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# Remote Work and Gender Disparities in the Brazilian Labour Market

*Trabajo remoto y disparidades de género en el  
mercado laboral brasileño*

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## Abstract

### Introduction

The COVID-19 pandemic significantly increased the adoption of remote work, creating new dynamics in the labor market. This shift provides a unique opportunity to analyze its impact on long-standing labor issues, such as gender inequality in the Brazilian context.

### Objective

Examine the effects of the expansion of telework during the pandemic on gender inequalities in the Brazilian labor market.

### Methodology

Recent data were used to estimate the gender gap in hourly earnings and in the total number of hours worked under telework arrangements. Additionally, the extent to which traditional human capital variables explain these disparities was assessed.

### Results

The findings reveal a significant gap favoring men in both hourly earnings and total hours worked in remote arrangements. A substantial portion of this disparity remains unexplained by traditional human capital variables, indicating the presence of other influencing factors.

### Conclusions

The study concludes that the unexplained portion of the gender gap in remote work is strongly associated with the sexual division of domestic labor. This traditional structure continues to penalize women, suggesting that the shift to remote work does not, by itself, mitigate deep-seated gender inequalities in the labor market.

### Keywords:

Brazil; South America; gender equality; gender division of labour; labour market; wages; working conditions; working time; income; women workers; technological change; family environment.

### JEL Classification:

J16; J22; J31.

## Resumen

### Introducción

La pandemia de la COVID-19 impulsó de manera significativa la adopción del teletrabajo, transformando las dinámicas del mercado laboral. Este cambio ofrece una oportunidad única para analizar su impacto en problemas estructurales de larga duración, como la desigualdad de género en el contexto brasileño.

### Objetivo

Examinar los efectos de la expansión del teletrabajo durante la pandemia sobre las desigualdades de género en el mercado laboral brasileño.

### Metodología

Se utilizaron datos recientes para estimar la brecha de género en ingresos por hora y en el número total de horas trabajadas bajo arreglos de teletrabajo. Además, se evaluó en qué medida las variables tradicionales de capital humano explican dichas disparidades.

### Resultados

Los resultados muestran una brecha significativa a favor de los hombres, tanto en la remuneración por hora como en el total de horas trabajadas en modalidad remota. Una parte considerable de esta desigualdad no se explica por los factores habituales de capital humano, lo que sugiere la influencia de otros determinantes.

### Conclusiones

El estudio concluye que la fracción no explicada de la brecha de género en el teletrabajo está fuertemente asociada con la división sexual del trabajo doméstico. Esta estructura tradicional continúa afectando de manera negativa a las mujeres, lo que indica que el teletrabajo, por sí solo, no reduce las desigualdades de género profundamente arraigadas en el mercado laboral.

### Palabras clave:

Brasil; América del Sur; igualdad de género; división sexual del trabajo; mercado laboral; salarios; condiciones de trabajo; tiempo de trabajo; ingresos; trabajadoras; cambio tecnológico; entorno familiar.

### Clasificación JEL:

J16; J22; J31.

## 1. Introduction

The COVID-19 outbreak, first reported in Wuhan in late 2019, rapidly escalated into an unprecedented global crisis, prompting the WHO to declare a pandemic in March 2020 (Salian, 2021). To contain the spread, governments worldwide adopted strict measures such as lockdowns and mobility restrictions, which—while necessary from a public health perspective—triggered one of the sharpest economic downturns in recent history (Susskind & Vines, 2020). The impacts, however, were far from uniform: sectors, occupations, and social groups experienced profoundly unequal consequences (Palomino et al., 2023).

A central driver of this heterogeneity was the unequal feasibility of remote work. While some activities quickly transitioned to home-based work, large segments of the labor force lacked the infrastructure, resources, or occupational characteristics required to operate remotely (Nwosu et al., 2022). Workers unable to telework were disproportionately exposed to unemployment risks (Palomino et al., 2023). Moreover, remote work privileges were not evenly distributed: they tended to favor men, older workers, those with higher education, and higher-wage occupations (Dingel & Neiman, 2020).

Evidence shows that women bore a particularly heavy burden. Overrepresented in occupations with low telework capacity, they faced sharper reductions in hours worked and earnings (Abraham et al., 2022). Even when employed remotely, women remained disproportionately responsible for domestic and caregiving tasks, often performing a “triple shift” of paid work, household chores, and family care (Antunes et al., 2023).

Although some studies suggest that, in the medium term, gender disparities did not consistently widen (Beland et al., 2022; Belot et al., 2021), other research indicates otherwise. Cortes and Forsythe (2022) demonstrate that women were indeed the most affected by changes in work arrangements during the pandemic. The Brazilian case reflects this global pattern. Alloatti and Oliveira (2023) and Borges et al. (2023) documented increased earnings

disparities between men and women. Additionally, Insfran and Muniz (2020) argue that not only were income inequalities exacerbated, but the sexual division of labor was also reinforced.

The sexual division of labor refers to the socially constructed allocation of productive and reproductive activities between men and women, which systematically undervalues and makes invisible domestic and caregiving work. Historically, this imbalance has meant that women assume a disproportionate share of unpaid responsibilities, while men concentrate in the formal labor market. During the pandemic, the closure of schools, daycare centers, and other support networks intensified this asymmetry, as mothers had to absorb additional care duties at home. In this context, the crisis not only deepened income inequalities but also reinforced gendered labor patterns, limiting women’s capacity to sustain their professional activities (Insfran & Muniz, 2020; Antunes et al., 2023).

