



Natália Rodrigues Corado

**Leavers and Stayers after Mass Layoffs:
Evidence from Brazil**

Dissertação de Mestrado

Thesis presented to the Programa de Pós-graduação em Economia, do Departamento de Economia da PUC-Rio in partial fulfillment of the requirements for the degree of Mestre em Economia.

Advisor : Prof. Carlos Viana de Carvalho

Co-advisor: Prof. Gustavo Gonzaga

Rio de Janeiro
November 2023



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B.A., Economics, Universidade de Brasília (UnB), 2020

Bibliographic data

Corado, Natália

Leavers and Stayers after Mass Layoffs: Evidence from Brazil / Natália Rodrigues Corado; advisor: Carlos Viana de Carvalho; co-advisor: Gustavo Gonzaga. – 2023.

46 f: il. color. ; 30 cm

Dissertação (mestrado) - Pontifícia Universidade Católica do Rio de Janeiro, Departamento de Economia, 2023.

Inclui bibliografia

1. Economia – Teses. 2. Demissões em massa. 3. Crédito. 4. Consumo. 5. RAIS. 6. Brasil. I. Viana de Carvalho, Carlos. II. Gonzaga, Gustavo. III. Pontifícia Universidade Católica do Rio de Janeiro. Departamento de Economia. IV. Título.

CDD: 331.1

Acknowledgments

I thank my advisor Carlos Viana for his guidance and words of encouragement. His contagious commitment to research and unwavering dedication to this project have been pivotal for the completion of this work. I am equally grateful to my co-advisor, Gustavo Gonzaga, for the extraordinary guidance, support, and invaluable opportunities he provided. I extend my gratitude to Bruno Perdigão for the the stimulating conversations and insights, inspiring work ethic, and unparalleled efficiency. Without his crucial assistance this work could never have been completed. I am also thankful to Sergio Leão, André Minella and Yvan Bécard for their instrumental contributions to this dissertation. In addition, I thank committee members, Joana Naritomi and Cezar Santos, for their availability and valuable comments that will certainly contribute to the improvement of this work.

I thank my parents, Carmesim and Heyda, for their love, support, and attention. Through their efforts, they laid the foundation for me to pursue my aspirations and walk the path of my choice. I thank my sister Fernanda for her kindness and companionship through our long study nights. I am grateful to Arthur for support, love, patience, and understanding beyond compare. I thank Carlos and Rafael for the insightful discussions and for inspiring me to continuously strive to ask better questions. I am grateful to Júlia for a fantastic friendship. I am also thankful to my classmates and the staff of PUC's Economics department.

"This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001. Financial support from PUC-Rio and Vinci Partners is also gratefully acknowledged.

Abstract

Corado, Natália; Viana de Carvalho, Carlos (Advisor); Gonzaga, Gustavo (Co-Advisor). **Leavers and Stayers after Mass Layoffs: Evidence from Brazil**. Rio de Janeiro, 2023. 46p. Dissertação de Mestrado – Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro.

We estimate the impacts of job loss on individuals' labor and credit market outcomes, exploiting detailed individual-level administrative data linking employment and credit histories. Leveraging mass layoffs for identification, we find job loss leads to sizable and pervasive declines in wages, future employment probabilities, and spending. We document evidence consistent with declining credit access following job loss, limiting workers' ability to partially self-insure their losses. Facing limited options for managing liquidity, workers, on average, resort more to not paying their credit card balances in full to finance consumption. The findings point that the costs of job loss may be further amplified in a developing country due to comparatively less developed credit markets. In addition, we benefit from the quasi-experimental variation provided by mass layoffs to study the behavior of job stayers, who would possibly perceive heightened income uncertainty. We document this group faces actual increased layoff risk, and those who do not exhibit hand-to-mouth behavior cut down spending in the aftermath of mass layoffs in their firms.

Keywords

Mass layoffs; Credit; Consumption; RAIS; Brazil.

Resumo

Corado, Natália; Viana de Carvalho, Carlos; Gonzaga, Gustavo. **Desligados e Retidos em Demissões em Massa: Evidência de Dados Brasileiros**. Rio de Janeiro, 2023. 46p. Dissertação de Mestrado – Departamento de Economia, Pontifícia Universidade Católica do Rio de Janeiro.

Nós estimamos os impactos da perda de emprego nas trajetórias de mercado de trabalho e crédito dos indivíduos, explorando dados administrativos detalhados em nível individual que vinculam históricos de emprego e crédito. Usando demissões em massa para identificação, encontramos que a perda de emprego implica quedas significativas de salários, gastos e probabilidades de reemprego. Documentamos evidência consistente com redução de acesso ao crédito após a perda de emprego, o que limita a capacidade dos trabalhadores de se segurarem parcialmente contra suas perdas. Enfrentando opções limitadas para administrar liquidez, trabalhadores, na média, recorrem mais a não pagar o total de suas faturas do cartão de crédito como forma de financiar consumo. Além disso, nos beneficiamos da variação quase-experimental fornecida pelas demissões em massa para investigar o comportamento dos trabalhadores que permanecem empregados e que, possivelmente, percebem maior incerteza em termos de renda. Documentamos que esse grupo enfrenta um aumento no risco de demissão, e aqueles que não adotam um comportamento do tipo *hand-to-mouth* reduzem os gastos após demissões em massa em suas empresas.

Palavras-chave

Demissões em massa; Crédito; Consumo; RAIS; Brasil.

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1 Introduction

Job loss stands as one of the most disruptive shocks a working-age individual can face. A wealth of research has demonstrated that displacement entails dire and long-lasting costs for individuals, causing substantial earning losses and worsening employment prospects.¹ The effects of job loss shocks may well spill over to credit markets as individuals adjust their consumption and financial positions. Understanding workers' responses is of crucial importance for the effective design of displacement insurance policies as well as risk-sharing arrangements between borrowers and lenders.

Leveraging mass layoffs for identification, this dissertation breaks new ground on this topic by investigating the causal effects of job loss on workers' consumption and credit behaviors in a large developing country. The size and richness of our data further allow us to entertain potential mechanisms driving individuals' responses as well as to characterize the heterogeneity of treatment effects along the critical dimension of balance sheet positions. To present a comprehensive picture of the costs faced by displaced individuals, we additionally examine the magnitude to which workers' labor market careers are adversely affected.

Beyond the realization of job loss shocks, unemployment risk may trigger behavioral responses. In the second part of this dissertation, we shed light on the consumption and credit profiles of workers who were not directly displaced but that were employed in firms that underwent mass layoffs. Our aim is to examine whether individuals who witness a substantial portion of their coworkers being displaced perceive a heightened layoff risk, leading them to revise expenses accordingly.

We link longitudinal individual-level registers on employment containing a total of 70 million workers to nationwide administrative records on a rich

¹For the impacts of job loss on labor market outcomes, see, e.g., Jacobson et al. (1993), Couch and Placzek (2010); Schmieder et al. (2023). For other outcomes, see Zimmer (2021); Browning et al. (2006) for mental health problems, Sullivan and Von Wachter (2009) for mortality, Charles and Stephens (2004); Eliason (2012) for divorce Bono et al. (2015) for fertility, Chan and Huff Stevens (2001) for retirement, Lindo (2011) for offspring birth weight, Black et al. (2015) for smoking, Rege et al. (2019); GC Britto et al. (2022) for childrens' school performance, and Rose (2018); Britto et al. (2022); Bhalotra et al. (2021); Khanna et al. (2021) for crime.

array of consumption and credit outcomes. Our empirical strategy relies on a staggered difference-in-differences design, in which we compare the trajectories of workers in firms that experienced mass layoffs to a finely matched control group of workers employed in firms that did not undergo substantial downsizing. Reassuringly, we observe no different trends in outcomes between treated and control groups prior to treatment, supporting our primary identification assumption that workers employed in firms that did not have mass layoffs serve as reliable counterfactuals to similar workers affected by mass job destruction in their firms.

Our analysis is divided into two parts. In the first part, we take a comprehensive approach and estimate the dynamic treatment effects of job displacement on the labor market careers as well as on spending and credit responses of displaced workers. The scope of our data sets allows us to assess the implications of job loss for both the short- and medium-run, providing valuable insights into the persistence of shocks. In line with evidence for developed economies, we document remarkably pervasive and long-lasting effects of job loss on future employment and labor income.

