



Labor market concentration and the gender wage gap

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ABSTRACT

We investigate the extent to which labor market power in the Brazilian formal labor market contributes to the persistence of the gender wage gap. Using linked employer-employee data (2010–2017), we perform a standard gender wage gap decomposition and introduce labor market concentration, measured by the Herfindahl–Hirschman Index, as a proxy for competition. Our findings suggest that labor market concentration plays a negligible role in explaining the gender wage gap, countering the initial hypothesis regarding labor market power. The average worker in Brazil is employed in a low-concentration market, where small associations have no meaningful impact on wages.

1. Introduction

On average, women earn lower wages than men—a pattern observed in most countries and persistent over time (Blau and Kahn, 1996; Weichselbaumer and Winter-Ebmer, 2005; Goldin, 2014; Blau and Kahn, 2017). Existing research attributes this gap to three broad factors: individual behavior and social norms, differences in characteristics that affect productivity, and employer-driven mechanisms, including discrimination rooted in personal prejudice. Regarding the latter, there exists some empirical evidence that firms engaging in discriminatory behavior do not survive in competitive markets (Weber and Zulehner, 2014). However, there is less evidence on whether such discriminatory behavior is more prevalent — and persists — in imperfect labor markets, where firms have wage-setting power and greater leeway for inefficiencies. In this paper, we examine the relationship between labor market competition and the gender wage gap.

Two theoretical frameworks that rely on employer-driven mechanisms can explain the link between labor market concentration and the gender wage gap. The first framework depends on firms' ability to price discriminate against workers based on gender (Sharma, 2022). Under this framework, firms use their market power to pay lower wages to workers with more inelastic labor supply—in this case, women.¹ When combined with Cournot competition in the labor market, this mechanism can generate a positive relationship between labor market concentration and the gender wage gap. Importantly, this mechanism is unrelated to taste-based discrimination.

The second framework relies on search frictions and is consistent with taste-based discrimination. In the perfectly competitive model

proposed by Becker (1957), prejudiced firms are driven out of the market, preventing a persistent gender wage gap (Arrow, 1973; Phelps, 1972). However, in labor markets characterized by search frictions and firm-level granularity (Jarosch et al., 2024), market concentration may allow prejudiced firms to persist, sustaining the gender wage gap. This occurs when prejudiced firms have a stronger willingness to bargain aggressively when negotiating with women compared to men. Consequently, women who match with prejudiced employers may be compelled to accept lower wages than men. This effect is expected to be more pronounced in concentrated markets, reinforcing the potential link between labor market concentration and the gender wage gap.

To study the relationship between labor market competition and the gender wage gap, we conduct a standard gender wage gap regression analysis. In this analysis, we decompose the gender wage gap into observable and residual components. The key contribution of this study is the introduction of labor market concentration — a proxy for competition — in such regressions, enabling us to investigate whether labor markets with fewer firms exhibit larger gender wage gaps. We conduct the analysis using the Brazilian linked employer-employee data (RAIS) from 2010 to 2017.

Our findings suggest that labor market concentration plays a negligible role in explaining the gender wage gap. While some specifications yield a positive association, the estimates are consistently small and often statistically indistinguishable from zero. The occasional significant result likely reflects sampling variation rather than a meaningful relationship.

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¹ This outcome holds only if male and female workers are imperfect substitutes. If they are perfect substitutes, firms would either equalize wages or exclusively hire one type of worker.

Empirical associations between labor market concentration and gender wage gap should be interpreted with caution and may be subject to criticism from the market power literature (Miller et al., 2022). The inclusion of concentration measures in wage regressions has been widely criticized due to the endogenous nature of concentration. However, it is important to note that we are not estimating the causal effect of labor market concentration on wage levels. Instead, our primary focus is on how the male–female wage gap varies across labor markets with different levels of concentration.

This study contributes to the literature on labor market power and gender wage disparities (Barth and Dale-Olsen, 2009; Hirsch et al., 2010; Vick, 2017; Caldwell and Oehksen, 2023). The closest studies to this paper are Card et al. (2016) and Gerard et al. (2021), which examine wage disparities using similar data but do not address market power. We contribute to this literature by utilizing comprehensive data to demonstrate that labor market concentration and the gender wage gap are not strongly associated.

2. Data and labor market definitions

2.1. The Brazilian linked employer-employee dataset

We use the Brazilian linked employer-employee dataset (RAIS), an administrative database managed by the Ministry of Labor. RAIS provides detailed information on the universe of formal employment relationships in Brazil, where each record corresponds to an employment contract. Establishment-level data include municipality and five-digit industry sector classification. Worker-level data include age, gender, and schooling. Regarding the worker–firm match, RAIS records hiring and separation dates, average monthly wages, hours worked, and a six-digit occupation code.

