

Separations Revisited: Do Layoffs or Quits Drive Lower Separation Rates in High-Quality Firms? *

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Abstract

We challenge the prevailing view that the negative correlation between firm quality and separation rates is driven by efficient separations, with no distinction between quits and layoffs. Using administrative data from Brazil, we demonstrate that this correlation is primarily due to lower layoff rates at high-quality firms, rather than differences in quits. To explain this pattern, we develop a parsimonious job search model incorporating wage rigidity and productivity uncertainty, which interact to generate inefficient layoffs that decline with firm quality. Our findings add to the growing body of evidence that inefficient separations are a fundamental force shaping labor market dynamics.

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Introduction

A well-established fact in labor economics is that high-quality firms tend to have lower separation rates—a pattern we refer to as the negative quality-separation correlation. Theoretical models often attribute this relationship to efficient separations, typically overlooking the distinction between quits and layoffs.¹ This simplification has been partly motivated by McLaughlin (1991), who demonstrated that both quits and layoffs can emerge in settings where all separations are efficient, implying that the distinction may not always be critical. However, recent empirical studies have shown that inefficient separations are widespread,² calling for a reassessment of the drivers behind the quality-separation correlation.

In this paper, we address this gap in the literature. First, we present empirical evidence that the negative correlation between firm quality and overall separation rates is primarily driven by a negative relationship between *firm quality and layoffs*, rather than quits. Second, to explain this empirical pattern, we develop a parsimonious job search model that incorporates inefficient separations.

Our empirical analysis utilizes the administrative records from the Brazilian Ministry of Labor (RAIS), which provide uniquely detailed information on separations, including exact separation dates and clear distinctions between quits and layoffs. We begin by outlining the features of the Brazilian context which contribute to accurate classification of separations in the RAIS data. Additionally, we demonstrate that post-separation outcomes for laid-off workers are worse than those for workers who quit, across multiple dimensions. This pattern reinforces the reliability of the quit/layoff indicator in the data.

Using this dataset, we document a novel but intuitive pattern: layoff rates decline with firm quality. Additionally, we find that the negative correlation between firm quality and overall separation rates is largely driven by lower layoff rates in high-quality firms. In fact, the slope of layoff rates with respect to firm quality nearly mirrors the slope of overall separation rates, with the ratio between these slopes ranging from 0.81 to 0.93, depending on the specific measure of firm quality used.

¹Burdett and Mortensen (1998); Postel-Vinay and Robin (2002); Postel-Vinay and Turon (2010); Elsby and Gottfries (2022).

²Schmieder and von Wachter (2010); Davis and Krolkowski (2023); Jäger et al. (2023).

An alternative explanation for this pattern could be worker heterogeneity, as high-skill workers tend to sort into high-quality firms (Card et al., 2013). Thus, lower layoff rates at better firms might simply reflect the characteristics of their workforce. However, we demonstrate that this is not the primary driver. Even after accounting for worker heterogeneity, the majority of the quality-separation correlation remains explained by lower layoff rates at high-quality firms.

To explain these findings, we develop a partial-equilibrium random-search model, incorporating two key features: worker-level productivity uncertainty and wage rigidity. In the model, firms set wages by balancing the trade-off between average markdowns (the gap between average productivity and wages) and worker retention, which increases with wages.

We demonstrate that the interaction between worker-level productivity shocks and wage rigidity leads to higher-quality firms having lower layoff rates. The mechanism operates as follows: expected profits per worker are the product of retention and expected markdown, making these two elements complementary inputs for the firm. Consequently, higher-quality firms choose both higher retention and larger markdowns. Because of their larger expected markdowns, higher-quality firms experience a smaller proportion of workers with negative markdowns at any given time. Since firms lay off workers when their markdowns are negative, this implies that higher-quality firms have fewer layoffs overall.

Our work builds upon the literature on inefficient separations resulting from wage rigidity (Hopenhayn, 1992; Hopenhayn and Rogerson, 1993; Carlsson and Westermark, 2022; Acabbi et al., 2024; Blanco et al., 2024). One important, yet often overlooked, prediction of this class of models is that high-quality firms experience fewer layoffs. We contribute to this literature by offering new empirical evidence that validates this prediction. Additionally, we uncover a novel mechanism underlying this pattern: layoff rates decrease with wage markdowns, which are systematically higher in high-quality firms due to the complementarity between markdowns and retention.

The remainder of the paper is organized as follows. Section 1 provides an overview of the institutional setting and presents evidence supporting the reliability of the distinction between quits and layoffs in our data. Section 2 presents

our main empirical finding that the negative correlation between firm quality and separation rates is driven by layoffs. Section 3 develops a theoretical framework to explain this empirical pattern. Finally, Section 4 offers concluding remarks and discusses implications for future research.

1 Distinguishing quits and layoffs empirically

1.1 Data and sample

Data: Employer-Employee Data from Brazil. We utilize the *Relação Anual de Informações Sociais* (RAIS), an extensive administrative record from Brazil that captures formal employment relationships from 2010 to 2017. Annually, companies submit RAIS filings, documenting all employees from the preceding year, including personal data such as gender, birth date, and education level, alongside contract specifics like earnings, contracted hours, and detailed occupation according to the *Classificação Brasileira de Ocupações* (CBO 2002), which encompasses 2,638 different occupation codes. Crucially, RAIS mandates reporting the dates and reasons for employee separations, distinguishing between quits and layoffs.