Considering this discrepancy, the present study aims to analyze whether gender differentials, in terms of hours worked and hourly earnings, increased with the rise in remote work adoption in Brazil. This study may contribute to existing literature on the topic, as current research, particularly for Brazil, focuses on overall labor market outcomes—without distinguishing between remote and in-person work—such as described by Leite and Sobreira (2023) and Da Costa Silva and Shinkoda (2021).

Moreover, this study utilizes recent microdata from the 4th quarter of the 2022 Continuous National Household Sample Survey (PNADC), which differentiates between remote and on-site work. To analyze the gender wage gap within this recent context, Mincerian equations for wages and hours worked are estimated, and the Oaxaca-Blinder decomposition is subsequently applied, allowing for the analysis of an ongoing process in Brazil that has not been extensively studied in the literature.

The paper is organized into four sections: Section 2 reviews the literature, Section 3 outlines

the methodology, Section 4 presents and discusses the results, and Section 5 provides the conclusions.

## 2. Literature review

Employment and working hours fell sharply with the onset of the pandemic. Losses were concentrated in occupations requiring face-to-face interaction, which could not adapt to remote work, disproportionately affecting workers in informal or precarious jobs and those with lower education levels (Castro & Moreira, 2021). Women were especially vulnerable, as many of their occupations could not be performed remotely, including those in healthcare and services (Dingel & Neiman, 2020; Silva & Shinkoda, 2021; Wu et al., 2023).

Several studies confirm this unequal impact. Adams-Prassl et al. (2020) found that women in the United States and Europe were 6% more likely to lose their jobs, while Dang and Nguyen (2021) reported a 24% higher probability of permanent job loss and large income reductions. In Brazil, Da Costa Silva and Shinkoda (2021) observed higher female job losses in the early months of the pandemic, followed by relative stabilization. Lee et al. (2020) estimated that 40% of global employment is in sectors most affected by COVID-19, with women overrepresented, particularly domestic workers and frontline health professionals. Abraham et al. (2022) and Oliveira and Kuwahara (2022) further note that higher education protected men but not women, accentuating female unemployment risks.

The persistence of gender inequalities is also linked to the sexual division of labor. Women, already responsible for most unpaid domestic tasks, faced a heavier burden when schools and childcare facilities closed (Lyttelton et al., 2022; Tverdostup, 2023). This “double or triple shift” reduced their productivity and limited participation in paid work. Evidence from Latin America prior to the pandemic already showed that women worked more total hours—paid and unpaid—than men (Araújo & Lua, 2021).

However, findings are not unanimous. Some studies suggest temporary or moderate gender

effects. Beland et al. (2022) found similar earnings impacts for men and women in Canada, while Belot et al. (2021) reported no significant medium-term disparities in China, Italy, the UK, and the US. Conversely, Cortes and Forsythe (2022) and Blaskó et al. (2020) argue that women suffered greater wage reductions and that the sexual division of labor intensified, even if long-term salary differences may narrow. This intensification occurred as lockdown measures and the closure of schools dramatically increased the demand for in-home childcare and domestic labor. Due to prevailing social norms, women disproportionately absorbed these new responsibilities, often at the expense of their time for paid work.

Collins et al. (2021) argue that long-term gender disparities in earnings and hours worked stem largely from unequal domestic responsibilities, with women reducing their paid work about five times more than men. In Brazil, Silva and Shinkoda (2021) found that labor market distortions during the pandemic disproportionately increased female job losses, while Costa et al. (2021) reported intensified inequalities due to higher female unemployment. Using Oaxaca-Blinder decomposition, Leite and Sobreira (2023) showed that the gender earnings gap remained stable before and after the pandemic. However, Isfran and Muniz (2020) demonstrated that the sexual division of labor was reinforced, confirming mechanisms highlighted by Collins et al. (2020).

## 3. Methodology

This study uses data from the 2022 Continuous National Household Sample Survey (PNADC), focusing on the fourth quarter, which included a supplemental survey on telework and app-based work. The PNADC provides representative information on employment, income, and working hours by gender, race, age, education, occupation, and region. The sample was restricted to employed individuals aged 18–65 working remotely, with occupations grouped into seven sectors (agriculture, utilities, construction, industry, services, public administration, and education/health/arts). Econometric estimates applied the appropriate sample weights.

### 3.1 Econometric approach

In estimating the Mincer equations, applying the Heckman correction (1979) to account for sample selection bias is common. However, in this study, the selection of individuals who performed remote work was based on the response to question S14.001 from the fourth quarter of the 2022 PNADC: “Where do you perform your main job?” As a result, only individuals engaged in remote work were included, eliminating the need for the correction.

This allowed for estimating Mincer equations for men’s and women’s earnings, as shown in equations [A1] and [A2] from appendix A. These equations are adapted from Mincer’s (1974) work, with controls based on more recent studies. Following that, the equations determining the working hours supply of men and women are presented through equations [A3] and [A4] from appendix A.

Additionally, Table B1 from appendix B presents the variables included in the Mincerian equations for earnings and hours worked, along with their respective descriptions and expected signs based on the relevant literature.