Turning to the impact on workers' consumption, we find that layoff leads to a 26 percent decrease in individuals' spending. We compare the consumption patterns of workers that secure employment in the quarter following dismissal to those who remain out of the labor market for a duration of four quarters. Even for individuals who manage to secure new employment quickly, consumption does not recover to pre-job loss levels years after the layoff, providing suggestive evidence that job loss is not a mere transitory shock to consumer spending.

Our findings are also consistent with tightening credit constraints following job loss, which limit workers' capacity to replace their lost income by borrowing. Upon unemployment, individuals experience a sizable decline in credit scores, credit card limits, and the value of new loans. We show that, facing limited options for self-insurance, workers, on average, resort more to not paying their credit card balances in full to finance consumption. Heterogeneity analyses further reveal that the adverse impacts on both consumer spending and deferral of credit card payments are amplified based on how constrained workers are prior to displacement. Overall, this dissertation provides evidence that an income shock, in the form of job loss, is also a substantial credit shock for Brazilian workers, as borrowing constraints increase precisely for a group that values credit access the most.

While the literature has primarily concentrated on the consequences for those directly affected by displacements, we take a step further in the second part of our analysis and study the effects of mass layoffs for workers that managed

to retain their jobs amidst these events. We find that the effects of mass job destruction also spill over to this group, which we refer to as *stayers*, in the form of heightened layoff risk. As a response to greater uncertainty, those who have room to adjust build up a buffer stock of savings to cushion income fluctuations. Examining stayers' precautionary motives provides meaningful insights into how economic downturns may be further amplified through downward consumption revisions even by those not directly displaced by labor market shocks.

This dissertation adds to a burgeoning literature that empirically assesses the sensitivity of consumption to income shocks. For instance, Stephens Jr (2004) and Browning and Crossley (2008) use survey data to document consumption dynamics around job loss, respectively, for the U.S. and Canada. Ganong and Noel (2019) find that the spending of U.S. workers is highly sensitive to income, both at the onset of unemployment and even at the predictable decrease in income arising from the exhaustion of unemployment benefits. For Brazil, Gerard and Naritomi (2021) find a similar pattern around UI exhaustion, although preceded by a consumption spike at layoff attributed to severance pay. Another strand of the literature explores the degree to which displaced workers self-insure by accessing credit markets. Prominently, Braxton et al. (2020) and Hundtofte et al. (2019) show that, on average, job loss does not affect borrowing behavior in the U.S. and Iceland, respectively. Closer to our work is that of Andersen et al. (2021), who leverage mass layoffs to analyze relevant credit response margins to job loss in Denmark.

Our work expands the literature in several ways. First, while these papers typically focus either on spending or credit responses, we examine the behavioral responses for both margins in a unified empirical framework. Second, to the best of our knowledge, our study is the first comprehensive investigation of the effects of involuntary job loss on consumption and credit outcomes, combining state-of-the-art econometric techniques with administrative, individual-level data on both formal job and credit outcomes for the whole country population. Third, though we build on a large body of work, there is scant evidence on spending and credit dynamics around displacement for developing economies. Our reported adverse effects on borrowing behavior stand in contrast to the zero net impact on borrowing upon job loss documented for advanced economies². Also importantly, the sizable sensitivity of credit scores and credit card limits we report are at odds with the unresponsiveness of these variables shown by Braxton et al. (2020) for the U.S. This speaks to the relevance of studying a developing country, where the costs of job loss may be further amplified due to comparatively less developed credit markets.

²See Andersen et al. (2021), Hundtofte et al. (2019), and Ganong and Noel (2019)

This dissertation also fits into a long-standing literature that uses mass layoffs as a source of exogenous variation to study the effects of job loss on a variety of outcomes. The identification strategy can be traced back to the seminal contribution of Jacobson et al. (1993), who documents the impacts of displacement on workers' earnings in the state of Pennsylvania. This empirical framework was leveraged in numerous subsequent papers examining the impacts of job loss under various settings.³ Prominently, Davis and Von Wachter (2011) find that scarring effects curtails earnings by 15 to 20 percent even two decades after displacement, with estimates being larger if separations occur amidst a recession. While we draw upon this literature for identification, our work departs from these contributions in one specific way. Our study explores how mass job destruction in firms may spill over to the spending and credit behaviors of the non-displaced as opposed to its direct impacts on laid-off workers. We further put forward a minor contribution in terms of methodology. Our results show job stayers are also treated in a sense, and thus are not a valid control group for identification of the causal effects of job loss based on mass layoffs. Relying on a control group of workers employed in the same firms as the displaced would likely underestimate the costs of job loss, as we document evidence of spillovers to co-workers.

The remainder of the dissertation is organized as follows. Section 2 details our data. Section 3 outlines the empirical framework. Section 4 presents our main findings on the costs of job loss, encompassing a discussion of our results and a heterogeneity analysis. Section 5 investigates the effects of exposure to mass layoffs for job stayers. Section 6 concludes.

³For a review of this fastly growing literature, see Flaaen et al. (2019).

2 Data

The data sources used in this dissertation are the Credit Information System of the Banco Central do Brasil (SCR) and the Annual Social Information System of the Ministry of Labor (RAIS). The Credit Information System was launched in 2003 and records information on all credit relationships between individuals and Brazilian financial institutions.¹ Credit suppliers (banks, credit unions, and non-banks) mandatorily report monthly detailed information on all credit relationships of those clients that have a total exposure with a financial institution above a certain reporting threshold. The reporting threshold has changed over time and, as of June 2016, was set at 200 BRL (about 40 USD). Of particular interest, the data contains detailed individual-level information on credit card spending, loans, debt, and credit score, allowing for a comprehensive understanding of an individual's credit profile.

The second data source is *Relação Anual de Informações Sociais* (RAIS), a matched employer-employee administrative dataset covering the universe of formal workers and firms in Brazil, collected by the Ministry of Labor. RAIS provides detailed information on individuals' formal labor employment and contract characteristics, including hours, average monthly wages, start/end date and location of each job, type of contract, occupation, sectoral code, and worker's education and earnings. Importantly, both RAIS and SCR provide a time-invariant individual identifier (*Cadastro de Pessoa Física – CPF*). This allows us to match the job characteristics of each worker with data on credit relationships. Since RAIS only encompasses the formal labor market, our analysis comes with the caveat that we are not able to discern whether individuals are unemployed or engaged in self-employment, informal work activities, or out of the labor force.

Our administrative data present several distinctive attributes that contribute to the reliability of our research design. First, SCR is not only nationally representative but also provides us with an array of consumption and credit outcomes, allowing us to analyze the relative importance of different

¹The Credit Information System is a confidential dataset of the Banco Central do Brasil (BCB). The collection and manipulation of identified loan-level data were conducted exclusively by the staff of the BCB. We accessed the de-identified versions of the data in a secure network-isolated data room created for academic research purposes only.

types of responses to job loss in great detail. Second, RAIS provides us with a high-frequency and comprehensive overview of the formal sector which enables us to track workers across time as well as obtain crucial demographic information. Notably, RAIS specifies the reason for separation and thus allows us to distinguish whether workers were displaced with or without cause, which is not often the case in prior literature.²

²For a careful discussion of how this issue hinders the identification of mass layoffs, see Flaaen et al. (2019). They address it for the first time in the context of the U.S. by matching survey data on worker-supplied reasons for separations with administrative data.

3

Identification strategy

3.1

Sample selection

In our main analysis, we are interested in the dynamic treatment effects of job displacement on labor market outcomes as well as on spending and credit behaviors. Our primary identifying assumption is that of parallel trajectories in the outcomes of interest across treatment and control groups in the absence of treatment. The main threat to this assumption is the possibility of dynamic selection of workers into displacement. To circumvent this issue, we leverage mass layoffs, which most likely depend on negative external shocks at the firm level, rather than the characteristics and behavior of dismissed workers (see, e.g., Gathmann et al. (2020)). Following Davis and Von Wachter (2011), our baseline definition of mass layoffs is the not-for-cause displacement of more than 30 percent of a firm's establishment within a quarter.

To implement a difference-in-differences strategy, we define as the treatment group workers displaced in these events in 2017. The range of our data sets allows us to estimate dynamic treatment effects for up to eight quarters following dismissal, as well as placebo effects up to three quarters before dismissal. The pool of candidate control workers includes all individuals employed in establishments that did not experience mass layoffs during our analysis period.¹ We further restrict our sample of treated and control individuals to include only full-time private sector workers. Observations in RAIS are at the job-year level. The same individual may have multiple entries in RAIS in the same year, for reasons such as: holding more than one job simultaneously, changing jobs during the year, changing occupations within the same firm, etc. For our purposes, we select the highest-paying contract in each quarter.