Sample: Urban, Private Sector Jobs. Our analysis focuses on Brazilian men and women born between 1959 and 1987, who have at least one year of potential labor market experience indicated by their highest educational degree. We restrict our study to individuals employed on December 31 with at least one month of tenure, in open-ended contracts, and earning above the minimum wage in urban areas within Brazil's private sector. For employees holding multiple jobs, we select the position with the highest contracted hours or, in case of a tie, the highest hourly wage. We categorize non-separated workers employed consecutive years by the same firm as *stayers*, and use the reported cause of separation to identify *layoffs* and *quits*.

Given that informal employment is significant in the Brazilian labor force and not captured in our data, we follow Gerard et al. (2021) and restrict our sample to the Southeast region, which includes the states of Espírito Santo, Minas Gerais, Rio de Janeiro, and São Paulo. This region accounts for nearly half of the country's

employment and exhibits lower informality rates. Moreover, we include only the largest connected set of firms and workers to estimate firm and worker effects, as proposed by Abowd et al. (1999).

Table I provides descriptive statistics comparing our final sample with the broader national and regional datasets. Workers in our sample have similar profiles in terms of education, age, and tenure with the broader Brazilian workforce. Hourly wages are slightly higher in the Southeast, reflecting its economic status. Our sample includes 74% of the firms in this region but captures 99% of worker-year observations. Notably, layoffs constitute 81% of all separations in our sample. This proportion is even higher across the broader national landscape, suggesting that the predominant role of layoffs in separation dynamics would be even more pronounced in a more expansive sample.

Table I – Descriptive statistics

	Brazil	Southeast region	Sample
Number of firms	4,106,339	2,049,035	1,523,100
Average firm size	7.9	8.4	9.8
Number of worker-year observations	138,145,968	75,560,104	74,910,200
Number of workers	34,585,144	18,728,810	14,868,221
Average age (years)	37.3	37.6	37.4
Average log-hourly wage	2.242	2.341	2.332
Average tenure (months)	47.3	48.6	46.4
Average schooling (years)	10.3	10.4	10.4
Average annual layoff rate	0.20	0.20	0.17
Average annual quit rate	0.03	0.03	0.04

Notes: The table reports summary statistics for formal employment relationships in RAIS and our final sample between 2010 and 2017. The first column reports statistics for Brazilian workers born between 1959 and 1987 with at least one year of potential labor market experience based on their highest education degree. In addition, we focus on individuals employed on December 31st with at least one month of tenure, open-ended contracts, and monthly paid jobs above the minimum wage in urban areas and the private sector. The second column further restricts the analysis to firms located in the Southeast region of Brazil, while the third column discards firms not belonging to the largest connected component.

Measuring Firm Quality: Pay Premium and Size. We assess firm quality using two established measures: firm size and AKM pay premiums. Firm size is determined by the total number of employees at the start of our observation period. To enhance accuracy, we categorize firms into 100 bins using a k-means

clustering algorithm, as recommended by Bonhomme et al. (2019). Appendix C details our estimation procedures and confirms that our data aligns well with the assumptions of the AKM model.

1.2 Context: Quits and Layoffs in Brazil

The RAIS dataset distinguishes between quits and layoffs, a critical distinction given that the government uses this data for administrative purposes. In the case of a layoff, the firm must pay a fine to the government and provide severance pay to the worker. Additionally, the worker becomes eligible for unemployment benefits and gains access to their public pension fund, which is typically reserved for retirement. Given the low incidence of quits in the data, a natural concern is whether these policies create incentives to misclassify quits as layoffs. Appendix D provides more details on these policies, and below we discuss why such incentives are unlikely to result in systematic misreporting.

If a separation is reported as a quit, it benefits the firm; if reported as a layoff, it benefits the worker. Consequently, both parties have strong incentives to ensure that the separation is accurately reported. However, there is a potential issue: in the case of a layoff, the firm incurs a cost by paying a fine to the government, while the worker benefits from unemployment payments and gains early access to their pension funds. If a worker highly values immediate liquidity—such as accessing their pension funds early—the total benefits received from the government could outweigh the costs to the firm. This scenario might create an incentive for collusion between the worker and the firm, where they agree to misclassify the separation as a layoff in exchange for side payments that leave both parties better off.

Nevertheless, such collusion is unlikely in practice. When a separation is classified as a layoff, the firm must make substantial payments to both the government and the worker. For collusion to succeed, the firm would need to trust that the worker will return a portion of these payments after accessing their pension funds, an arrangement that is difficult to enforce given its illegal nature.

