with children in their household, the estimates give no indication that performance pay is associated with greater hours. The coefficients are routinely small, insignificant, and even sometimes negative. The results for men without children show a small but positive increase in hours. The fixed effects estimates indicate that these men increase their hours of work 1.4% upon moving to a performance pay job.

**TABLE 6** Performance pay, existence of children in the household, and gender hours gap.

	With children		Without children	
	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_C)$	$\ln(H_A)$
Performance pay	-0.004 (0.006)	0.001 (0.008)	0.014 (0.006)**	0.014 (0.007)*
Woman $\times$ Performance pay	0.066 (0.023)***	0.069 (0.025)***	0.003 (0.012)	0.005 (0.012)
Control variables	Included	Included	Included	Included
Within R <sup>2</sup>	0.115	0.122	0.076	0.076
Number of observations	4783	4783	7948	7948
Number of employees	1886	1886	3085	3085

*Notes:* Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours. All regressions include interactions of gender with the control variables.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

Panel B of Table 5 contrasts women with and without children in their household. For women with children in their household, the estimates are very large. Women moving from a job without performance pay to one with performance pay increase their contracted hours by approximately 6.4% and their actual hours by approximately 7.3%. The estimates are substantially larger than those for women without children in their household. While statistically significant, these women increase their contracted hours by approximately 1.7% and their actual hours by 1.9%. These estimates are only slightly larger than the 1.4% increase for men without children.

To examine the statistical significance of these gender differences, Table 6 presents fully gender interacted estimations on a combined sample of men and women for workers with and without children. In the subsample of workers with children in the household, the interaction of performance pay with woman emerges with significantly positive coefficients, whereas the variable for performance pay itself does not take significant coefficients. Thus, among workers with children, performance pay is associated with substantially more hours for women. It increases the contracted hours of women by 6.8%, and their actual hours by 7.1%. In the subsample of workers without children in the household, the interaction variable does not take significant coefficients, while the variable for performance pay emerges with significant coefficients that are, however, of small magnitude. Thus, the fully gendered interactions confirm the split regressions of Table 5.

As a check of robustness, Appendix Table A4 presents the regressions that use hours instead of log of hours as dependent variable for the fully gender interacted regressions. This exercise largely confirms the basic pattern of key results. Most importantly, it shows that a substantial hours response to performance pay is confined to women with children in the household. For women with children, performance pay is associated with about 1.7 more contracted hours and almost 2 more actual hours.

Altogether, it remains the case that women are more sensitive to performance pay than men, and that the presence of children largely drives this sensitivity. This highlights the importance of home production associated with children (done largely by women) and specialization as a determinant of gender differences in the response to performance pay.

#### 4.4 | The age of children

The presence of children is a very broad category. The age of the children at home may be a more relevant indicator of extensive home production. The usual assumption is that younger children

TABLE 7 Gender and existence of children in the household—detailed splits.

	With children (0–7 years)	With children (0–10 years)	With children (0–12 years)	With children (0–15 years)	With children (0–17 years)	Without children (0–17 years)
<i>Panel A: Men</i>	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$
Performance pay	–0.004 (0.010)	–0.003 (0.007)	–0.0004 (0.009)	–0.002 (0.007)	–0.003 (0.006)	0.015 (0.006)**
Control variables	Included	Included	Included	Included	Included	Included
Within R <sup>2</sup>	0.102	0.088	0.065	0.047	0.038	0.100
Number of observations	1005	1521	1866	2364	2696	3896
Number of employees	450	639	761	933	1050	1512
	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$
Performance pay	–0.005 (0.013)	–0.006 (0.010)	0.003 (0.011)	0.003 (0.009)	0.002 (0.008)	0.016 (0.007)**
Control variables	Included	Included	Included	Included	Included	Included
Within R <sup>2</sup>	0.066	0.052	0.044	0.034	0.033	0.084
Number of observations	1005	1521	1866	2364	2696	3896
Number of employees	450	639	761	933	1050	1512
<i>Panel B: Women</i>	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_C)$
Performance pay	0.113 (0.067)*	0.082 (0.036)**	0.056 (0.028)**	0.047 (0.024)**	0.059 (0.022)***	0.019 (0.010)*
Control variables	Included	Included	Included	Included	Included	Included
Within R <sup>2</sup>	0.180	0.092	0.090	0.102	0.117	0.054
Number of observations	401	910	1242	1751	2087	4052
Number of employees	188	416	534	718	836	1573
	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$	$\ln(H_A)$
Performance pay	0.117 (0.070)*	0.071 (0.036)**	0.061 (0.028)**	0.054 (0.026)**	0.068 (0.024)***	0.019 (0.010)*
Control variables	Included	Included	Included	Included	Included	Included
Within R <sup>2</sup>	0.197	0.107	0.113	0.119	0.133	0.059
Number of observations	401	910	1242	1751	2087	4052
Number of employees	188	416	534	718	836	1573