We leverage the dimension of our data to adopt an exact matching approach to complement the staggered difference-in-differences strategy. Each treated individual is matched with a control who (i) is not displaced in the same

¹We consider relatively stable establishments as those that dismissed less than 10 percent of their workforce in a given quarter. In Figure A.1 (Appendix A), we show that our main results are robust to minor variations in this share.

quarter, (ii) has the same gender, race (white vs. non-white), age, job tenure (by 3 months bins), and education level (11), (iii) belongs to the same earnings category (by R\$250 month bins), firm size (quartiles), one-digit industrial sector (10), state (27), and (iv) and has the same treatment history (i.e. same employment status in the pre-treatment periods) following Imai et al. (2021). One control unit is randomly selected when treated individuals are matched with multiple controls. This avoids weighting issues that may arise when splitting the sample to estimate heterogeneous effects.

We are able to successfully match 96,268 individuals to a control unit. Table 1 presents summary statistics for treated and control units in our main working sample. Although the difference-in-differences design does not strictly require the treatment and control groups to be the same in levels, the two groups are balanced across a fine set of demographic and job characteristics. This holds true even for variables that are not part of the matching procedure, such as share of managers² and routine content of the occupations.³ In addition, the standardized differences between the two groups remain below the threshold of 0.20 suggested by Imbens and Rubin (2015) for all variables. We hope that by matching workers on various observables, and by reporting estimates on pre-trends for all of our outcomes, we confer sufficient credibility to the validity of our research design.⁴ In order to attenuate potential anticipation effects, we exclude from our sample workers in firms that experienced mass layoffs in any of the pre-treatment periods.

²Our classification encompasses codes 1144 through 1427 of the 2002 Brazilian Occupations Code (CBO).

³We use the task classification proposed by Spitz-Oener (2006) and adapted to Brazilian occupations by Gonzaga and Guanziroli (2019). They map each Brazilian occupation in the Brazilian Occupations Code (CBO) into non-routine tasks (analytical, interactive, and manual) and routine tasks (cognitive and manual).

⁴In Appendix A, Figure A.2 shows an exogeneity test of mass layoffs, which reveals patterns consistent with our identifying assumption.

Table 3.1: Summary Statistics, Treated vs. Non-Treated Observations

	(1)	(2)	(3)
	Control	Treatment	Std. Diff.
Demographic Characteristics			
Schooling	6.44	6.44	0.00
High School Education	72.3%	72.3%	0.00
College Education	1.2%	1.2%	0.00
Age	28.5	28.5	0.00
Race - white	68.2%	68.2%	0.00
Men	60.6%	60.6%	0.00
Women	39.4%	39.4%	0.00
Job Characteristics			
Real Average Monthly Wage	1018.5	1015.2	0.01
Tenure (<i>months</i>)	15.6	14.5	0.14
Manager	2.9%	2.7%	0.01
Establishment size (<i>employees</i>)	294.9	268.2	0.05
Contracted Hours	43.8	43.7	0.05
Routine Content (<i>occupation</i>)	37.2%	37.4%	0.00
Share of Laid off Workers	5.64%	47.13%	
Observations	192,536	192,536	

Notes: This table reports the average characteristics of treated (i.e. displaced in mass layoffs) and control workers, together with the standardized difference between the two groups, for the working sample used in the main analysis.

3.2 Empirical framework

Our empirical strategy aims to identify the effects of displacement on individuals' consumption and credit behaviors as well as labor market trajectories. To address the pre-existing differences in levels and control for common shocks, we use a staggered difference-in-differences (DD) framework that leverages the timing of mass layoffs for identification. In particular, we rely on Callaway and Sant'Anna (2021)'s methodology to estimate dynamic treatment effects.⁵

Let G_{gi} be a dummy variable equalling one if individual i was dismissed in a mass layoff at period g . Additionally, let c be the set that identifies the periods at which different cohorts in our sample were treated.

⁵Recent methodological contributions highlight that a straightforward two-way fixed-effect (TWFE) regression is not suited to provide causal interpretation in the context of an application with multiple time periods, staggered treatment and heterogeneous treatment effects. TWFE recovers a weighted average of some underlying treatment effect parameters, but some of the weights on these parameters can be negative. See Roth et al. (2023), De Chaisemartin and d'Haultfoeuille (2022), and Baker et al. (2022) for recent surveys of this literature.

First, we stack observations in the treatment group into cohorts according to the baseline period of the mass layoff events. Then, we estimate the cohort-time average treatment effects (ATTs) as:

$$\delta(t, g) = \mathbb{E} \left[\left(\tilde{Y}_{it}^1 - \tilde{Y}_{it}^0 \right) - \left(\tilde{Y}_{i0}^1 - \tilde{Y}_{i0}^0 \right) \mid G_{gi} = g \right]$$

where Y_{it} is the outcome of interest associated to individual i at time t . If, in the absence of treatment, the average outcomes for treated and comparison groups would have followed parallel paths over time, one can estimate the average treatment effect for the treated subpopulation (ATT) by comparing the average change in outcomes experienced by the treated group to the average change in outcomes experienced by the comparison group.

Next, we aggregate cohort-time treatment effects by time:

$$\beta_t = \sum_g \frac{\delta(c, t) * N_c}{N}$$

where N_g is the number of individuals treated at period g (i.e. number of units in each cohort), and N is the total number of cohorts. This estimator is nothing but the average of cohort-time treatment effects evaluated at t .

We compute standard errors using Callaway and Sant'Anna's multiplier bootstrap procedure. In all cases, we cluster standard errors at the establishment level - that is, the level at which the treatment is assigned - to allow for heteroskedasticity and serial correlation within a establishment.

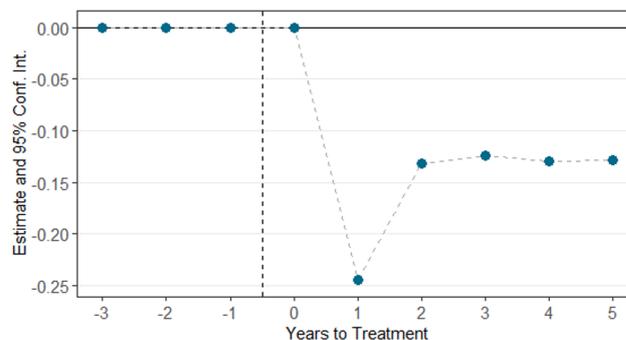
4 Effects of job loss

4.1 Effects of job loss on labor market outcomes

Our aim is to provide a comprehensive picture of the extent to which job displacement adversely affects individuals. In this section, we turn first to discuss the detrimental effects of job loss on the labor market careers of Brazilian workers. We observe significant and persistent effects on displaced individuals' subsequent employment and labor income.

Figure 4.1 plots the estimated effects of job loss due to a mass layoff on employment. In the first year after the layoff, the probability of formal employment for displaced workers sharply declines by 24 percent relative to the matched control group. This gap narrows in the following years, but the declines are persistent, and five years after dismissal, treated workers still experience 13 percent lower employment rates.

Figure 4.1: Effect of job loss on formal employment

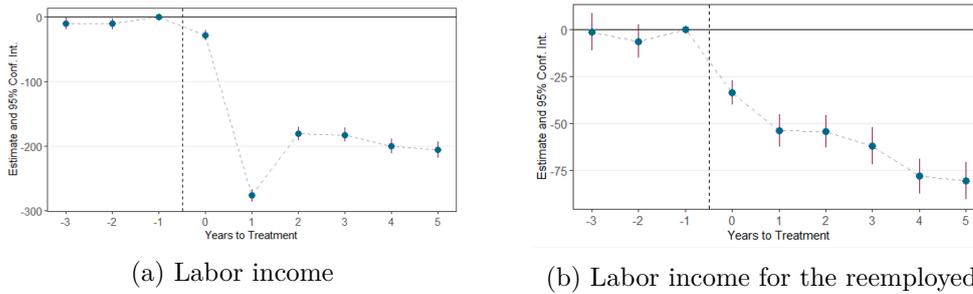


Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on formal employment, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

Figure 4.2 depicts the estimated effects on subsequent employment and labor income. Panel (a) shows that after job loss, income declines by 275 BRL, which corresponds to a 27 p.p reduction relative to the baseline mean of treated workers. Wage estimates closely mirror the pattern observed for employment and do not recover to pre-job loss levels in the entire analysis period. In panel (b), we condition on re-employment, and find relative earning declines even

for workers who are able to eventually reallocate in the formal labor market. Relative reductions average at 77 BRL (8 percent to baseline) in the fifth year after displacement. The pattern of continuously declining estimates is consistent with lower reentry wages after prolonged jobless spells due to human capital depletion and loss of seniority (see, e.g., Krueger et al. (2014) and Burdett et al. (2020)).