Empirical evidence supports the rarity of such collusion agreements. Since 2018, firms and workers in Brazil have had the option to terminate contracts by

mutual agreement. Under this arrangement, the worker receives severance pay and can access 80% of their pension funds, but the firm avoids the government fine. If early access to pension funds were a strong motivator for misreporting quits as layoffs, mutual agreement separations would be more common. However, they account for only 0.5% of all separations. Another potential motive for misreporting is access to unemployment benefits. Using the same RAIS data, Van Doornik et al. (2023) finds that workers eligible for unemployment insurance are 11% more likely to be laid off. However, their analysis shows that these excess layoffs are not merely misclassified quits, further suggesting that misreporting is uncommon.

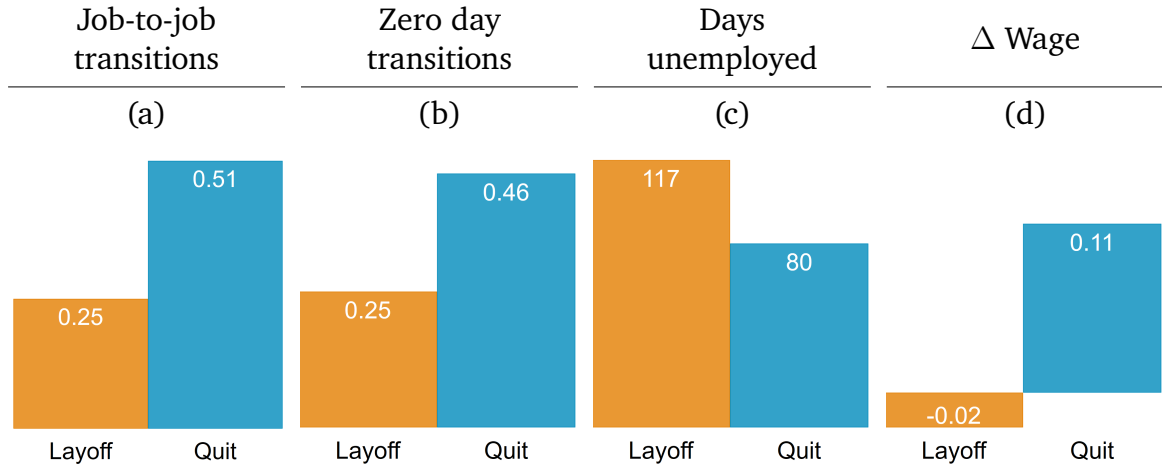
Finally, we conducted further validation by comparing the post-separation outcomes of workers who quit versus those who were laid off. Figure I presents compelling evidence: workers who quit are significantly more likely to secure employment within a year compared to those who were laid off—51% versus 25%, respectively. Moreover, among those who found jobs, quitting workers tended to secure new positions more quickly (46% found immediate employment, compared to 25% of those laid off) and experienced more favorable wage growth, with an average increase of 11% in wages compared to a 2% decrease among those laid off. These patterns align with the hypothesis that separations categorized as quits are indeed voluntary and initiated by the workers, while those labeled as layoffs are not, further substantiating the accuracy of the reporting in our data.

2 The quality-separation correlation: Empirics

In this section, we empirically investigate the determinants of the quality-separation correlation. First, we demonstrate that the negative correlation between firm quality and separation rates is primarily driven by high-quality firms having lower layoff rates. Second, we show that this result is not confounded by differential sorting of high-skill workers into high-quality firms.

Our main findings are in Figure II. The y-axis presents firm-level quit and layoff rates, while the x-axis corresponds to different measures of firm quality:

Figure I – Quitting workers make better moves than laid-off ones



Notes: The figure compares average labor outcomes and mobility patterns between laid-off and quitting workers. Panel (a) reports the share of separated workers finding a job the same year (job-to-job transition). Panel (b) reports the share of job-to-job transitions with workers not spending a single day in nonemployment. Panel (c) reports the average number of days in non-employment for workers in a job-to-job transition. Panel (d) report the difference in log-hourly wage changes with respect to the average log-hourly wage change for *stayers*.

firm pay premiums (a) and firm size (b). Regardless of the measure used, the same patterns emerge.

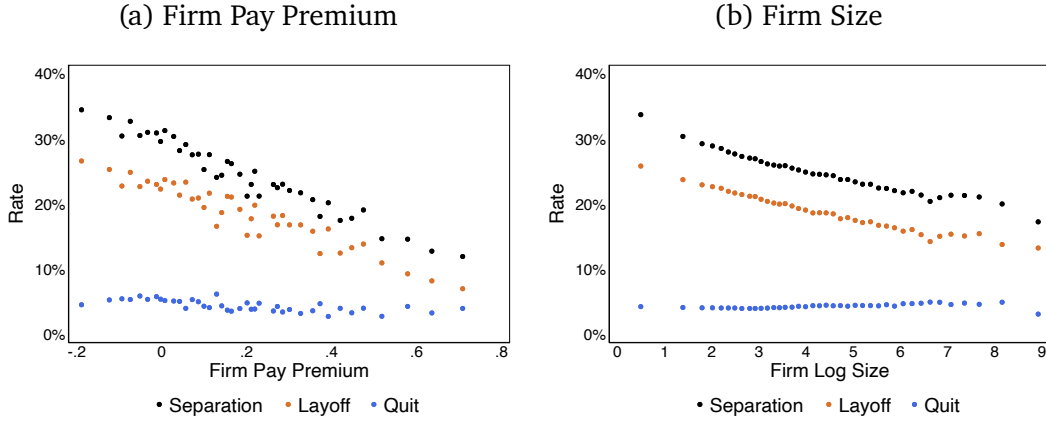
First, layoff rates decline as firm quality increases. Second, the negative relationship between firm quality and overall separation rates is predominantly driven by layoffs, as evidenced by the similarity in the slopes of layoff rates and separation rates with respect to firm quality. Specifically, the ratio of the slopes between layoff rates and separation rates ranges from 0.81 to 0.93, depending on the measure of firm quality used.