#### 3.1.1 Oaxaca-Blinder decomposition

To analyze gender inequalities in terms of hourly wages and hours worked remotely, the traditional Oaxaca (1973) and Blinder (1973) decomposition was employed. The Oaxaca-Blinder decomposition is a technique used to examine wage differences between groups, in this case, by gender. It utilizes estimates from Mincerian wage equations, with the function represented in the following matrix form:

$$\ln(W) = X^I\beta + v \quad [1]$$

The difference in the natural logarithm of the average earnings between men and women can be expressed as the difference in the linear prediction taken at the mean point of the regressors for each group (Cirino, 2018), as indicated below.

$$D = E(\ln W_H) - E(\ln W_M) = E(X_H^I\beta_H + v) - E(X_M^I\beta_M + v) = E(X_H)^I\beta_H - E(X_M)^I\beta_M \quad [2]$$

$$D = [E(X_H) - E(X_M)]^I\beta_M + E(X_M)(\beta_H - \beta_M) + [E(X_H - E(X_M))]^I(\beta_H - \beta_M) \quad [3]$$

According to Jann (2008), expression [3] is known as the three-fold decomposition, where the total differential in earnings between men and women is divided into three components: the explained component, or the effect of endowments; the unexplained component, or the effect of coefficients; and the interaction term. The first term on the right side of equation [3] represents the explained component, which refers to the portion of the average earnings difference between genders that can be attributed to the fact that the groups have different productive characteristics and differences in labor market participation.

The second term measures the contribution of coefficient differences, including the intercept, and is referred to as the unexplained component or the effect of coefficients. This term is often associated with discrimination between groups, as it indicates unequal treatment in the labor market when keeping individuals’ productive characteristics constant. The differences in the returns to those characteristics, as measured by the differences in the coefficients between the two groups, would reflect this unequal treatment. Finally, the third component on the right side of [3] measures the interaction between differences in the mean productive and personal characteristics.

**Table 1.** Socio-demographic and labor market characteristics of the sample by gender

Variable	Remote Work		On Site Work	
	Male	Female	Male	Female
Log of the work hours supplied	3.52	3.27	3.70	3.61
Log of the hourly earnings	4.07	3.59	3.82	3.81
<b>Region</b>				
North	11.22	11.91	14.54	13.04
Northeast	29.12	33.07	28.70	26.27
Southeast	30.44	29.22	26.64	28.60
South	19.36	15.37	18.97	20.77
Centre West	9.86	10.43	11.15	11.32
<b>Household location</b>				
Urban	84.01	86.30	72.23	81.93
Rural	15.99	13.70	27.77	18.07
<b>Race</b>				
White	50.40	44.76	39.74	43.92
Non-white	49.60	55.24	60.26	56.08
<b>Education</b>				
No education	25.08	24.24	32.79	18.33
Elementary school	11.83	14.51	16.67	12.42
High school	36.97	41.22	36.97	41.78
Higher education	26.12	20.03	13.56	27.46
<b>Job position</b>				
Employed in the private sector	8.18	5.61	51.38	42.75
Domestic worker	1.40	5.33	1.27	14.27
Public sector worker	0.73	0.49	10.04	20.68
Employer	5.67	2.40	4.95	3.20
Self employed	84.02	86.16	30.71	15.01
Family worker	0	0	1.64	4.09
<b>Formalization</b>				
Formal	65.24	73.82	71.27	65.34
Informal	34.76	26.18	28.73	34.66
<b>Sector</b>				
Industry	29.42	13.11	11.44	6.98
Public utility industrial service	0.01	0.01	0.96	0.37
Construction	0.01	0.01	12.34	0.6
Services	63.38	83.04	41.15	53.86
Public administration	0.01	0.01	6.13	6.05
Education, health and arts	7.16	3.81	6.24	24.42
Agro-industry	0.01	0.01	21.73	7.71
<b>Age</b>				
18 to 25 years old	14.25	11.74	16.27	15.06
26 to 35 years old	26.21	23.64	23.06	24.19
36 to 50 years old	33.85	38.16	37.60	40.39
51 to 65 years old	25.70	26.46	23.07	20.36

Source: own elaboration based on PNADC (2022).

## 4. Results and discussion

Table 1 presents the average earnings and hours worked, along with other controls included in the econometric model estimates for remote workers, broken down by gender. This outlines the occupational profile of both women and men who work remotely. It can be observed that most men working remotely, 30.44%, reside in the Southeastern region, while most women, 33.07%, reside in the Northeastern region. Regarding the housing situation, considering both genders, most remote workers live in urban areas, 84.01% men and 86.30% women.

Regarding race, there is an almost equal distribution between white and non-white men who work remotely. However, for women working remotely, the difference was more pronounced: 55.24% of them are black, brown, or indigenous, while 44.76% are white.

Regarding education levels, most men working remotely have completed at least high school (36.97%), and a similar situation is observed for women, with 41.22% having completed high school. Notably, both genders show a higher percentage of remote workers without formal education compared to those who have completed elementary school.

Concerning the main job category, it can be inferred that most male and female workers are self-employed. The disparity concerning other job categories is significant, as 84.02% of men and 86.16% of women are self-employed. Additionally, in terms of the formal labor market, the gender difference is notable. While 73.82% of women contribute to social security, this percentage drops to 65.24% for men.

In terms of economic sectors, Table 1 shows that both men and women working remotely predominantly operate in the service sector; 63.38% of men and 83.04% of women work in this sector, aligning with the findings of Góes et al. (2020). Table B2 in appendix show the distribution of workers across service sub-sectors, revealing patterns of horizontal gender segregation in both remote and on-site modalities. Male workers are concentrated in sectors such as Information and Communication (19.41%)

and Professional, Scientific, and Technical Activities (23.91%). Conversely, female workers are concentrated in “Other services” (41.58% in remote work and 51.68% in on-site work) and “Accommodation and Food Services.” This sectoral distribution is consistent with the concept of a sexual division of labor, where sectors aligned with the care economy remain feminized (Pereira, 2016; Vicente & Rotenberg, 2023). Additionally, the distribution of women across different sectors is more heterogeneous than that of men.