Figure 4.2: Effect of job loss on labor income

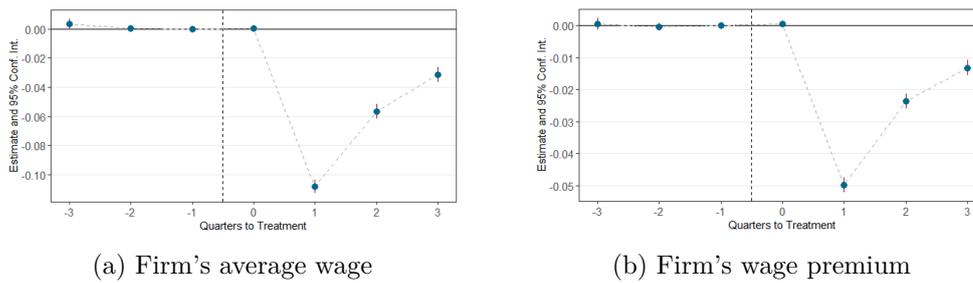


Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on formal labor income, along with 95% confidence intervals. In Panel (a), we consider wages as zero if workers are not employed in the formal labor market. In Panel (b), zeros are handled as missing values. Standard errors are clustered at the establishment level.

We now turn to investigate the potential role of worker reallocation in explaining these findings. In particular, we examine whether displaced workers transition from better- to worse-paying firms. We address that by using RAIS to construct a quarterly panel that exhibits the firm of employment of each individual. If a worker is employed in more than one firm in a given quarter, the oldest- highest-paying contract is the one taken into account. Additionally, we define measures of average wages and wage premiums paid by the firms in a baseline period prior to treatment. This way, any shifts reflect compositional changes only rather than alterations in firms' payment schemes over time.

We find that displaced workers switch to establishments that pay, on average lower wages and wage premiums. The left panel of Figure 4.3 plots the estimated effects on establishments' average wage, which serves as our most immediate measure of firms' paying capacity. In the first quarter following layoff, we estimate relative reductions of approximately 112 BRL (a 11 p.p reduction in relation to the mean of displaced workers prior to treatment). In the right panel, we show as an outcome the establishments' wage premium, calculated as the average wage residual in the establishment obtained from an individual-level wage regression that controls for workers' demographic and job characteristics (age, sex, education, and hours). Estimates point to a 5 p.p relative decline. In Appendix A, Figure A.3 shows additional evidence that is consistent with a pattern of downward sorting into lower quality firms.

Figure 4.3: Reallocation effects of job loss



Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on reallocation patterns, along with 95% confidence intervals. All coefficients are rescaled by the average value of the outcome in the treated group at $t = -1$. Standard errors are clustered at the establishment level.

4.2

Effects of job loss on spending and credit outcomes

We next examine how job loss influences displaced workers' spending and credit behaviors. In this section, we aim to provide a far-reaching inspection of whether individuals are able to mitigate income shortfalls by self-insuring through credit markets. Additionally, we seek to entertain the specific mechanisms potentially driving workers' responses to job loss shocks.

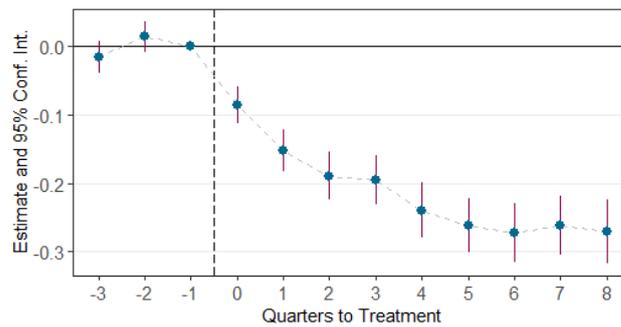
4.2.1

Spending

We first examine workers' spending response following job loss, as measured by new expenditures made through credit card transactions.¹ While workers may utilize alternative payment methods, we argue that credit card spending serves as a robust proxy for capturing workers' consumption profiles. Within our sample, monthly expenditures, on average, account for approximately 68 percent of workers' mean monthly wages. As depicted by Figure 4.4, layoff leads to a sharp decrease in workers' spending in relation to that of a matched comparison group. At first, part of the income shock may be cushioned by a transitory inflow of liquidity provided through job displacement insurance policies. However, the decline in consumer spending persists through the following periods, and, eight quarters after dismissal, laid off workers still experience a 26 percent relative drop.

¹To evaluate a measure of current expenses, we do not include installment purchases in our analysis of credit card spending.

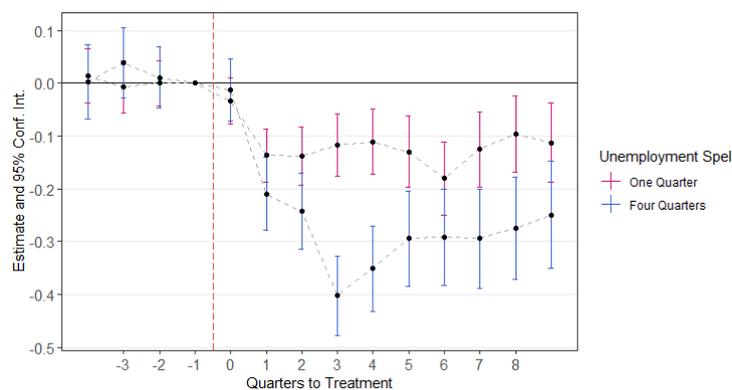
Figure 4.4: Effect of job loss on credit card spending



Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on credit card spending (in logs), along with 95% confidence intervals. Standard errors are clustered at the establishment level.

Figure 4.5 compares point estimates for workers that secure (formal) employment in the quarter following dismissal to those who remain out of the labor market for a duration of four quarters. As expected, the effects on consumption become increasingly detrimental with the length of the unemployment spell. However, even individuals who manage to secure new employment quickly still undergo lasting revisions in their consumption patterns. This pattern reinforces that job loss is not a mere transitory shock to consumer spending, lining up with the persistent employment and labor income losses we document. In fact, as demonstrated in the previous section, even workers who successfully find re-employment in the formal labor market tend to, on average, transition to firms that offer lower wage premiums.

Figure 4.5: Effect of job loss on credit card spending



Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on credit card spending (in logs), along with 95% confidence intervals. Estimates are shown separately for workers that secure new employment one and four quarters after the occurrence of mass layoffs. Standard errors are clustered at the establishment level.

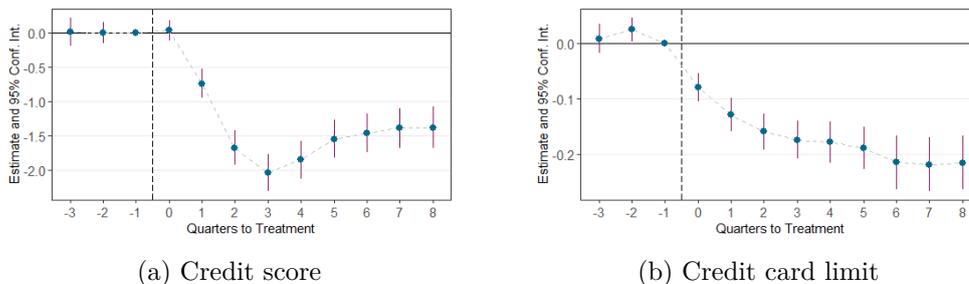
While workers stay out of work only temporarily, their wages suffer

persistently. Affected individuals may experience a downward shift in their beliefs about permanent income, inducing substantial revisions in consumption. This explanation is consistent not only with the short-term drops in consumption upon unemployment, but also with the lower levels of consumption observed quarters after re-employment.