Notes: Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours. Control variables include age, married, partner, children in household, size of household, education, public sector, tenure, work experience, permanent contract, three firm-size dummies, East Germany, risk tolerance, locus of control, three year dummies, four occupation dummies and four industry dummies.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

require greater supervision, education and care at home. To examine this, we generate subsamples of families with children. To retain sufficient data size in cells, we start with the smallest category of workers, with children aged seven and younger. We successively expand this to workers with children under 11, with children under 13, with children under 16, and finally, with children under 18. Thus, we move step by step closer to our current definition of any child under 18. We estimate the gender differences in the hours response to performance pay in each of these telescoping categories.

Table 7 presents the results, starting with workers with the youngest children, then successively adding workers with older children. This procedure implies that we have initially relatively low numbers of observations. Thus, we use for all regressions a more compact specification of control variables.<sup>7</sup> The regressions in the last two columns of the table correspond to those shown in Table 5 but use the compact set of controls.

Panel A of Table 7 presents the results for men. Only those without any children under 18 show a significant but small positive coefficient on performance pay. Thus, the hours of men with children of any age appear unresponsive to performance pay jobs. The results for women are dramatically different. First, in all estimations with the subsample of women, the coefficient for performance pay emerges as positive and significant. Second, the pattern across the age categories largely supports the notion that performance pay jobs take greater time away from household production when children are young. For both contracted and actual hours, the estimated coefficient monotonically decreases as older children are added to the subsample—the only exception is a modest increase in the coefficients when we move from workers with children under 16 to workers with children under 18. The size of the coefficient for actual hours suggests that when working women take a performance pay job with young children, their hours increase by 14.2%. This contrasts with 4.8% when having a child of any age under 16, and only 1.9% when having no children under 18. Thus the pattern is clear: taking a performance pay job with young children is associated with a larger increase in hours for women but not men.

## 5 | CONCLUSION

Firms make increasing use of performance pay. This gives rise to the question of how performance pay influences the various gender gaps in labour market outcomes. Our study uses German panel data to show that performance pay is associated with a substantially lower gender gap in weekly working hours. While the hours of both men and women increase under performance pay, the increase is substantially larger for women. The increase in hours for women is 3–4%, whereas that for men is only 1%. We interpret this as reflecting gender specialization where women are disproportionately responsible for family and household. Gender specialization implies that the working hours of women are more responsive to the earnings opportunities provided by performance pay. The earnings opportunities cause women to give up valuable home production, a trade-off that men do not face as fully.

To further explore this interpretation, we examined households with children, recognizing that children are associated with increased home production. This focus revealed an even more differentiated pattern. Within households without children, both men and women modestly increase their hours of work when receiving performance pay. Indeed, our estimates show remarkably similar increases in hours by gender when moving into a performance pay job. Consequently, there is no discernible impact of performance pay on the gender time gap. By contrast, we find sharp gender differences for workers with children in the household. Within households with children, the work hours of men appear insensitive to the presence of performance pay. The hours of women are much more sensitive to performance pay, with an estimated increase of 6–7%. This difference in the hours response between women and men has the anticipated influence on the gender time gap. Performance pay reduces the gap by 1.5–2 weekly working hours.

Finally, taking into account that younger children require greater supervision and care at home, we also examined workers' hours responses to performance pay for different age categories of the children. The estimates show a particularly strong hours response to performance pay for women with young children in the household. The hours of men with children in the household are insensitive to performance pay, regardless of the age of the children. These results imply that performance pay has a particularly strong impact on the gender time gap among workers with young children.

Altogether, our study addresses an under-researched topic in the performance pay literature. While the effects of performance pay on productivity and earnings have been widely examined, the impact on working hours has received far less attention. The few studies examining the link between performance pay and working hours obtained very mixed findings. Building from well-known insights about gender-specific labour supply elasticities, our study suggests that the mixed findings can be understood if one accounts for the moderating role of gender. The gender-specific hours responses to performance pay shown in our study may be viewed as being similar to those documented in the literature on wages and labour supply. This is an interesting insight as performance pay includes far more than just higher earnings. It also entails greater effort per hour of work, and adverse consequences for a worker's health and social life. Thus we are measuring the hours responses to an alternative labour contract that is a complex mix of positive and negative characteristics from the workers' point of view. Our results suggest that the earnings aspect dominates when it comes to the choice of working hours.