### 4.1 Econometric results

Table 2 and Table 3 present the results for estimating the equations of earnings and hours

worked remotely for men and women, respectively. Table 2 shows that being black, brown, or indigenous tends to reduce earnings for both genders, but the disadvantage is more pronounced for women. This suggests evidence of racial discrimination in the Brazilian labor market, as highlighted by Matos and Machado (2006).

Regarding the education dummies, higher levels of education are associated with greater earnings for both men and women, which is consistent with Cirino (2018). Furthermore, not contributing to social security, a proxy for informality, tends to lower hourly earnings for both genders, supporting the findings of Góes et al. (2020).

**Table 2.** Estimation of the earnings equation results for men and women regarding remote work

Variable	Male		Female	
	Coefficient	Standard Error	Coefficient	Standard Error
Non-white	-0.145***	0.029	-0.152***	0.021
Elementary school	0.198***	0.049	0.253***	0.033
High school	0.461***	0.039	0.445***	0.027
Higher education	0.934***	0.044	0.915***	0.034
Employed	0.280	0.129	0.581***	0.065
Public worker	0.183	0.251	0.638***	0.189
Family worker	0.000	0.000	0.000	0.000
Employer	0.755***	0.132	0.937***	0.800
Self employed	0.145	0.119	0.412***	0.048
26 to 35 years old	0.134**	0.454	0.035	0.036
36 to 50 years old	0.240***	0.440	0.068	0.034
51 to 65 years old	0.280***	0.463	0.113**	0.036
Informal labor	-0.319***	0.029	-0.266***	0.023
Industrial services	-0.162	0.355	0.319	0.391
Construction	0.144	0.088	-0.036	0.136
Services	0.103	0.047	-0.068	0.028
Public services	0.200	0.300	0.024	0.274
Industry	-0.463	0.052	-0.300***	0.032
Education and health	0.107	0.071	0.170**	0.050
Northeast	-0.289***	0.046	-0.222***	0.032
Southeast	0.189***	0.048	0.271***	0.034
South	0.295***	0.053	0.399***	0.040
Centre West	0.305***	0.058	0.381***	0.041
Constant	3.255***	0.129	2.88***	0.067

**Note:** \*\*\*, \*\*, and \* = significant at 1%, 5%, and 10%, respectively.

**Source:** own elaboration based on PNADC (2022).

**Table 3.** Estimation results of the remote work hours supplied equation for men and women

Variable	Male		Female	
	Coefficient	Standard Error	Coefficient	Standard Error
Non-white	-0.0162	-0.90	-0.0248	-1.43
Elementary school	0.0700*	2.36	0.0147	0.54
High school	0.0232	0.98	0.00227	0.10
Higher education	0.00795	0.29	0.0699*	2.52
Employed	-0.226**	-2.90	-0.142**	-2.73
Public worker	-0.0748	-0.49	-0.0102	-0.07
Family worker	0.000	0.000	0.000	0.000
Employer	-0.173*	-2.16	-0.00921	-0.14
Self employed	-0.278***	-3.86	-0.228***	-5.84
26 to 35 years old	0.132***	4.80	0.111***	3.80
36 to 50 years old	0.135***	5.08	0.122***	4.47
51 to 65 years old	0.0790**	2.83	0.0250	0.86
Informal labor	-0.146***	-8.11	-0.252***	0.61
Industrial services	0.197	0.92	0.192	0.61
Construction	0.130*	2.43	0.155	1.43
Services	0.144***	5.02	0.122***	5.31
Public services	-0.085	-0.47	0.039	0.18
Industry	0.193***	6.06	0.099***	3.89
Education and health	-0.032	-0.74	-0.068	-1.70
Northeast	-0.0203	-0.72	-0.0400	-1.53
Southeast	0.0179	0.61	-0.00996	-0.36
South	0.0206	0.64	-0.0120	-0.37
Centre West	0.0201	0.57	-0.0179	-0.54
Constant	3.659***	46.75	3.509***	64.66

**Note:** \*\*\*, \*\*, and \* = significant at 1%, 5%, and 10%, respectively.

**Source:** own elaboration based on PNADC (2022).

A key result concerns the impact of employment sector on hourly earnings. For women, two effects stand out when compared to agriculture: working in industry is linked to lower earnings, while education and health are associated with higher earnings. The negative result for industry, though counterintuitive, reflects the composition of women's remote jobs in this sector, concentrated in lower-paid administrative or support roles rather than core industrial functions (Castro & Moreira, 2021).

Regarding the regional dummies, the results indicated that men and women residing in the Northeast tend to earn lower hourly wages than those living in the North. In contrast, workers from the Southeast, South, and Midwest regions generally earn higher wages than those in the North. Cirino (2018) reported similar findings.

Table 3 presents the results of the remote work hours supply equation for men and women. It shows that the variable non-white, which identifies individuals who are black, brown, or indigenous, does not have statistical significance in explaining the hours of remote work offered by either men or women.

Additionally, regarding educational attainment, men who have completed elementary school tend to offer more hours for work than those who have never completed elementary school. On the other hand, for women, obtaining a higher education degree considerably boosts, on average, the hours offered for work in comparison to those who lack formal education.

Furthermore, for both men and women, being employed in the private sector or working independently was associated with fewer hours for remote work than domestic workers. Moreover, for men, being an employer is also linked to fewer hours offered for remote work. Although counterintuitive, this finding can be explained by the occupational composition of remote work. Domestic workers who remained employed often reported longer continuous shifts, while private sector employees, the self-employed, and especially employers tend to perform task-oriented or managerial functions, which translate into fewer reported hours. Sim-

ilar heterogeneity in telework intensity across occupations has been documented by Dingel and Neiman (2020).