4.2.2 Credit outcomes

We now turn to investigate how workers' access to credit evolves following displacement. Our findings are consistent with tightening borrowing constraints upon unemployment, limiting workers' ability to self-insure against labor income losses. First, the left panel of Figure 4.6 illustrates that credit scores are largely responsive to job loss. Our credit score measure consists of nine ascending categories, ranging from the worst to the best. On average, displaced workers experience a decline in their scores, moving down two categories. This suggests a meaningful increase in the marginal cost of acquiring new credit. As shown by the right panel of Figure 4.6, displacement also entails a negative impact on treated workers' credit card limits, in comparison to the control group. Limits decline by approximately 20 percent and remain lower for the duration of the entire analysis period. Point estimates for these average effects over eight quarters after dismissal are shown in Table A.1 of Appendix A.

Figure 4.6: Effect of job loss on credit outcomes

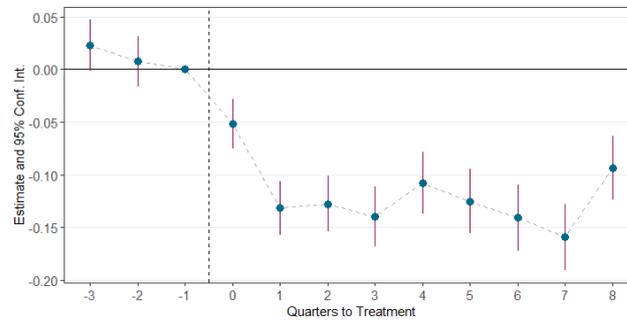


Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on credit scores and log credit card limits, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

In turn, Figure 4.7 points to a sizable impact of job loss on the borrowing capacity of workers, as measured by the value of new personal loans. In the first quarter following layoff, we estimate a relative decline of approximately 13 percent. By the eighth quarter after displacement, we observe a mild recovery, but borrowing still remains 9 percent lower for treated workers compared to controls. Figure A.4 and Table A.1 (Appendix A) report, respectively, dynamic treatment effects and point estimates for other credit modalities, which exhibit a

remarkably similar pattern. Overall, our findings indicate that consumer credit becomes more costly to acquire precisely for a group that would presumably value it the most.

Figure 4.7: Effect of job loss on borrowing (personal credit)



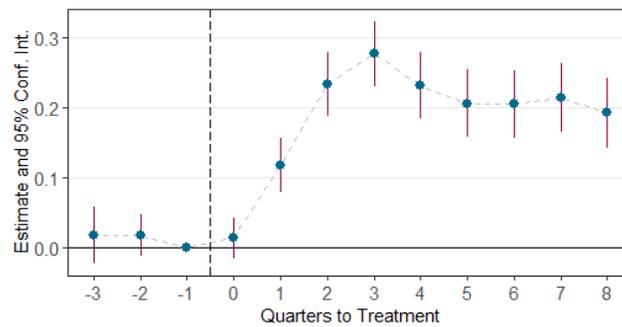
Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on the log value of new loans, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

Our estimates stand in contrast to the zero net effect on borrowing upon job loss documented by Andersen et al. (2021), Hundtofte et al. (2019), and Ganong and Noel (2019), respectively, for Denmark, Iceland, and the U.S. In particular, Braxton et al. (2020) not only find zero average impact on loans but also report that credit scores and credit limits in the United States are primarily unaffected by displacement events. This suggests that job loss shocks may impose greater costs in less advanced economies, with comparatively less developed credit markets.

We find that consumers who face adverse shocks may not be able to tap new sources of credit or may face reduced credit limits on currently available sources. So we next consider whether workers may opt not to pay their credit card balances in full to build a cash buffer against income losses. Figure 4.8 plots the estimated effects of job loss on the deferral of credit card payments, measured by the stock of balances past due for more than 90 days. Unpaid credit card balances climb steadily after layoff, reaching a 27 percent relative increase. Figure A.5 in Appendix A also reports dynamic treatment estimates for credit past due below 90 days. These patterns line up with the idea that when borrowing limits tighten, unsecured, high-interest forms of credit may provide some extra insurance value.

Of course, our results are intrinsically interconnected. Defaulting on payments gives rise to reputation concerns, potentially contributing to the fore documented patterns of deteriorating credit scores. This, in turn, may render future loans even costlier, prolonging the costs associated with job loss.

Figure 4.8: Effect of job loss on credit card default



Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on credit card default (in logs), along with 95% confidence intervals. Standard errors are clustered at the establishment level.

We observe large fluctuations in consumption upon unemployment, which suggests a sizable value for insurance following income shocks. In Brazil, losing a formal job may imply a more persistent shock to workers' employment status as formal jobs are more scarce. Gerard and Gonzaga (2021) show that displaced formal workers return much slower to a formal job than in high-income countries, with 94% of UI takers remaining without a formal job 4 months after layoff. Hazard rates are low even for workers who become ineligible for UI benefits and about 50% of workers are still without a formal job 12 months after layoff. Figure A.6 (panel a) in the Appendix provides similar evidence using data from Donovan et al. (2023), showing a relatively higher share of workers transitioning from unemployment spells to formal wage employment in high-income countries compared to Brazil.

Although Brazil has a large informal labor market, it may constitute an imperfect means of self-insurance for displaced workers². Engbom et al. (2022) and Gomes et al. (2020) show that workers who switch from formal to informal jobs undergo significant earnings penalty and higher earnings volatility. Also, many displaced workers do not transition to the informal labor market after losing their formal jobs. Gerard and Gonzaga (2021) show that a large share of displaced formal workers engage in informal work activities while remaining without a job, yet many stay unemployed. This is also consistent with the pattern illustrated in Figure A.6 (panel b), Appendix A. While a considerable share of workers leaving formal employment switch to self-employment and informal wage employment in Brazil, a similar share remains unemployed when

²According to PNAD Contínua, a household survey run by the Brazilian Statistical Census Bureau (IBGE), the labor force comprised approximately 104 million individuals, with 40 percent of all jobs being categorized as informal (i.e., without a formal work permit) in 2017. Data from RAIS shows that 55 million individuals were employed in formal positions, and among them, 52 million were engaged in full-time formal employment.

compared to developed countries. In a country where job loss represents a significant shock and private market insurance options are very limited for individuals out of the formal labor market, the need for informal risk sharing arrangements such as kinship transfers, peer-to-peer lending, and defaulting on payments may become more pronounced.

4.2.3

Heterogeneity analysis

Suggestive evidence of credit constraints playing a role in the consumption drop is also supported by heterogeneous impacts based on workers' financial situations prior to displacement. The level of detail of both RAIS and SCR allows us to scrutinize workers with a wide range of baseline balance sheet positions. We thus split our sample based on the following categories: debt-to-income ratio and credit card spending-to-limit ratio. We deem workers on the top quartiles of the debt-income and spending-limit ratios distributions as being more constrained in the period that precedes job loss.

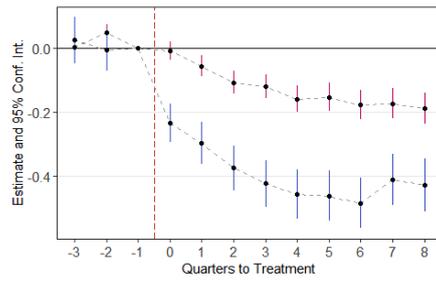
Figure 4.9 shows that the decline in consumption following displacement is salient across all of our groups. However, the more constrained — who presumably would have more limited access to credit markets — revise consumption more intensely. Also importantly, Figure 4.10 illustrates that this group of workers defer credit card payments to a greater degree. This further aligns with the idea that skipping payments provides a route for managing liquidity in the face of job loss shocks.

As a robustness check to assess the statistical significance of the differential trends depicted in the previous figures, we rely on a Triple Differences (DDD) model:

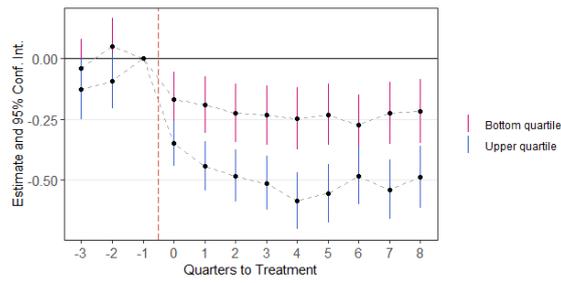
$$y_{it} = \beta_0 + \beta_1 \times \text{Treat}_i + \beta_2 \times \text{Heterogeneity}_i + \beta_3 \times \text{Post}_t + \beta_4 \times \text{Post} \times \text{Treat} + \beta_5 \times \text{Post} \times \text{Heterogeneity} + \beta_6 \times \text{Treat} \times \text{Heterogeneity} + \beta_7 \times \text{Post} \times \text{Heterogeneity} \times \text{Treat} + \varepsilon_{it}$$

in which β_7 is the interaction term of interest and is reported in Table A.2, Appendix A. All estimates are significant at least at the 0.05 level, conferring credibility to our conclusions.