We recognize the competing policy implications of our findings. On the one hand, our findings suggest that performance pay has the potential to promote gender equality in the labour market. On the other hand, a series of studies has shown that performance pay has adverse consequences for workers' health. Performance pay is associated with a long list of physical and mental health problems, and with an increase in alcohol and drug use (Andelic *et al.* 2024; Artz *et al.* 2021; Baktash *et al.* 2022a,b; Cadsby *et al.* 2016; Bender and Theodossiou 2014). Longer hours can drive these adverse consequences as long work hours harm health (World Health Organization 2021; Cygan-Rehm and Wunder 2018). Furthermore, performance has negative consequences for workers' family life as it increases the risk of divorce (Baktash *et al.* 2025). These findings caution against promoting performance pay as a great equalizer. Family-friendly policies, and particularly policies encouraging men to take more responsibility for family, may be more suitable to achieve greater gender equality.

We recognize that more study is needed to confirm our results. Future studies could examine if the intensity of performance pay plays a role in the hours response of male and female workers. Furthermore, linked employer–employee data could control in more detail for firm characteristics. Finally, we note that we have neither experimental nor quasi-experimental results, so any claims to causation are guarded at best. If there are unobserved time-varying factors influencing both work hours and self-sorting into performance pay jobs, then simple fixed effects estimations may not be enough to control for potential endogeneity.

Nonetheless, we have provided an important starting place, and offer a further suggestion for future research. Our assumption has been that women with children in performance pay jobs substitute work hours for household production. Future research might identify the women who move into performance pay jobs, and with sufficient detail on time use, might identify the actual household duties that they no longer perform.

## ENDNOTES

<sup>1</sup> We also note that women may respond with greater hours as they need to increase their earnings sufficiently to pay for childcare that they would otherwise provide.

<sup>2</sup> The percentage difference is  $e^{\Delta} - 1$ , where  $\Delta$  is the estimated difference in log hours.

<sup>3</sup> These figures reflect that the percentage change with a coefficient  $\beta$  is  $e^{\beta} - 1$ .

<sup>4</sup> The estimates are available from the authors on request.

<sup>5</sup> We have experimented with using weights accounting for disproportional sample probabilities, selective non-response and panel attrition. The SOEP contains longitudinal weights at the household and the individual level. For our study, individual weights are appropriate as we use individual employee data. Appendix Table A2 provides the key results of the weighted regressions, which are virtually identical to those shown Table 3. Thus in the remainder of our tables, we present unweighted regressions.

<sup>6</sup> We note that women also provide the vast majority of care for dependent adults (Himes 1994), but the share of workers caring for dependent adults is less than 1% in our estimation sample. Consequently, we cannot dig deeper into this issue.

<sup>7</sup> See the Notes to Table 7 for the controls included in the regressions.

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## APPENDIX

**TABLE A1** Definitions and descriptive statistics of the control variables.

Variable	Definition	Mean	S.D.
Age	Worker's age by years ranging from 19 to 60	44.07	9.19
Children in household	Number of children under 18 years in household	0.62	0.89
Married	Dummy equals 1 if the worker is married	0.66	0.47
Partner	Dummy equals 1 if the worker has a partner, but is not married	0.20	0.40
First-generation immigrant	Dummy equals 1 if the worker is a first-generation immigrant	0.08	0.26
Second-generation immigrant	Dummy equals 1 if the worker is a second-generation immigrant	0.03	0.18
Size of household	Number of persons in household	2.81	1.19
Education	Worker's years of education ranging from 7 to 18 years	12.93	2.63
Public sector	Dummy equals 1 if the worker is employed in public sector	0.31	0.46
Tenure	Number of years worker is with their current firm	12.84	9.89

TABLE A1 (Continued)