Regarding age, older workers tend to offer more hours of remote work than younger ones, regardless of gender. However, in the last age group (51 to 65 years), there is a significant reduction in hours offered for men compared to younger age brackets. The estimated coefficients indicate that men aged 26 to 50 tend to work more hours on average than those aged 51 to 65.

Regarding informal labor, Table 3 shows that for both men and women, informal labor (i.e., not contributing to social security) is associated with offering fewer hours of remote work. As for sectoral dummies, those working in the services and industrial sectors tend to offer more hours of remote work than those in the agricultural sector, regardless of gender. Additionally, for men, those employed in the construction sector also offer more work hours than agricultural workers. Finally, concerning the regional dummies, no statistically significant results were found to differentiate the number of hours of remote work offered by men and women across Brazil's regions.

#### *4.1.1 Gender gaps in hourly earnings and hours worked: an Oaxaca-Blinder decomposition*

To analyze gender gaps in hourly earnings and hours worked among remote workers, we applied the Oaxaca-Blinder decomposition. In on-site work, the literature consistently shows unexplained differences favoring men, often linked to discrimination or unobserved factors (Cirino, 2018; Matos & Machado, 2006).

Table 4 and Table 5 present the decompositions of hours worked and hourly earnings for men and women, respectively. The decomposition of hours worked shows that women in remote jobs work 0.28 hours less on average than men. Using the Oaxaca-Blinder method, this gap is split into an "endowment effect" (human capital factors such as schooling, age, race, marital status, and region) and an unexplained component. The positive endowment effect indicates that, given their observable attributes, women

**Table 4.** Decomposition of the differential in hours supplied between men and women in remote work

Differential in hours worked between men and women in remote work	Log of working hours
Male	3.548*** (0.00711)
Female	3.264*** (0.00709)
Difference	0.2845*** (0.0100)
Endowments	0.0180*** (0.00495)
Coefficients	0.242*** (0.0104)
Interaction component	0.024*** -0.0063

**Note:** \*\*\*, \*\*, and \* = significant at 1%, 5%, and 10%, respectively.

**Source:** own elaboration based on PNADC (2022).

should actually supply more hours, suggesting they possess equal or even superior productive characteristics compared to men.

Despite possessing these advantageous human capital characteristics, women still offer fewer paid work hours. This paradox is explained by the second component of the decomposition: the ‘coefficient effect.’ This effect, which represents the unexplained portion of the gap, was found to be positive. Such a result suggests that structural barriers, rather than a lack of qualifications, are suppressing women’s labor supply. This finding is consistent with the literature on the care economy, which posits that the disproportionate burden of unpaid domestic and care work—a core tenet of the sexual division of labor—imposes a “time tax” on women, limiting the hours they can dedicate to the formal market. Furthermore, the interaction effect, which corresponds to the interaction between characteristics and the returns on those characteristics, also somewhat contributes to the differential. This may indicate that women’s characteristics are not rewarded in the same way as men’s in remote work.

The literature on the economics of care can help explain these differences. Care work (both household and caregiving), often unaccounted and unpaid, is disproportionately assigned to

**Table 5.** Decomposition of the earnings differential between men and women in remote work

Earnings differential between men and women in remote work	Log of hourly earnings
Male	3.944*** (0.0161)
Female	3.511*** (0.0116)
Difference	0.432*** (0.0199)
Endowments	0.142*** (0.0135)
Coefficients	0.294*** (0.0172)
Interaction component	0.004 (-0.0093)

**Note:** \*\*\*, \*\*, and \* = significant at 1%, 5%, and 10%, respectively.

**Source:** own elaboration based on PNADC (2022).

women, limiting the time they can dedicate to paid work (Pereira, 2016). Even in remote work, where theoretically there would be more flexibility, women remain burdened by these responsibilities, leading to fewer work hours being offered.

The decomposition presented in Table 5 shows that men have a log of hourly earnings for remote work of 3.944, while women have a value of 3.511, resulting in a differential of 0.432. This means that, on average, women earn significantly less per hour worked than men, which is statistically significant at 1%.

Regarding the endowments, the positive coefficient of 0.142 means that, theoretically, women possess characteristics that should lead to higher earnings, indicating that their qualifications or other favorable attributes are not fully valued in the remote work market. The “coefficients effect,” which measures the unexplained wage gap based on observable characteristics, is 0.294, the main factor accounting for the wage discrepancy. This suggests that most of the difference between men’s and women’s earnings in remote work is not justified by their characteristics. The “interaction effect,” small and insignificant, indicates that the combination of characteristics and returns on these characteristics does not significantly contrib-

ute to the wage differential. This shows that, beyond the observable characteristics, there is little interaction between them that can explain a substantial part of the wage gap between men and women.

The economics of care, previously discussed, is also crucial for understanding why women continue to face economic penalties. Unpaid care responsibilities significantly interfere with the time for paid work, leading to lower earnings. This devaluation of care work, coupled with the lack of recognition of its impact on the labor market, plays a key role in explaining the observed wage disparity.

These results reflect the persistence of gender disparities even in the context of remote work, both in terms of hourly wages and hours worked, where women, despite possessing characteristics that could potentially place them on equal or higher footing than men, end up being disadvantaged in both aspects. The unexplained portion of wage and work-hour differences suggest the presence of gender differentiation in the labor market, even in remote environments (Joshi & Kumar, 2023).