An alternative explanation for the patterns observed in Figure II is sorting. There is substantial evidence showing that higher-skilled workers tend to sort into higher-quality firms (Abowd et al., 1999; Card et al., 2013). As a result, the lower layoff rates observed in high-quality firms could simply reflect the higher skill levels of their employees rather than firm quality itself.

To assess the extent to which this sorting behavior influences our findings, we estimate the following regression:

$$Y_{it} = \beta_Y Q_{J(i,t)} + \gamma X_{it} + \epsilon_{it}, \quad (1)$$

Figure II – Quality-layoff correlation drives the quality-separation correlation



Notes: This figure shows the relationship between yearly separation rates and firm quality. The data is from the administrative records of the Brazilian Ministry of Labor (RAIS) and is at the firm level. The sample is restricted to urban jobs in the Southeast Region and includes all open-ended private sector contracts between 2010 and 2017; details in Section 1. We use two measures of firm quality: “Firm Pay Premium” are AKM firm fixed effects, details in Appendix C, and “Firm Size” is the total number of workers in the firm, in the first year of the sample. Panels (a) and (b) present the data using different measures of firm quality. Total separation rates are in black, layoffs in orange, and quits in blue.

where t represents a year, i is an individual worker, and $J(i, t)$ denotes the firm employing worker i at time t . The dependent variable Y represents outcomes of interest, specifically whether a worker separated from or was laid off by their firm on that year. Q is our measure of firm quality, X is a set of worker characteristics, and ϵ captures the residuals. The parameter of interest is β_Y .

In this analysis, we include several covariates to control for worker characteristics. First, since tenure is one of the primary determinants of layoff rates (Jovanovic, 1979; Topel and Ward, 1992; Ureta, 1993), we control for both tenure and tenure squared. Second, given that different genders and skill levels exhibit distinct career trajectories in the labor market, we control for age and age squared, interacted with gender and education fixed effects. Third, to account for potential discrimination, we include race fixed effects. Fourth, to control for variations across different occupations—such as differences in unionization rates—we introduce occupation fixed effects. Finally, to adjust for unobserved differences in worker skill, we incorporate AKM worker effects.³

³Due to measurement error in the estimated AKM effects, the results using this covariate must be interpreted with caution.

We focus on how layoffs contribute to the negative separation-quality correlation, estimating this effect as the ratio $\frac{\beta^{\text{Layoff}}}{\beta^{\text{Separation}}}$. The results are presented in Table II.⁴ Even after accounting for worker heterogeneity, layoffs account for at least 70% of the negative separation-quality correlation. These findings suggest that worker heterogeneity does not fully explain the observed patterns, reinforcing the idea that layoffs are the predominant driver of the negative relationship between firm quality and separation rates.

Table II – Quality-layoff corr. drives quality-separation corr.: Robustness

	(1)	(2)	(3)	(4)
<i>Panel A - Firm Pay Premium</i>				
$\frac{\beta^{\text{Layoff}}}{\beta^{\text{Separation}}}$	0.812*** (0.0000)	0.773*** (0.0000)	0.702*** (0.0000)	0.702*** (0.0000)
<i>Panel B - Firm Size</i>				
$\frac{\beta^{\text{Layoff}}}{\beta^{\text{Separation}}}$	0.927*** (0.0000)	0.906*** (0.0000)	0.947*** (0.0000)	0.899*** (0.0000)
Observations	49,835,818	49,830,114	49,835,818	49,830,114
Worker covariates			✓	✓
Worker AKM Effect		✓		✓

Notes: This table reports OLS estimates of Equation (1), which estimates the relationship between firm quality and separation rates. The data is from the administrative records of the Brazilian Ministry of Labor (RAIS) and is at the individual-year level. The sample is restricted to urban jobs in the Southeast Region and includes all open-ended private sector contracts between 2010 and 2017; details in Section 1. We use two measures of firm quality: “Firm Pay Premium” are AKM firm fixed effects, details in Appendix C, and “Firm Size” is the total number of workers in the firm, in the first year of the sample. We report the ratio of the estimates using layoff rates as an outcome by the one using total separations. The included worker covariates are race fixed effects, occupation fixed effects, tenure, tenure squared, and age and age squared interacted with gender and education fixed effects. Appendix Table B.1 shows estimates of β^{Layoff} and $\beta^{\text{Separation}}$ separately.