Variable	Definition	Mean	S.D.
Work experience	Worker's total length of part-time and full-time employment experience, in years	20.78	9.61
Permanent contract	Dummy equals 1 if the worker has a permanent employment contract	0.94	0.24
Firm size: 20–199	Dummy equals 1 if the worker is employed in a firm with 20–199 employees	0.30	0.46
Firm size: 200–1999	Dummy equals 1 if the worker is employed in a firm with 200–1999 employees	0.25	0.43
Firm size: 2000+	Dummy equals 1 if the worker is employed in a firm with more than 2000 employees	0.27	0.44
East Germany	Dummy equals 1 if the worker resides in a federal state located in East Germany	0.28	0.45
Risk tolerance	Score of risk tolerance. The interviewee answers the question 'Are you generally willing to take risks or do you try to avoid taking risks?' on an 11-point Likert scale ranging from 0 'not at all willing to take risks' to 10 'very willing to take risks'.	4.63	2.11
Conscientiousness	Score of conscientiousness constructed from adding three survey items measured on a 7-point Likert scale ranging from 1 'does not apply to me at all' to 7 'applies to me perfectly'. The sum of items is divided by 3. The items are: I see myself as someone who ... 'does a thorough job', 'does things effectively and efficiently', 'tends to be lazy'. The last item was recoded in inverse order before adding.	5.92	0.85
Extraversion	Score of extraversion constructed from adding three survey items measured on a 7-point Likert scale ranging from 1 'does not apply to me at all' to 7 'applies to me perfectly'. The sum of items is divided by 3. The items are: I see myself as someone who ... 'is communicative', 'is sociable', 'is reserved'. The last item was recoded in inverse order before adding.	4.79	1.13
Agreeableness	Score of agreeableness constructed from adding three survey items measured on a 7-point Likert scale ranging from 1 'does not apply to me at all' to 7 'applies to me perfectly'. The sum of items is divided by 3. The items are: I see myself as someone who ... 'is sometimes somewhat rude to others', 'has a forgiving nature', 'is considerate and kind to others'. The first item was recoded in inverse order before adding.	5.31	0.95
Openness	Score of openness constructed from adding three survey items measured on a 7-point Likert scale ranging from 1 'does not apply to me at all' to 7 'applies to me perfectly'. The sum of items is divided by 3. The items are: I see myself as someone who ... 'is original', 'values artistic experiences', 'has an active imagination'.	4.45	1.13
Neuroticism	Score of neuroticism constructed from adding three survey items measured on a 7-point Likert scale ranging from 1 'does not apply to me at all' to 7 'applies to me perfectly'. The sum of items is divided by 3. The items are: I see myself as someone who ... 'worries a lot', 'gets nervous easily', 'deals well with stress'. The last item was recoded in inverse order before adding.	3.74	1.19

TABLE A1 (Continued)

Variable	Definition	Mean	S.D.
Locus of control	Score of locus of control constructed from adding eight items measured on a 7-point Likert scale ranging from 1 'disagree completely' to 7 'agree completely'. The sum of items is divided by 8. The items are: 'How my life takes course is dependent on me', 'Success is gained through hard work', 'Compared to others, I have not achieved what I deserve', 'What one achieves in life is, in the first instance, a question of destiny or luck', 'I often experience that others have a controlling influence over my life', 'When I encounter difficulties in my life, I often doubt my own abilities', 'The opportunities that I have in life are determined by the social conditions', 'I have little control over things that happen in my life'. Items 4–8 are recoded in inverse order before adding.	4.96	0.79
Year dummies	Three dummies for the years 2008, 2011 and 2016 (reference year 2004)	—	—
Occupation dummies	Ten broad two-digit occupation dummies for skilled blue-collar, blue-collar foreman/forewoman, blue- and white-collar master craftsperson, semi-skilled white-collar, skilled white-collar, highly skilled white-collar, white-collar with extensive managerial duties, middle-level civil servant, upper-level civil servant, and executive-level civil servant (reference group: unskilled/semi-skilled blue-collar, unskilled white-collar, and lower-level civil servant).	—	—
Industry dummies	Six broad industry dummies for manufacturing, construction, trade, transport, banking/insurance and services (reference group: agriculture, energy and mining).	—	—

Notes: Number of observations is 14,630.

TABLE A2 Robustness check; weighted estimates.

	$\ln(H_C)$	$\ln(H_A)$
Performance pay	0.017 (0.006)***	0.020 (0.007)***
Control variables	Included	Included
Within R <sup>2</sup>	0.085	0.090
Number of observations	14,330	14,330
Number of employees	5217	5217

Notes: Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

TABLE A3 Initial estimates—full results.