Based on these findings, Pereira (2016) argued that the sexual division of labor places most caregiving tasks, whether paid or unpaid, on women, while men focus on activities that are more socially valued. As a result, caregiving tasks, which are often undervalued, limit women's time and opportunities for professional advancement. While helpful in explaining part of the wage gap between men and women, the Oaxaca-Blinder decomposition does not fully capture this devaluation, leaving an unexplained portion that may be tied to the sexual division of labor and the undervaluation of care work.

Furthermore, Bonelli and Marinho (2020) indicate that many women work in shared spaces, contrary to the implication of the term "home office," which suggests having a dedicated office space at home. Instead, women often work at places like the dining table, where family demands frequently interrupt their activities, which can negatively affect their productivity and, consequently, the hours worked and their

earnings. Additionally, Araújo and Lua (2021) and Nogueira et al. (2022) emphasized that the overlap of productive and domestic activities in the same remote work environment leads to a significant burden on women, as they remain the primary caregivers responsible for household tasks and caring for those around them, such as children and elderly parents.

This dual role significantly limits their time and availability for paid work, ultimately impacting their productivity and career progression, as evidenced by Lyttelton et al. (2022). These authors showed that mothers disproportionately reduce their paid work hours to take on domestic tasks compared to fathers. This reality contributes to the unexplained differences in hours worked and earnings in the decomposition results.

Additionally, Fares and De Oliveira (2023) argue that the predominant responsibility of women for unpaid labor leads to a series of long-lasting disadvantages, including wage disparities. Employers may assume that women working remotely must inevitably divide their time between professional and domestic duties, which leads to lower wages. Moreover, Vicente and Rotemberg (2023) highlight that the simultaneous demands of professional and domestic work create competition for women, who often prioritize domestic tasks, further intensifying gender inequalities. They argue that the convergence of professional and domestic spheres within the same space created a direct conflict for workers' time. This situation disproportionately affected women, who faced an increased volume of domestic and care work, particularly with children at home from school. Even when tasks were shared, women often retained the 'mental load' of managing the household. Furthermore, the study reveals that men's work was frequently prioritized in the allocation of physical space, leaving women more exposed to interruptions. This constant multitasking and unequal division of labor led to higher stress and a documented decline in productivity for female workers, thus amplifying inequalities that existed long before the pandemic.

Bonacini et al. (2024) also emphasize that remote work adoption may paradoxically widen the gender wage gap, particularly in occupa-

tions with high “home office” viability. Furthermore, the high opportunity cost resulting from women’s lower productive labor wages contributes to keeping some of them out of the formal labor market (Fares et al., 2022).

In sum, the Oaxaca-Blinder results show that women are penalized in both hours worked and hourly earnings. Prior studies confirm that, while remote work provides flexibility, it also reproduces and often intensifies existing gender disparities. Maeda et al. (2019) explain that women tend to engage in a triple workday: paid employment, domestic work, and caregiving for children (for those who are mothers), which penalizes them in terms of hours worked and hourly wages. Furthermore, the excess of unpaid labor they perform not only reduces productivity but also leads to significant consequences, including work overload, which is associated with an increase in mental health issues and cardiovascular problems among female workers.

## 5. Conclusion

This study analyzed gender disparities in wages and working hours in Brazil’s remote labor market using PNADC 2022 data and econometric tools such as Mincer equations, labor supply estimations, and Oaxaca-Blinder decomposition. The results show that remote work did not mitigate inequalities; instead, it reinforced them. Women continue to face the “triple shift” of paid work, household chores, and caregiving, which reduces their time for paid labor, limits earnings, and increases health risks. The decomposition further revealed a positive endowment effect, suggesting that women’s observable characteristics are at least as favorable as men’s, but remain undervalued.

These findings highlight the need for structural policies that reframe care as a collective responsibility. In the Brazilian context, this aligns with the ongoing debate on the creation of a National Care Policy (Política Nacional de Cuidados), which seeks to institutionalize care as a collective, economic, and social responsibility rather than a private issue. Complementary measures should include fully paid, non-transferable parental leave for both parents, which promotes

male co-responsibility and challenges traditional caregiving norms, as well as the expansion of public childcare and after-school programs.

The COVID-19 pandemic demonstrated how fragile support systems deepen gender gaps when they collapse, reinforcing the urgency of treating care as essential economic infrastructure. Investments in this area would reduce the care burden, allowing women to fully utilize their human capital and reducing the penalties in hours and earnings identified in this study. This link is consistent with the empirical evidence, which shows a positive endowment effect for women but persistent unexplained differences that reflect structural barriers in the labor market. Despite its contributions, this research has limitations.

The analysis is based on self-reported remote workers in the PNADC, which may introduce biases related to technology access and subjective definitions of telework. These limitations suggest that the results may either underestimate or overestimate the actual magnitude of inequalities, but they do not alter the direction of the effects identified, which are consistent with international literature on the care penalty. Furthermore, the survey lacks direct measures of domestic workload, preventing empirical operationalization of the “care penalty.” These constraints call for caution in interpretation but also indicate a promising agenda for future research with more detailed data on unpaid work.

## Author Contributions

**Lucas Ian Carrera Samuels:** conceptualization, investigation, formal analysis, visualization, methodology, writing (original draft).

**Igor Santos Tupy:** supervision, validation, project administration, formal analysis, visualization.

**Evandro Camargos Teixeira:** supervision, validation, project administration, formal analysis, visualization, writing (review and editing).

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## Conflicts of interest

The authors declare that they have no conflicts of interest regarding the writing and publication of this article.