3 The quality-separation correlation: Theory

This section introduces a simple labor search model to explain our empirical finding that high-quality firms have lower layoff rates. Previous theoretical work has established that both quits and layoffs can occur even within a framework of fully efficient separations (McLaughlin, 1991). However, recent empirical research has

⁴Appendix Table B.1 shows estimates of β^{Layoff} and $\beta^{\text{Separation}}$ separately.

revealed that inefficient layoffs are pervasive (Schmieder and von Wachter, 2010; Davis and Krolkowski, 2023; Jäger et al., 2023). Building on these findings, we develop a model that generates endogenous inefficient layoffs through the interaction of two key features: wage rigidity and uncertainty about workers' productivity. Specifically, firms commit to a wage rate before the worker's productivity shock is realized. There is a productivity threshold below which it becomes unprofitable for the firm to retain the worker at the predetermined wage, resulting in a layoff. In these cases, the firm would prefer to reduce the wage but cannot do so due to wage rigidity, which is the source of inefficiency in the model. Aside from these key features, we keep the model as simple as possible.

We consider a partial-equilibrium random-search model with homogenous workers. Workers being homogenous mean that we are considering the labor market for a given worker type; for example, an education level or occupation. Random search means that firms are matched with an exogenously determined number of workers. Finally, partial equilibrium implies the distribution of the workers' outside option is exogenous. This means we are assuming that the firm is atomistic and its decisions do not influence the factors determining workers' outside option, such as offers received by other firms, government policies, etc.

The rest of this section proceeds as follows. First, we present the economy in which our model operates and the timing of agents' decisions. Second, we delve into the quality-separation correlation and present our key theoretical result: more productive firms have both fewer quits and fewer layoffs. Third, we discuss the distinction between quits and layoffs from workers' point of view.

3.1 Set up

There is a single firm, characterized by quality ψ . In each period t , it chooses the wage rate w_t , common to all its workers, and whether to layoff each worker to maximize the present value of expected profits. The firm discounts the future at rate β . There is a continuum of ex-ante homogeneous workers, with expected productivity α . In each period t , each worker i receives a productivity shock η_{it} . Hence, the total revenue the firm receives from worker i in period t is $\psi + \alpha + \eta_{it}$. The value of the outside option to worker i in year t is b_{it} . For simplicity, we

assume workers discount the future infinitely and hence accept an offer if $w_t \geq b_{it}$. Both shocks, η_{it} and b_{it} , are idiosyncratic and follow known distributions, F_η and F_b , respectively. We normalize α so that $\mathbb{E}_\eta[\eta_{it}] = 0$.

In each period t , the timing is as follows:

1. Firm starts the period with s_t workers.
2. Firm meets an additional unit mass of potential hires.
3. Firm chooses a wage w_t to offer both to current workers and potential hires.
4. Workers and the firm observe productivity (η_{it}) and outside option (b_{it}) shocks.
5. Workers decide whether to quit.
 - The share of workers who stay (retention rate) is $\rho(w_t)$.
6. Firm decides whether to layoff each worker.
 - The layoff rate is $\delta_\psi(w_t)$.
7. Payoffs realize:
 - Firm's profit per worker: $\psi + \alpha + \eta_{it} - w_t$.
 - Employed workers payoff: w_t .
 - Non-employed workers payoff: b_{it} .
8. Firm starts next period with $s_{t+1} = \rho(w_t) \cdot [1 - \delta_\psi(w_t)](1 + s_t)$.

The key feature of this timing is that firms must commit to a wage rate before observing the productivity shock (η), but decide whether to layoff each worker after observing it. This structure creates endogenous layoffs in our model.

Note that workers can quit the same period they meet with the firm. In this formulation, the retention rate represents both the share of current workers that stays in the firm and the share of new matches that accepts the offer. Since all shocks are independent across periods and workers are ex-ante homogeneous, these two shares are identical.

An equilibrium is defined by the optimality of three decisions: layoffs, quits, and wages. The firm lays off a worker if their realized productivity plus the continuation value of keeping the worker is lower than wages, which defines the layoff rate as a function of wages. Workers quit if the outside option is higher than wages, which defines the quit rate as a function of wages. The firm does not control workers' quit decisions and cannot commit to a layoff policy, hence it takes both the layoff and quit rate functions as given when it chooses wages to maximize profits. Below we define these objects formally.

Definition 1 An equilibrium is defined by wages w_ψ^* , retention function $\rho(w)$, and layoff function $\delta_\psi(w)$, such that conditions (I), (II), and (III) below hold:

(I) Workers quit if $w < b$. Hence, retention function is:

$$\rho(w) = P_b(b \leq w) = F_b(w).$$

(II) Firm lays off worker if realized markdown is negative. Hence, layoff function is:

$$\delta_\psi(w) = P_\eta(\mu_\psi(w) + \eta \leq 0) = F_\eta[-\mu_\psi(w)].$$

(III) Firm chooses wages to maximize the expected present value of profits:

$$w_\psi^* = \arg \max_w V_\psi(w). \quad (2)$$

Where $\mu_\psi(w)$ and V_ψ are defined as follows.