Figure 4.9: Effects of job loss on credit card spending



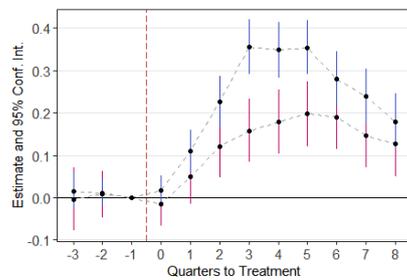
(a) Heterogeneity in terms of debt-to-income ratio



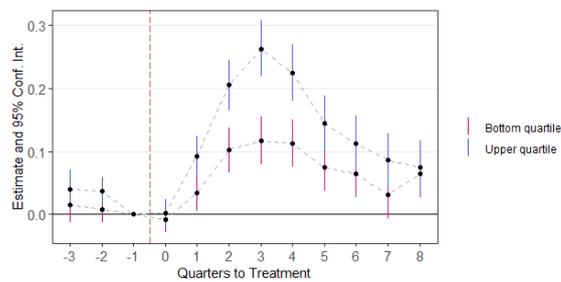
(b) Heterogeneity in terms of credit card spending-to-limit ratio

Notes: This figure shows the effect of job loss due to a mass layoff on credit card spending (in logs), along with 95% confidence intervals. Standard errors are clustered at the establishment level.

Figure 4.10: Effects of job loss on credit card default



(a) Heterogeneity in terms of debt-to-income ratio



(b) Heterogeneity in terms of credit card spending-to-limit ratio

Notes: This figure shows the effect of job loss due to a mass layoff on credit card default (in logs), along with 95% confidence intervals. Standard errors are clustered at the establishment level.

4.2.4

Discussion

Although the evidence points to tightening credit constraints and changes in workers' expected lifetime income as potential drivers of the observed patterns in spending following unemployment, we cannot rule out one other possible explanation.

Unemployed households could substitute away from market goods towards home production as in Aguiar and Hurst (2005). While our credit card spending data is not categorized, we observe categorized individual data for *boletos*. *Boletos* are bank slips regulated by the Banco Central do Brasil, payable through internet banking and also in cash at bank branches, lottery houses, and supermarkets. Importantly, as it consists of a payment method accessible to the unbanked population, *boletos* are widely used to pay monthly bills for essential services and rent. Figure A.7 (Appendix A) shows that job loss does not impact spending related to gas, electricity, or water bills. This lends support to the idea that shifts to home production probably do not play a significant role in driving the large declines in spending.

5 Effects of mass layoffs for job stayers

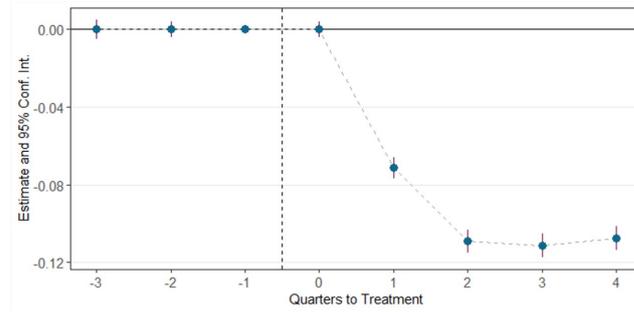
The inability to insure against the burden of job loss could provide households with strong incentives to prepare for formal unemployment spells by building a buffer of precautionary savings. We scrutinize this conjecture by investigating the consumption patterns of workers who would arguably perceive heightened uncertainty about income. This group, which we henceforth refer to as stayers, were employed in firms that experienced mass job destruction but managed to retain their work positions.

To assess the possibility that the effects of mass layoffs spill over to job stayers, we rely on the same empirical framework presented in Section 3, except for one key modification. The treatment group now consists of workers who maintained their employment within firms during the quarters mass layoffs occurred. Importantly, in this dissertation we deviate from the literature by identifying mass layoffs at the establishment level rather than the firm level. This decision is justified on the grounds that individuals may perceive changes in layoff risk more intensely if their direct co-workers are displaced.

We are interested in examining whether job stayers engage in precautionary saving so as to safeguard against heightened layoff risk. Since we are not able to measure individuals' risk perception, we turn to investigate the effect of exposure to mass layoffs on the employment prospects of stayers. Our evidence indicate that risk indeed materializes as stayers experience heightened probability of job loss after the occurrence of mass layoffs in their firms. As depicted by Figure 5.1, the probability of formal employment for job stayers substantially declines by 11 percent relative to a matched comparison group of workers who remained employed in firms that did not undergo mass layoffs¹.

¹While the evidence points to an increase in layoff risk, we cannot rule out that some of these workers may also leave their firms to engage in the informal labor market or even to pursue entrepreneurial activities.

Figure 5.1: Effect of exposure to mass layoffs on formal employment

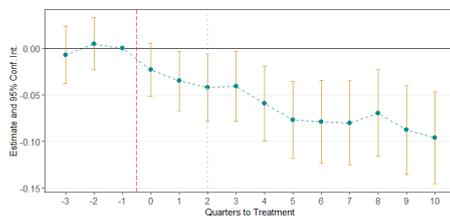


Notes: This figure shows the dynamic treatment effects of exposure to mass layoffs on formal employment, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

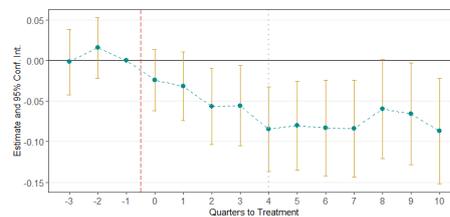
To investigate spending dynamics around mass layoffs, we aim to isolate the *income effect* that might result from future displacement from the *behavioral effect* that could arise from changes in workers' perceived job stability. Hence we restrict our stayers sample to include only workers who remain continuously employed for a considerable period following mass layoffs. To address potential selection concerns, we impose the same restrictions to the matched control group.

In Figure 5.2, Panels (a) and (b) plot the dynamic treatment effects on spending behavior for workers who remain employed for at least two and four quarters, respectively, after being exposed to mass layoffs in their firms. Although there is a declining pattern in spending, the effects are not statistically significant in the quarters that immediately succeed the event.

Figure 5.2: Effect of exposure to mass layoffs on credit card spending



(a) Sample with a 2-quarter restriction on employment



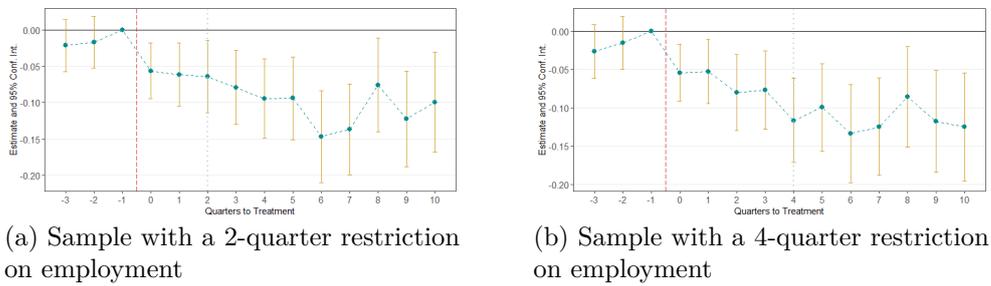
(b) Sample with a 4-quarter restriction on employment

Notes: This figure shows the dynamic treatment effects of exposure to mass layoffs on credit card spending (in logs), along with 95% confidence intervals. In panels (a) and (b), we restrict to job stayers who remain employed for at least two and four quarters, respectively, after being exposed to mass layoffs in their firms. Standard errors are clustered at the establishment level.