## Ethical implications

The authors state that there are no ethical implications to declare in the writing and publication of this article.

## 6. Appendix

### 6.1 Appendix A

$$\begin{aligned} \ln\left(\frac{W}{H}\right)_i = & \beta_0 + \beta_1 nonwhite_{2i} + \beta_2 noeducation_{3i} + \beta_3 elementaryedu_{4i} \\ & + \beta_4 highschooledu_{5i} + \beta_5 higheredu_{6i} + \beta_6 south\_region_{7i} \\ & + \beta_7 southeast\_region_{8i} + \beta_8 northeast\_region_{9i} + \beta_9 north\_region_{10i} \\ & + \beta_{10} centerwest\_region_{11i} + \beta_{11} informality_{12i} + \beta_{12} services_{13i} \\ & + \beta_{13} industry_{14i} + \beta_{14} public_{15i} + \beta_{15} education_{16i} + \beta_{16} utility_{17i} \\ & + \beta_{17} construction + \beta_{18} publicadmin_{19i} + \beta_{19} age18_{20i} + \beta_{20} age26_{21i} \\ & + \beta_{21} age36_{22i} + \beta_{22} idade51_{23i} + \beta_{23} employed_{24i} + \beta_{24} employer_{25i} \\ & + \beta_{25} domesticworker_{26i} + \beta_{26} publicworker_{27i} + \beta_{27} selfemployed_{28i} \\ & + \beta_{28} familiarworker_{29i} + \beta_{29} agroindustry_{30i} + v_i \end{aligned} \quad [1]$$

$$\begin{aligned} \ln\left(\frac{W}{H}\right)_i = & \beta_0 + \beta_1 nonwhite_{2i} + \beta_2 noeducation_{3i} + \beta_3 elementaryedu_{4i} \\ & + \beta_4 highschooledu_{5i} + \beta_5 higheredu_{6i} + \beta_6 south\_region_{7i} \\ & + \beta_7 southeast\_region_{8i} + \beta_8 northeast\_region_{9i} + \beta_9 north\_region_{10i} \\ & + \beta_{10} centerwest\_region_{11i} + \beta_{11} informality_{12i} + \beta_{12} services_{13i} \\ & + \beta_{13} industry_{14i} + \beta_{14} public_{15i} + \beta_{15} education_{16i} + \beta_{16} utility_{17i} \\ & + \beta_{17} construction + \beta_{18} publicadmin_{19i} + \beta_{19} age18_{20i} + \beta_{20} age26_{21i} \\ & + \beta_{21} age36_{22i} + \beta_{22} idade51_{23i} + \beta_{23} employed_{24i} + \beta_{24} employer_{25i} \\ & + \beta_{25} domesticworker_{26i} + \beta_{26} publicworker_{27i} + \beta_{27} selfemployed_{28i} \\ & + \beta_{28} familiarworker_{29i} + \beta_{29} agroindustry_{30i} + v_i \end{aligned} \quad [2]$$

$$\begin{aligned} \ln(H)_i = & \beta_0 + \beta_1 nonwhite_{2i} + \beta_2 noeducation_{3i} + \beta_3 elementaryedu_{4i} \\ & + \beta_4 highschooledu_{5i} + \beta_5 higheredu_{6i} + \beta_6 south\_region_{7i} \\ & + \beta_7 southeast\_region_{8i} + \beta_8 northeast\_region_{9i} + \beta_9 north\_region_{10i} \\ & + \beta_{10} centerwest\_region_{11i} + \beta_{11} informality_{12i} + \beta_{12} services_{13i} \\ & + \beta_{13} industry_{14i} + \beta_{14} public_{15i} + \beta_{15} education_{16i} + \beta_{16} utility_{17i} \\ & + \beta_{17} construction + \beta_{18} publicadmin_{19i} + \beta_{19} age18_{20i} + \beta_{20} age26_{21i} \\ & + \beta_{21} age36_{22i} + \beta_{22} idade51_{23i} + \beta_{23} employed_{24i} + \beta_{24} employer_{25i} \\ & + \beta_{25} domesticworker_{26i} + \beta_{26} publicworker_{27i} + \beta_{27} selfemployed_{28i} \\ & + \beta_{28} familiarworker_{29i} + \beta_{29} agroindustry_{30i} + v_i \end{aligned} \quad [3]$$

$$\begin{aligned}
 \ln(H)_i = & \beta_0 + \beta_1 nonwhite_{2i} + \beta_2 noeducation_{3i} + \beta_3 elementaryedu_{4i} \\
 & + \beta_4 highschooledu_{5i} + \beta_5 higheredu_{6i} + \beta_6 south\_region_{7i} \\
 & + \beta_7 southeast\_region_{8i} + \beta_8 northeast\_region_{9i} + \beta_9 north\_region_{10i} \\
 & + \beta_{10} centerwest\_region_{11i} + \beta_{11} informality_{12i} + \beta_{12} services_{13i} \\
 & + \beta_{13} industry_{14i} + \beta_{14} public_{15i} + \beta_{15} education_{16i} + \beta_{16} utility_{17i} \\
 & + \beta_{17} construction + \beta_{18} publicadmin_{19i} + \beta_{19} age18_{20i} + \beta_{20} age26_{21i} \\
 & + \beta_{21} age36_{22i} + \beta_{22} idade51_{23i} + \beta_{23} employed_{24i} + \beta_{24} employer_{25i} \\
 & + \beta_{25} domesticworker_{26i} + \beta_{26} publicworker_{27i} + \beta_{27} selfemployed_{28i} \\
 & + \beta_{28} familiarworker_{29i} + \beta_{29} agroindustry_{30i} + v_i
 \end{aligned}
 \tag{4}$$