Since $\mathbb{E}_\eta[\eta] = 0$, ex-ante expected markdown is:

$$\mu_\psi(w) \equiv \psi + \alpha - w + \beta V_\psi^* + \mathbb{E}_\eta[\eta] = \underbrace{\psi + \alpha - w}_{\text{instant markdown}} + \underbrace{\beta V_\psi^*}_{\text{continuation value}}.$$

The expected present value of profits is:

$$V_\psi(w) \equiv \underbrace{\rho(w)}_{\text{retention rate}} \cdot \underbrace{[1 - \delta_\psi(w)]}_{\text{layoff rate}} \cdot \left\{ \underbrace{\psi + \alpha - w}_{\text{instant markdown}} + \underbrace{\mathbb{E}_\eta[\eta | \mu_\psi(w) + \eta \geq 0]}_{\text{expected productivity shock for non-laid off workers}} + \underbrace{\beta V_\psi^*}_{\text{continuation value}} \right\}.$$

And $\mu_\psi^* \equiv \mu_\psi(w^*)$, $V_\psi^* \equiv V_\psi(w^*)$, $\rho_\psi^* \equiv \rho_\psi(w^*)$, $\delta_\psi^* \equiv \delta_\psi(w^*)$.

A few clarifications regarding Definition 1. The term $V_\psi(w)$ represents the value of each individual worker that the firm meets, rather than the total firm value. Nonetheless, optimizing these two objects is equivalent because the number of meetings is exogenously determined. Additionally, note that the continuation value in $\mu_\psi(w)$ and $V_\psi(w)$ is βV_ψ^* , not $\beta V_\psi(w)$, since the firm does not commit to offering the same wage in subsequent periods.

3.2 Drivers of the quality-separation correlation

We now delve into the determinants of the quality-separation correlation. First, we present a theorem that establishes our main theoretical result: high-quality firms have *both* lower quit and lower layoff rates. The theorem's assumptions impose only weak restrictions on the distributions of productivity and outside options shocks, which are necessary to guarantee a unique equilibrium. Second, we discuss the intuition behind this result.

Theorem 1 Assume F_b is a log-concave distribution and F_η is such that $\frac{\partial \mathbb{E}_\eta[\eta | \eta > x]}{\delta x} \leq$

1. Then, there is a unique equilibrium and:

- (I) Wages are increasing in firm quality $\left(\frac{dw_\psi^*}{d\psi} \geq 0\right)$;
- (II) Markdown is increasing in firm quality $\left(\frac{d\mu_\psi^*}{d\psi} \geq 0\right)$;
- (III) Quit rate is decreasing in firm quality $\left(\frac{d(1-\rho(w_\psi^*))}{d\psi} \leq 0\right)$;
- (IV) Layoff rate is decreasing in firm quality $\left(\frac{d\delta_\psi(w_\psi^*)}{d\psi} \leq 0\right)$;
- (V) Steady-state firm size is increasing in firm quality.

Proof: Appendix A.

The assumptions in Theorem 1 mean that F_b and F_η do not have heavy tails. These assumptions hold for a wide range of common distributions, as formalized in the following remark.

Remark 1 The assumptions of Theorem 1 hold if F_b and F_η are any of the following distributions, under any set of parameters: uniform, normal, and Gumbell.

Intuition for Theorem 1: Theorem 1 establishes that higher-quality firms layoff less. We now discuss the intuition behind this result. To start, note that the layoff rate is given by $P_\eta(\eta \leq -\mu)$; hence, layoff decreases with markdown. The reason is simple: a worker is only laid-off if their productivity shock is negative enough to overcome the firm's average markdown.

Therefore, the crucial question is whether higher-quality firms have larger markdowns. While this is intuitive, it is not straightforward. High-quality firms pay higher wages in order to increase their retention. If the incentives to increase retention were strong enough, higher-quality firms could end with *lower* markdowns. However, Theorem 1 shows that this is not the case.

To understand the intuition behind Theorem 1, consider the following calibration of the model: $\eta \sim U[-\sigma_\eta, \sigma_\eta]$, $b \sim U[0, \sigma_b]$, and $\beta = 0$. Additionally, we normalize $\sigma_\eta = 1$.⁵ The problem of the firm then simplifies to:

$$\max_{\rho, \mu} \rho^{\frac{1}{3}} \cdot (\mu + 1)^{\frac{2}{3}} \tag{3}$$

$$\text{subject to: } \mu + \sigma_b \rho = \psi + \alpha.$$

⁵Layoff and rate quits depend only on $\frac{\sigma_b}{\sigma_\eta}$, not on σ_b and σ_η separately.

Equation (3) highlights the main tradeoff of the model: The firm chooses wages to maximize profits by trading-off retention (ρ) and markdown (μ). Markdowns are twice as important because they affect both profits per worker and the layoff rate, as we can see in Equation (2). Figure III presents this trade-off graphically. The solid lines represent the production possibility frontier (PPF), while dashed lines represent isoprofit curves.

The level of the PPF depends on firm quality (ψ):⁶ a higher-quality firm (orange line) can have a higher μ for any given ρ . Finally, note that the objective function is convex and, hence, ρ and μ are complementary inputs. Therefore, if the PPF expands (higher ψ), the firm increases *both* its ρ and μ . That is, higher quality firms have higher markdowns, even though they pay higher wages. Hence, they have lower layoff rates. Moreover, note that the quit rate is simply $1 - \rho$, so more productive firms also have fewer quits.