However, one may hypothesize that even if households perceive an elevated

risk of job loss, some may heavily rely on their current labor income to meet immediate consumption needs. We test this prediction by splitting our sample into workers with a spending-to-income ratio in the baseline below and above the median. Figure 5.3 shows the estimated effects on spending for the group in the lower median, considering the same aforementioned two restrictions on the duration of employment following mass layoffs. We find that this group cuts down consumption by 5 to 6 percent relative to the matched control group. Our findings are also robust to considering a sample of workers with at least one year of tenure, who probably have a stronger attachment to their firms (see Appendix A, Figure A.8).

Figure 5.3: Effect of exposure to mass layoffs on credit card spending



Notes: This figure shows the dynamic treatment effects of exposure to mass layoffs on credit card spending (in logs) for a sample of workers with a spending-to-income ratio above the median in the baseline. In panels (a) and (b), we restrict to job stayers who remain employed for at least two and four quarters, respectively, after being exposed to mass layoffs in their firms. Standard errors are clustered at the establishment level.

Overall, our results are consistent with the idea that if workers have room to adjust, they may exhibit precautionary motives to build up a buffer stock of savings to cushion expected income shocks. In Appendix A (Figure A.9), we further report estimates on borrowing responses. We find relative declines in personal credit in the aftermath of mass layoffs, as measured by new loans, suggesting that credit constraints may affect consumption and borrowing behavior even when they are not currently binding. If uncertainty about future earnings raises the prospect of binding constraints in the future, precautionary motives may surface.

6

Conclusion

Leveraging mass layoffs and taking advantage of detailed employment and credit data covering the universe of workers in Brazil, we are able to comprehensively estimate the impacts of unemployment on the labor and credit market outcomes of workers. Our analysis reveals that job loss worsens employment prospects and imposes significant and persistent income losses. Effects extend well beyond labor markets, with workers' financial positions remaining scarred even two years after displacement. We also study the consumption decline faced by workers upon unemployment and conjecture changes in beliefs about permanent income and tightening credit constraints as the key mechanisms behind it.

While the existing literature has mainly focused on examining the repercussions for those directly affected by displacements, our study breaks new ground by studying the effects for workers who managed to retain their work positions amidst mass layoffs in their firms. Our findings suggest that job stayers face increased layoff risk, and those who do not exhibit hand-to-mouth behavior, cut down spending in the aftermath of mass job destruction in their firms.

Taken together, our results indicate that mass layoffs are events with ample effects. Not only do the directly affected face financial distress and deteriorated career prospects, but the effects also spill over to their co-workers. Studying these events is thus crucial to assess how economic downturns may be further amplified through behavioral changes exhibited even by those who are not directly displaced by labor market shocks.

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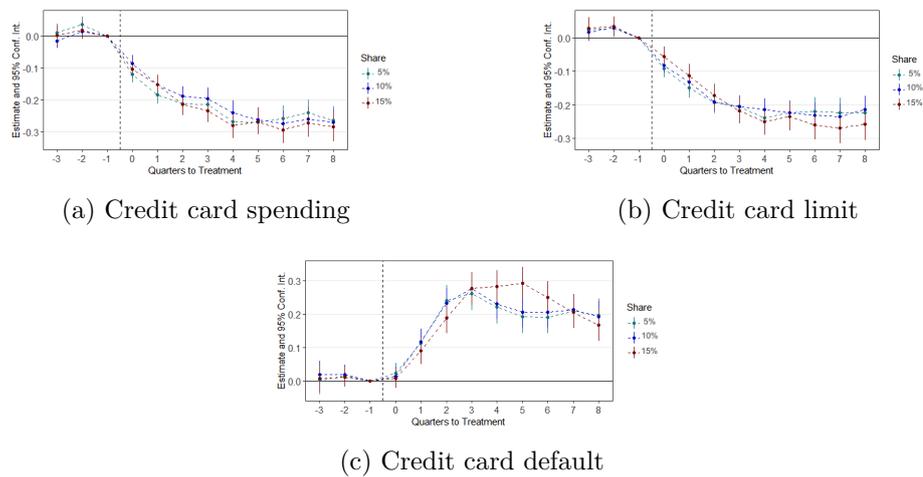
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A Appendix

A.1 Appendix to Section 3

A.1.1 Robustness check

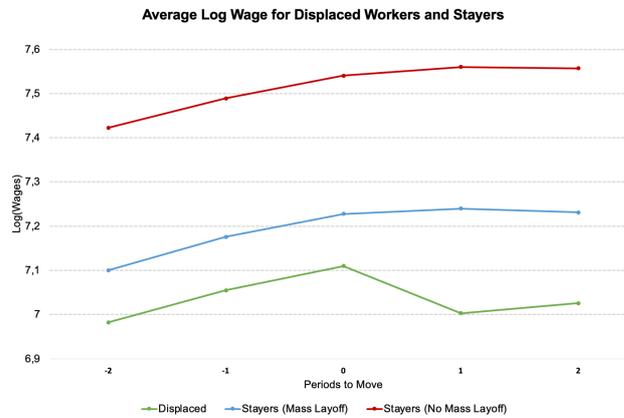
Figure A.1: Robustness check



Notes: This figure shows the dynamic treatment effects of job loss due to a mass layoff on some of our main outcomes. Results are robust to using different shares to define the non-occurrence of mass layoffs. Standard errors are clustered at the establishment level.

A.1.2 Robustness check: exogeneity of mass layoffs

Figure A.2: Exogeneity test of mass layoffs

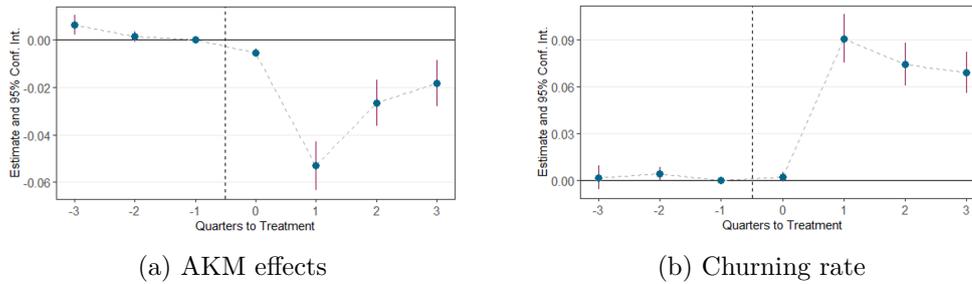


Note: This figure shows the average of log wages for treated and control groups in an event-study setting. Despite the differences in levels (different fixed effects), there are no clear differential pre-trends in the evolution of wages. For all three groups, the trends are roughly similar and the mass layoffs events are the ones responsible for influencing the changes after $t = 0$, which is consistent with our identifying assumption.

A.2 Appendix to Section 4

A.2.1 Reallocation of displaced workers to firms

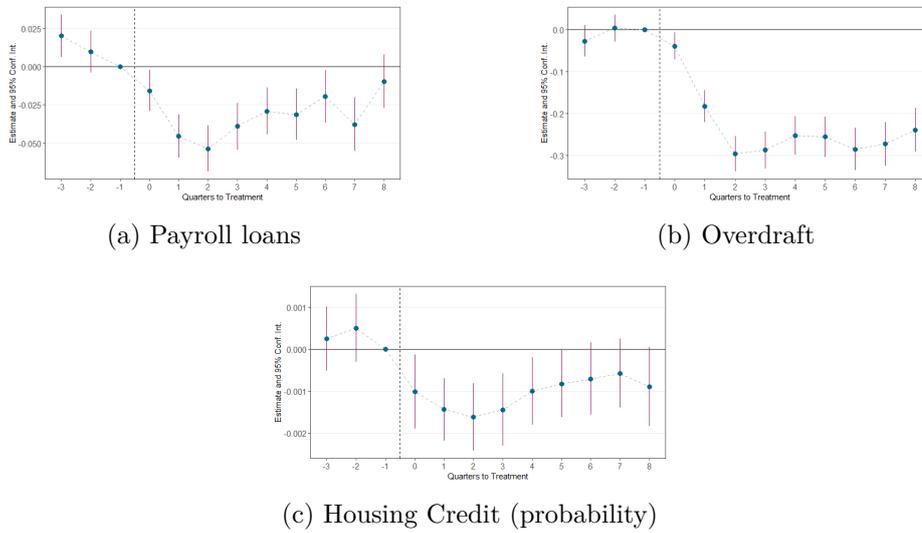
Figure A.3: Reallocation of displaced workers to firms



Notes: This figure shows the effect of job loss on reallocation, along with 95% confidence intervals. The figure shows the effect of job loss on the reallocation of workers to establishments of lower quality. In Panel (a), establishment quality is measured as the establishment's fixed effect, estimated in an AKM-style (log) wage regression that controls for worker and establishment fixed effects over a three-year pre-baseline window. In Panel (b), the dependent variable is the change in the establishment's churning rate, calculated as the sum of workers who leave and join the establishment, divided by the number of employees at baseline. Standard errors are clustered at the establishment level. We also investigated the effects on establishments' poaching index, computed as the proportion of new hires originating from employment rather than unemployment. However, we found strong violation of the parallel trends assumption.