## 6.2 Appendix B

**Table B1.** Description of the variables used in estimating mincerian equations and labor supply hours

Variable	Description	Expected sign
Log earnings/hours	Dependent Variable: Log of habitual monthly earnings from the main job divided by the hours usually worked per week.	Dependent variable.
Log work hours offered	Dependent Variable: Log of the hours usually worked per week in all jobs.	Dependent variable.
Non-white	Dummy variable, where 1 indicates that the worker identifies as Black, Brown, or Indigenous, and 0 otherwise.	Negative, according to Oliveira and Kuwahara (2022).
No education	Dummy variable, where 1 indicates that the individual has no formal education, and 0 otherwise. Variable omitted in the estimation.	Reference variable.
Elementary education	Dummy variable, where 1 indicates that the highest level of education completed by the individual is elementary school, and 0 otherwise.	Positive, according to Lee et al. (2020).
High school education	Dummy variable, where 1 indicates that the highest level of education completed by the individual is high school, and 0 otherwise.	Positive, according to Dingel and Neiman (2020).
Higher education	Dummy variable, where 1 indicates that the highest level of education completed by the individual is higher education, and 0 otherwise.	Positive, according to Dingel and Neiman (2020).
South-region	Dummy variable, where 1 indicates that the individual resides in the South region of Brazil, and 0 otherwise.	Positive, according to Cirino (2018).
Southeast-region	Dummy variable, where 1 indicates that the individual resides in the Southeast region of Brazil, and 0 otherwise.	Positive, according to Cirino (2018).
Northern-region	Dummy variable, where 1 indicates that the individual resides in the North region of Brazil, and 0 otherwise. Variable omitted in the estimation.	Reference variable.
Northeast-region	Dummy variable, where 1 indicates that the individual resides in the North East region of Brazil, and 0 otherwise.	Negative, according to Cirino (2018).
Centralwestern-region	Dummy variable, where 1 indicates that the individual resides in the Center West region of Brazil, and 0 otherwise.	Positive, according to Cirino (2018).
Services	Dummy variable, where 1 indicates that the individual works in the services sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Positive, according to Dingel and Neiman (2020).
Industry	Dummy variable, where 1 indicates that the individual works in the industrial sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Positive, according to Dingel and Neiman (2020).
Education	Dummy variable, where 1 indicates that the individual works in the education, health, and arts sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Positive, according to Cirino (2018).
Utility	Dummy variable, where 1 indicates that the individual works in the public utilities services sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Positive, according to Cirino (2018).

Source: own elaboration.

**Table B1.** Description of the variables used in estimating mincerian equations and labor supply hours (continuation)

Public administration	Dummy variable, where 1 indicates that the individual works in the public administration sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Positive, according to Cirino (2018).
Construction	Dummy variable, where 1 indicates that the individual works in the construction sector, according to CNAE classification, and 0 if the individual does not participate in this sector.	Negative, according to Góes et al. (2020).
Agroindustry	Dummy variable, where 1 indicates that the individual works in the agriculture sector, according to CNAE classification, and 0 if the individual does not participate in this sector. Variable omitted in the estimation.	Reference variable.
Informal jobs	Dummy variable, where 1 indicates that the worker is informal, and 0 if the worker is formal. Informality was defined by the lack of contribution to social security.	Negative, according to Góes et al. (2020).
Age 18	Dummy variable, where 1 indicates that the worker is between 18 and 25 years old, and 0 otherwise. Variable omitted in the estimation.	Reference variable.
Age 26	Dummy variable, where 1 indicates that the worker is between 26 and 35 years old, and 0 otherwise.	Positive, according to Kosteas et al. (2022).
Age 36	Dummy variable, where 1 indicates that the worker is between 36 and 50 years old, and 0 otherwise.	Positive, according to Kosteas et al. (2022).
Age 51	Dummy variable, where 1 indicates that the worker is between 51 and 65 years old, and 0 otherwise.	Positive, according to Kosteas et al. (2022).
Employed	Dummy variable, where 1 indicates that the worker is employed in the private sector, and 0 otherwise.	Positive, according to Góes et al. (2020).
Public worker	Dummy variable, where 1 indicates that the worker is employed in the public sector, and 0 otherwise.	Positive, according to Góes et al. (2020).
Domestic worker	Dummy variable, where 1 indicates that the worker is a domestic employee, and 0 otherwise. Variable omitted in the estimation.	Reference variable
Self employed	Dummy variable, where 1 indicates that the worker is self-employed, and 0 otherwise.	Positive, according to Góes et al. (2020).
Family worker	Dummy variable, where 1 indicates that the worker is considered a family worker, and 0 otherwise.	Positive, according to Góes et al. (2020).

Source: own elaboration.

**Table B2.** Distribution of service sector employment by gender and work modality

Service sector	Remote work		On site work	
	Male	Female	Male	Female
Trade and repair	11.17	0.55	15.51	2.56
Transportation, storage, and postal services	2.95	1.41	27.09	3.27
Accommodation and food services	10.22	25.76	13.23	17.36
Information and communication	19.41	5.07	3.91	1.84
Financial activities	6.72	3.05	3.11	3.71
Real estate activities	3.74	1.60	1.70	1.42
Professional, scientific, and technical activities	23.91	16.46	7.87	8.47
Administrative activities	4.44	4.52	14.51	9.69
Other services	17.43	41.58	13.07	51.68

Source: own elaboration from PNADC (2022).

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