This simple framework is also informative about the relative rates of quits to layoffs. This ratio depends on how the firm trades-off retention and markdowns, which is determined by the slope of the PPF. This slope is given by σ_b since it determines the labor-supply elasticity. The more elastic labor supply is (low σ_b), the “cheaper” it is for the firm to retain a worker and, hence, the firm will choose relatively higher retention and lower markdown, which results in fewer quits and more layoffs.

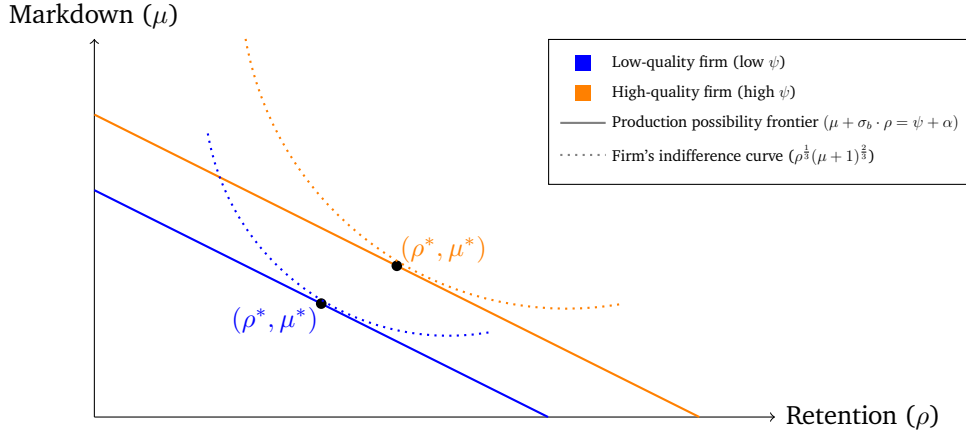
4 Final Remarks

In this paper, we investigate the determinants of the negative quality-separation correlation. We show empirically that high-quality firms have lower layoff rates and propose a parsimonious theoretical framework that explains this pattern. Our findings indicate promising directions for future research.

In most countries, firms must pay a fee to layoff workers. The goal of these policies is to increase job stability. However, firms take this penalty into consideration when making hiring decisions, which might lead to lower employment rates in equilibrium. Our model could be extended to incorporate a layoff penalty, for-

⁶The PPF also depends on average workers’ productivity (α), but this is fixed across firms.

Figure III – High-quality firm has *both* higher markdown and retention



Notes: This figure illustrates the model presented in Equation (3). Markdown and retention are defined in Definition (1). Solid lines represent the production possibility frontier and dashed lines represent firms' indifference curves. Stars denote equilibrium outcomes. Two firms are represented in the figure: high-quality (orange) and low-quality blue.

malize the tradeoffs behind this policy, and study optimal penalty design.

Our findings also shed new light on the literature that estimates job-search models from job flows. We have shown that layoffs are the majority of separations and that layoff rates depend on firm quality. Several previous papers allow for firm-specific involuntary separation rates. However, they do not directly observe layoffs. Some papers assume that involuntary separation are exogenous and treat them as residuals (Sorkin, 2018; Jarosch, 2023), others infer layoff rates indirectly from other moments (Acabbi et al., 2024; Blanco et al., 2024). Revisiting these models taking advantage of the Brazilian data, which explicitly flags layoffs, could bring valuable new insights.

A Proofs

Theorem 1: Define the following functions: $H_\eta(x) \equiv \mathbb{E}_\eta[\eta | \eta \geq x] - x$ and $H_b(x) \equiv \frac{1}{\frac{\partial \ln F_b(x)}{\partial x}}$. Taking first order conditions of Equation (2) with respect to w , we have that:

$$H_\eta(-\mu_\psi^*(w)) = H_b(w^*). \quad (4)$$

(I) *Wages are increasing in firm quality:* Replacing $\mu_\psi^*(w)$ from Definition (1) in Equation (4), taking total derivative with respect to ψ , and isolating $\frac{dw^*}{d\psi}$, we have:

$$\frac{dw^*}{d\psi} = \frac{H'_\eta \cdot (1 + \beta V'^*)}{H'_\eta - H'_b}. \quad (5)$$

Under the assumptions of Theorem (1), $H'_b > 0$ ⁷, and $H'_\eta < 0$ ⁸. Additionally, $V'^* > 0$ since the value of a match is always increasing in firm quality. Therefore, from Equation (5), $\frac{dw^*}{d\psi} > 0$.

(II) *Expected markdown is increasing in firm quality:* Replacing w from Definition (1) in Equation (4), taking derivatives with respect to ψ , and isolating $\frac{d\mu^*(w)}{d\psi}$, we have:

$$\frac{d\mu^*(w)}{d\psi} = \frac{\partial \mu}{\partial \psi} + \frac{\partial \mu}{\partial w} \cdot \frac{dw}{d\psi} = \frac{H'_b(1 + \beta V'^*)}{H'_b - H'_\eta}. \quad (6)$$

Since $H'_b > 0$ and $H'_\eta < 0$ under the assumptions of Theorem (1), and $V'^* > 0$, from Equation (6), $\frac{d\mu^*(w)}{d\psi} > 0$.