A.2.2 Effects of job loss on borrowing

Figure A.4: Effect of job loss on borrowing



Notes: This figure shows the effect on borrowing, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

A.2.3 Effects of job loss on spending and credit outcomes

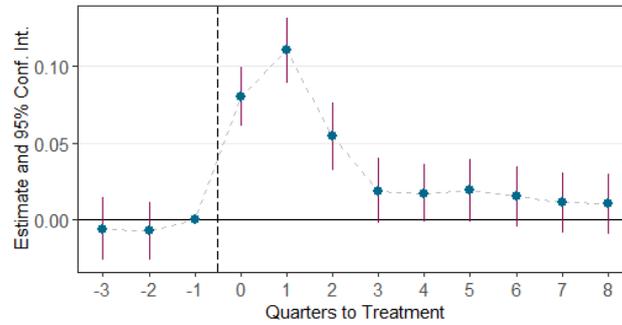
Table A.1: Effects of job loss (point estimates)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent var.	Credit card spending	Credit score	Credit card limit	Personal loans	Housing loans	Payroll loans	Delayed Stock
Point estimates	-0.237*** (0.011)	-0.094*** (0.006)	-0.1780*** (0.014)	-0.131*** (0.003)	-0.001*** (0.001)	-.0040*** (0.001)	0.2007*** (0.006)
Observations	192,536	192,536	192,536	192,536	192,536	192,536	192,536

Note: ***, **, * represent $p < 0.01$, $p < 0.05$ and $p < 0.1$ respectively.

A.2.4**Effect of job loss on credit card default (balances past due for less than 90 days)**

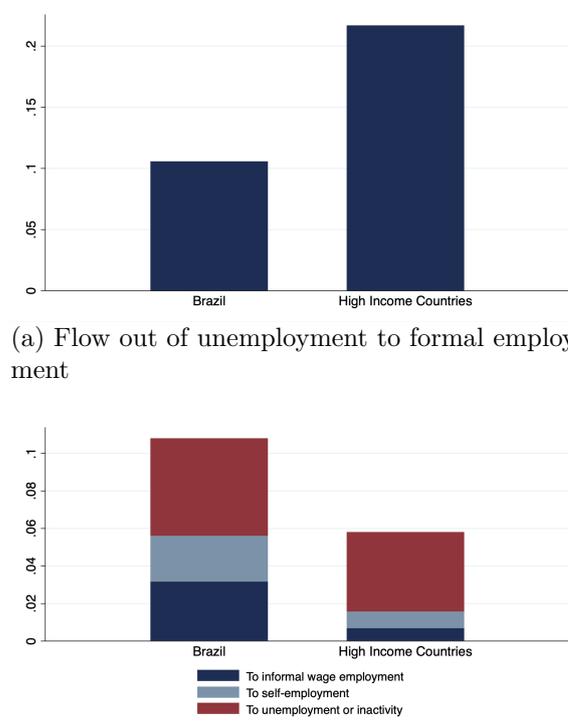
Figure A.5: Effect of job loss on credit card default (credit due below 90 days)



Note: This figure shows the dynamic treatment effects of job loss due to a mass layoff on credit card default (in logs), along with 95% confidence intervals. Standard errors are clustered at the establishment level.

A.2.5 Flows out of unemployment and formal employment

Figure A.6: Flows out of unemployment and formal employment



(a) Flow out of unemployment to formal employment

(b) Destination of flows out of formal employment

Notes: Data from Donovan et al. (2023). Panel (a) shows quarterly flows out of unemployment to formal wage employment for Brazil and high income countries (according to the World Bank classification). Panel (b) displays the destination of flows out of formal employment for Brazil and high income countries.

A.2.6 Heterogeneity analysis

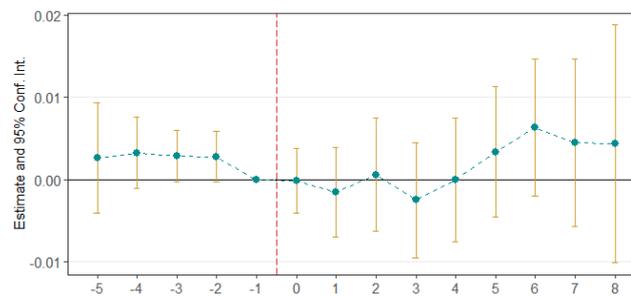
Table A.2: Triple differences estimates

	(1)	(2)
Dependent variable:		
	Credit card spending	Credit card default
Panel A: Debt-to-income ratio		
Post×Heterogeneity×Treat	-0.136*** (0.029)	0.072*** (0.013)
Panel B: Spending-to-limit ratio		
Post×Heterogeneity×Treat	-0.178*** (0.053)	0.059** (0.020)

Note: ***, **, * represent $p < 0.01$, $p < 0.05$ and $p < 0.1$ respectively.

A.2.7 Spending on bills

Figure A.7: Effect of job loss on spending with gas, water and electricity bills

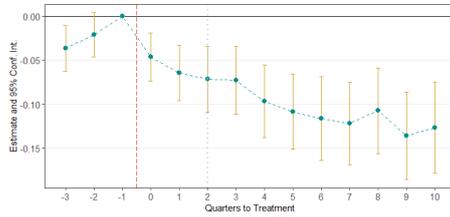


Note: This figure shows the dynamic treatment effects of job loss due to a mass layoff on spending with gas, water and electricity bills, along with 95% confidence intervals. Standard errors are clustered at the establishment level.

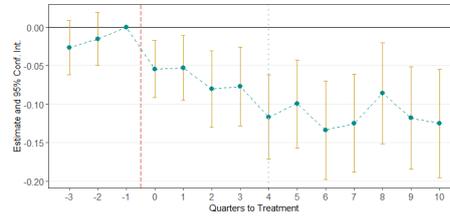
A.3 Appendix to Section 5

A.3.1 Stayers' spending responses (high-tenured workers)

Figure A.8: Stayers' spending responses (high-tenured workers)



(a) Sample with a 2-quarter restriction on employment

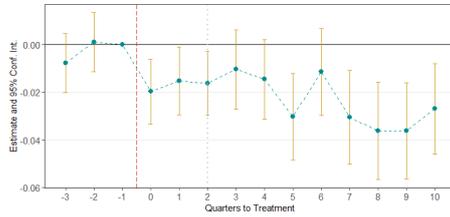


(b) Sample with a 4-quarter restriction on employment

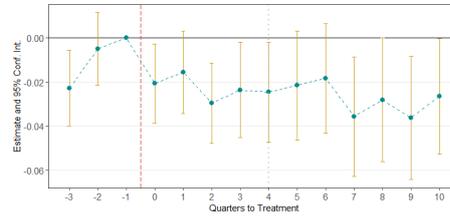
Notes: This figure shows the dynamic treatment effects of exposure to mass layoffs on credit card spending (in logs) for a sample of workers with a spending-to-income ratio above the median in the baseline. In panels (a) and (b), we restrict to job stayers who remain employed for at least two and four quarters, respectively, after being exposed to mass layoffs in their firms. Standard errors are clustered at the establishment level.

A.3.2 Stayers' borrowing responses

Figure A.9: Effect of exposure to mass layoffs on personal credit



(a) Sample with a 2-quarter restriction on employment



(b) Sample with a 4-quarter restriction on employment

Notes: This figure shows the dynamic treatment effects of exposure to mass layoffs on personal credit for a sample of workers with a spending-to-income ratio above the median in the baseline. In panels (a) and (b), we restrict to job stayers who remain employed for at least two and four quarters, respectively, after being exposed to mass layoffs in their firms. Standard errors are clustered at the establishment level.