We restrict our analysis to all employment contracts from 2010 to 2017 for individuals aged 25 or older who were employed on December 31 of each year. Additionally, we limit the sample to labor markets with at least 100 workers to exclude cases where small changes in employment could lead to excessive variation in concentration. The final sample comprises approximately 157 million observations.

2.2. Labor market definitions

To measure labor market concentration, we compute the Herfindahl–Hirschman Index (HHI) based on employment shares. The HHI for each labor market m and year t is given by:

$$HHI_{mt} = \sum_{j \in \Theta_m} s_{jmt}^2 \quad (1)$$

where s_{jmt} represents firm j 's employment share relative to total employment in labor market m , and Θ_m denotes the set of firms operating in that market. The HHI ranges from 0 to 1, where 0 corresponds to a perfectly competitive market with an infinite number of firms, and 1 represents a monopoly, where a single firm dominates the labor market.

Defining labor market boundaries involves a well-known trade-off. Broadly defined markets are unlikely to appear concentrated, potentially overlooking meaningful variations in market power that occur within these large cells. Conversely, narrowly defined markets may artificially inflate concentration measures, as minor changes in firm structure could be misinterpreted as significant shifts in concentration.

As a result, the definition of labor markets in empirical research varies widely and is largely dictated by data availability. Common approaches include geography $\times$ occupation (Azar et al., 2022; Felix, 2022; Azar et al., 2018; Schubert et al., 2024), geography $\times$ sector (Urena et al., 2021; Berger et al., 2022), and geographic units alone (Dix-Carneiro and Kovak, 2017; Topalova, 2010).

Table 1

Descriptive statistics of workers used in gap decomposition analysis.

	All	Women	Men
Avg. wage (monthly)	1722.83	1463.96	1904.83
Avg. hours	42.32	41.62	42.80
Avg. tenure (months)	44.22	41.99	45.78
Avg. age	38.06	37.25	38.62
Education			
Less than HS	0.335	0.254	0.392
HS grad	0.487	0.517	0.467
More than HS	0.177	0.229	0.141
Observations	157,286,264	64,928,831	92,357,433
Avg. HHI_m	0.0315	0.0230	0.0374

Note: RAIS 2010–2017.

We adopt a more granular definition — municipality $\times$ six-digit occupation code — to capture greater variation in labor market concentration.²

2.3. Descriptive statistics

Table 1 presents the descriptive statistics of our sample. On average, men work slightly more hours, are slightly older, have nearly four additional months of tenure, and are more represented in the sample than women. Although men have lower average education levels, they earn higher wages than women, resulting in a gender wage gap of 23.14%.

Men are also employed in more concentrated labor markets. However, even under a restrictive labor market definition, the average individual works in a relatively low-concentration market, with an HHI of 0.031.

3. Gap decomposition

3.1. Empirical approach

We regress the log wages of individual i , employed at firm j in labor market m at year t , on the gender variable and control variables, as specified in the equation below³:

$$\ln(wage)_{imt} = \beta_1 Female_i + \beta_2 HHI_{mt} + \beta_3 HHI_{mt} \times Female_i + \beta_4 \mathbb{X}_{imt} + \delta_t + \delta_m + \delta_{jm} + \delta_i + \epsilon_{imt}, \quad (2)$$

where $Female$ is a dummy variable equal to 1 if the individual is female, HHI_{mt} is defined in Section 2.2, $\mathbb{X}_{imt}$ represents a set of controls (age, age squared, and schooling), and δ_t , δ_m , δ_{jm} , and δ_i correspond to time, labor market, firm-labor market, and individual fixed effects, respectively.

The main coefficients of interest are β_1 , which captures the residual gender gap in a zero-concentration labor market, and β_3 , which reflects the association between labor market concentration and the gender gap. While β_2 does not represent the causal effect of labor market power on wages, β_3 remains informative regarding the relationship between labor market concentration and the gender wage gap. Conditional on HHI, a negative β_3 could be interpreted as evidence that discriminatory firms, which pay lower wages to women, are more likely to persist in labor markets where they have market power.

² We also conduct the analysis with broader labor market definitions and obtain similar results.

³ We use December wages, deflated to January 2010 values.

Table 2
Regression table of gender gap decomposition.

	Dependent variable: Ln(real monthly wage)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	−0.318*** (0.028)	−0.318*** (0.028)	−0.317*** (0.028)	−0.156*** (0.008)	−0.068*** (0.004)	
HHI		0.005 (0.052)	0.011 (0.059)	−0.014* (0.008)	0.004 (0.006)	−0.004 (0.002)
Female × HHI			−0.021 (0.056)	0.064*** (0.013)	−0.017 (0.012)	0.002 (0.003)
Labor market FE				Yes	Yes	Yes
Firm × Labor market FE					Yes	Yes
Worker FE						Yes
R ²	0.312	0.312	0.312	0.599	0.835	0.932
Observations	157,286,264	157,286,264	157,286,264	157,286,264	157,286,264	157,286,264

Notes: All specifications incorporate year-fixed effects and individual-level controls. Standard errors, clustered at the labor market level, are reported in parentheses. (***) $p \leq 0.01$, (**) $p \leq 0.05$, (*) $p \leq 0.1$.