(III) *Quit rate is decreasing in firm quality:* Since wages are increasing in firm quality, and quit rate is decreasing in wages, it is also decreasing in firm quality.

(IV) *Layoff rate is decreasing in firm quality:* Since expected markdown is increasing in firm quality, and layoff rate is decreasing in expected markdown, it is also decreasing in firm quality.

(V) *Steady-state firm size is increasing in firm quality:* Firm size dynamics can be described as $s_{t+1} = \rho(w_t) \cdot [1 - \delta_\psi(w_t)](1 + s_t)$. In steady-state, $s_t = s_{t+1} = s$.

⁷Since $F_b(w)$ is log concave, $\frac{\partial \log F_b(w)}{\partial w}$ is decreasing, hence $\frac{1}{\frac{\partial \log F_b(w)}{\partial w}}$ is increasing. That is, $H'_b(x) > 0$.

⁸ $H'_\eta = \frac{\partial \mathbb{E}_\eta[\eta | \eta \geq x]}{\partial x} - 1$, so $H'_\eta < 0$ since $\frac{\partial \mathbb{E}_\eta[\eta | \eta \geq x]}{\partial x} < 1$.

Isolating s , steady-state firm size is:

$$s = \frac{\rho(w) \cdot [1 - \delta_\psi(w)]}{1 - [\rho(w) \cdot [1 - \delta_\psi(w)]]}.$$

Therefore, since retention ($\rho(w)$) is increasing in firm quality and layoffs ($\delta_\psi(w)$) are decreasing, firm size is increasing in firm quality.

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Supplemental Appendices

B Appendix figures and tables

Table B.1 – Quality-layoff corr. drives quality-separation corr.: Robustness

	(1)	(2)	(3)	(4)
<i>Panel A - Firm Pay Premium</i>				
β^{Layoff}	-0.214*** (0.0002)	-0.183*** (0.0003)	-0.116*** (0.0003)	-0.131*** (0.0003)
$\beta^{\text{Separation}}$	-0.264*** (0.0003)	-0.236*** (0.0003)	-0.165*** (0.0004)	-0.187*** (0.0004)
$\frac{\beta^{\text{Layoff}}}{\beta^{\text{Separation}}}$	0.812*** (0.0000)	0.773*** (0.0000)	0.702*** (0.0000)	0.702*** (0.0000)
<i>Panel B - Firm Size</i>				
β^{Layoff}	-0.015*** (0.0000)	-0.011*** (0.0000)	-0.010*** (0.0000)	-0.009*** (0.0000)
$\beta^{\text{Separation}}$	-0.016*** (0.0000)	-0.012*** (0.0000)	-0.011*** (0.0000)	-0.010*** (0.0000)
$\frac{\beta^{\text{Layoff}}}{\beta^{\text{Separation}}}$	0.927*** (0.0000)	0.906*** (0.0000)	0.947*** (0.0000)	0.899*** (0.0000)
Observations	49,835,818	49,830,114	49,835,818	49,830,114
Worker covariates			✓	✓
Worker AKM Effect		✓		✓

Notes: This table reports OLS estimates of Equation (1), which estimates the relationship between firm quality and separation rates. The data is from the administrative records of the Brazilian Ministry of Labor (RAIS) and is at the individual-year level. The sample is restricted to urban jobs in the Southeast Region and includes all open-ended private sector contracts between 2010 and 2017; details in Section 1. We use two measures of firm quality: “Firm Pay Premium” are AKM firm fixed effects, details in Appendix C, and “Firm Size” is the total number of workers in the firm, in the first year of the sample. We report estimates using both layoff rates or total separations as the outcome. The included worker covariates are race fixed effects, occupation fixed effects, tenure, tenure squared, and age and age squared interacted with gender and education fixed effects.

C AKM estimation

to-do

D Setting: Details

The Public Pension Fund: FGTS. All formally employed workers in the private sector are required to have an account at *Caixa*, a public bank. This account is known as FGTS (Fundo de Garantia do Tempo de Serviço). Employers must deposit 8% of each worker's gross monthly salary into this account. Furthermore, if a worker is laid off, they receive a severance payment amounting to 40% of the total balance accrued in their FGTS account. Workers can access these funds if they are laid off or upon reaching retirement age.

Layoff Fine. In the event of a layoff, firms are required to pay a government fine equivalent to 10% of the worker's total FGTS balance. This is in addition to the 40% severance payment made directly to the worker.

Unemployment Benefits. Workers who are laid off are eligible for unemployment benefits, which are contingent upon the length of their formal employment. The benefits are structured as follows:

- Workers employed for 6 to 11 months within the last 36 months receive three months of benefits.
 - Workers employed for 12 to 23 months within the last 36 months receive four months of benefits.
 - Workers employed for 24 months or more within the last 36 months receive five months of benefits.
- In 2015, the monthly unemployment payment ranged from one to 1.76 times the minimum wage, dependent on the worker's average salary prior to being laid off.