	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_A)$
	RE	FE	RE	FE
Performance pay	0.023 (0.004)***	0.018 (0.005)***	0.026 (0.005)***	0.021 (0.005)***
Age	-0.014 (0.001)***	0.018 (0.015)	-0.013 (0.001)***	0.015 (0.015)
Woman	-0.208 (0.006)***	—	-0.220 (0.007)***	—
Married	-0.044 (0.007)***	-0.037 (0.011)***	-0.045 (0.008)***	-0.039 (0.012)***
Partner	0.001 (0.007)	-0.000 (0.008)	-0.003 (0.007)	-0.006 (0.009)
First-generation immigrant	0.052 (0.012)***	—	0.038 (0.012)***	—
Second-generation immigrant	-0.012 (0.018)	—	-0.019 (0.018)	—
Children in household	-0.037 (0.004)***	-0.037 (0.004)***	-0.040 (0.004)***	-0.040 (0.004)***
Size of household	-0.007 (0.003)**	-0.003 (0.003)	-0.006 (0.003)**	0.000 (0.004)
Education	0.005 (0.002)***	0.085 (0.022)***	0.009 (0.002)***	0.088 (0.022)***
Public sector	-0.009 (0.008)	-0.007 (0.011)	-0.023 (0.008)***	-0.016 (0.011)
Tenure	-0.000 (0.000)	-0.000 (0.001)	-0.001 (0.000)	0.000 (0.001)
Work experience	0.013 (0.001)***	0.028 (0.005)***	0.013 (0.001)***	0.028 (0.005)***
Permanent contract	0.035 (0.011)***	0.029 (0.013)**	0.030 (0.011)***	0.026 (0.012)**
Firm size: 20–199	0.038 (0.008)***	0.029 (0.011)***	0.049 (0.008)***	0.038 (0.011)***
Firm size: 200–1999	0.051 (0.009)***	0.036 (0.013)***	0.060 (0.009)***	0.046 (0.013)***
Firm size: 2000+	0.031 (0.009)***	0.026 (0.013)**	0.039 (0.010)***	0.034 (0.014)**
East Germany	0.082 (0.007)***	-0.007 (0.037)	0.083 (0.007)***	-0.007 (0.037)
Risk tolerance	0.001 (0.001)	-0.000 (0.001)	0.003 (0.001)***	0.001 (0.001)
Conscientiousness	0.008 (0.002)***	0.003 (0.003)	0.010 (0.003)***	0.001 (0.003)

TABLE A3 (Continued)

	$\ln(H_C)$	$\ln(H_C)$	$\ln(H_A)$	$\ln(H_A)$
	RE	FE	RE	FE
Extraversion	-0.003 (0.002)	-0.001 (0.003)	0.002 (0.002)	0.003 (0.003)
Agreeableness	-0.008 (0.002)***	-0.008 (0.002)***	-0.008 (0.002)***	-0.006 (0.003)**
Openness	0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.004 (0.003)
Neuroticism	-0.002 (0.002)	0.000 (0.002)	-0.000 (0.002)	0.000 (0.002)
Locus of control	-0.005 (0.003)**	-0.001 (0.003)	-0.007 (0.003)**	-0.004 (0.004)
Year dummies	Included	Included	Included	Included
Occupation dummies	Included	Included	Included	Included
Industry dummies	Included	Included	Included	Included
Overall/within R <sup>2</sup>	0.301	0.077	0.320	0.077
Number of observations	14,630	14,630	14,630	14,630
Number of employees	5332	5332	5332	5332

Notes: The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $\ln(H_C)$  is the natural log of contracted weekly hours, and  $\ln(H_A)$  is the natural log of actual weekly hours.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.

TABLE A4 Contracted and actual working hours as outcome variables.

	With children		Without children	
	$H_C$	$H_A$	$H_C$	$H_A$
Performance pay	-0.201 (0.189)	0.040 (0.319)	0.314 (0.170)*	0.358 (0.273)
Woman $\times$ Performance pay	1.671 (0.558)***	1.957 (0.662)***	0.190 (0.312)	0.219 (0.415)
Within R <sup>2</sup>	0.106	0.105	0.066	0.065
Number of observations	4783	4783	7948	7948
Number of employees	1886	1886	3085	3085

Notes: Method: fixed effects. The table shows the estimated coefficients. Standard errors in parentheses are clustered at the individual level.  $H_C$  is the contracted weekly hours, and  $H_A$  is the actual weekly hours. All regressions include interactions of gender with the control variables.

\*, \*\*, \*\*\* indicate statistically significant at the 10%, 5%, 1% level, respectively.