3.2. Results

Table 2 presents our main results. All columns include controls and year fixed effects. The estimate of β_1 in Column 1 indicates that the residual gender wage gap, after controlling for age and schooling, exceeds the raw gender gap reported in Table 1 (31.8% versus 23.1%). Men, on average, are employed in more concentrated labor markets than women, as Table 1 shows (0.0374 HHI points vs 0.0230 HHI points). To ensure that gender wage disparities are not driven by compositional changes related to such labor market characteristics, we first include HHI as a control.⁴ Later, we add labor market fixed effects to control for potential differences in composition between men and women.⁵ Notably, the inclusion of the HHI variable in Column 2 has a negligible effect on the estimate of β_1 , suggesting that the selection of men and women into more concentrated labor markets does little to explain wage differences.

In the third column of Table 2, we control for the interaction between *Female* and HHI. Our main coefficient of interest is negative and is not statistically significant ($\hat{\beta}_3 = -0.021$). According to point estimate, workers in a monopsonistic labor market experience a 2.1 percentage point larger gender wage gap compared to those in a perfectly competitive labor market. While this effect may seem large, considering that the average worker is in a market with an HHI of 0.031, transitioning the average labor market to perfect competition would reduce the gender gap by only about 0.06 percentage points.

The variation in labor market concentration that identifies the previous effects arises from multiple sources: differences across labor markets, over time, and from workers who switch labor markets. This is not ideal, as it may lead to comparisons between fundamentally different occupations and municipalities that define labor markets, such as construction workers in São Paulo and salespeople in Manaus.

To improve comparability, and as previously discussed, we introduce labor market fixed effects in the fourth column of Table 2. This ensures that the variation identifying β_3 comes solely from changes in wages and concentration within the same labor market over time. Under this specification, the coefficient associated with the Female dummy decreases by 16 percentage points to −0.156, suggesting that a substantial portion of the gender gap stems from differences in occupation and municipality of work between men and women.⁶ This finding aligns with Goldin (2014) for the U.S.

⁴ For example, more concentrated labor markets may be associated with either lower wages due to reduced competition or higher wages due to increased productivity (Berger et al., 2022).

⁵ For example, men may be employed in more productive industries, more hazardous occupations, or higher-wage localities.

⁶ The inclusion of labor market fixed effects effectively controls for municipality and occupation.

Notably, $\hat{\beta}_3$ becomes positive and statistically significant in the fourth column, contradicting the market power story. Nonetheless, it is important to highlight the small size of the effect. Given that the average labor market is 0.03 HHI points, bringing the average market to perfect competition would reduce the gender gap by 0.2%.

Column 5 includes firm × labor market fixed effects.⁷ Consistent with Card et al. (2016), the sorting of male and female workers into high-paying firms explains part of the gender gap. Interestingly, even when conditioning male and female workers to be in the same occupation, municipality, and firm, while having the same age and education level, a residual gender wage gap of 6.8% persists. In a monopsonistic labor market, this gap would be 1.7 percentage points larger. However, the overall contribution of labor market concentration to the gender gap in our sample remains close to zero.⁸

For last, we introduce worker fixed effects in column 6 to control for time-invariant productivity differences among workers, particularly between men and women. In this specification, there is no observed association between labor market concentration and the gender gap. However, β_3 is identified through male and female workers who switch labor markets, and these workers may differ systematically from the average worker. Our estimate for β_3 indicates that, in addition to being statistically insignificant, the overall impact of labor market concentration on the gender gap is negligible.

4. Discussion

We take the collection of our results as evidence that the contribution of labor market concentration to the gender wage gap is minimal, countering the initial hypothesis regarding labor market power. Synthesizing across all specifications, we observe that the estimated interaction coefficient is uniformly of very low magnitude — often statistically indistinguishable from zero — and only attains significance once, where it even reverses sign. Given the small absolute size of these estimates, minor sampling fluctuations readily flip the coefficient's sign. In other words, there is no consistent relationship to recover, and the lone 'significant' positive estimate simply reflects statistical noise rather than an economically meaningful effect of labor market concentration on the gender wage gap.

Our findings indicate that policies aimed at mitigating labor market power are unlikely to address the gender wage gap. If market concentration and the gender wage gap were closely linked, a single policy intervention could simultaneously address both issues. However, the lack of a significant relationship between these variables

⁷ A firm may have establishments in multiple municipalities and hire workers from different occupations.

⁸ Considering the average HHI of 0.03, the overall effect is of 0.05% (1.7% × 0.03 = 0.05%).

underscores the need for distinct policy tools to target each concern effectively. This distinction is particularly relevant in settings with constrained policy budgets, where prioritizing interventions requires careful consideration.

Data availability

The data that has been used is confidential.

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