Employment Effects of Alleviating Financing Frictions: Worker-level Evidence from a Loan Guarantee Program[†]

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Abstract

We document the impact on worker employment trajectories of a countercyclical loan guarantee program aiming at mitigating financing frictions for SMEs. Our identification strategy exploits plausibly exogenous heterogeneity in policy generosity between French regions, interacted with a geographical regression discontinuity design. We show that the guarantees result in a significantly higher likelihood of being employed over the seven years following the intervention, which translates into significantly higher cumulated earnings. The program benefits disproportionately high wage, male and younger workers, due to both differences in retention decision by the initial employer and differences in labor market frictions for these populations. We estimate the gross cost to preserve a job(-year) to be around €3,200, and a negative net cost when we include the savings on unemployment benefits.

Keywords: Loan Guarantees, Financial Frictions, Labor Market, Employment Trajectory.

JEL Codes: G28, G33, H81, J23, J31, J65

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1 Introduction

Numerous governments provide loan guarantee programs to facilitate bank lending to small firms. Such programs have been shown to foster employment growth at beneficiary firms (Brown and Earle, 2017). The main focus of existing studies, however, has been on understanding how these programs affect *firms'* outcomes, while the impact on *worker* employment trajectory is largely unknown. Because workers differ in their ability to switch jobs across employers, across areas and industries, firm-level studies only paint a partial picture of the employment effect of such policies at the worker level. The literature is also mostly silent on whether such programs represent an effective countercyclical policy, and at which cost.

In this article, we use administrative data at the worker level and examine how exposure to a new loan guarantee program implemented in France during the 2008-2009 financial crisis affects the employment and earnings trajectories of workers over the medium run. At the micro level, this allows us to trace the employment trajectory of workers from affected firms, as well as understand who benefits the most from the program in the cross-section of workers. This exercise sheds light on both the effectiveness for employment of mitigating financial constraint and on the existing frictions in the labor market. At a more macro level, the data allows us to implement a cost-benefit analysis of the program that includes both the cost of guarantees and the savings associated with reduced unemployment insurance, which we can benchmark against the cost of other types of policy aiming at reducing unemployment.

The recovery loan guarantee program allows SMEs to rollover their short-term debt in the midst of the financial crisis, thereby mitigating their financial constraints in the short run. This new program was announced in the last quarter of the year 2008. As regional offices screen applications in a decentralized manner, we observe plausibly exogenous variation in the intensity of the program at the regional level. We exploit this heterogeneity and interact it with a regional border discontinuity approach in order to estimate the causal impact of the program on workers at firms benefitting from a guarantee. The identifying assumption is that workers in firms located on each side of the border would have experienced similar

labor market outcomes in the absence of the loan guarantee program.

We first find strong evidence that the regional intensity of the loan guarantee program translates into a higher take-up of loan guarantees at the firm level. We then check that higher exposure to the program is indeed associated with an increase in the quantity of bank debt at the firm level. For this, we exploit balance-sheet data and find that firms in more exposed regions increase their quantity of bank debt relative to the counterfactual. We then leverage firm and individual level administrative data to evaluate how this program affects the employment and earnings trajectories of workers until 2015. The granularity of our data allows us to decompose worker employment spells by firm, industry, and place of work and to examine variation in the impact of the policy according to firm and worker characteristics.

We find that the program has a significant and positive impact on workers' employment and earnings trajectories. In regions with average treatment intensity as compared to a hypothetical region that would not have been exposed to the program, workers experience on average higher cumulative earnings over the period 2009-2015, with a magnitude of around 6 percentage points of their initial annual earnings for the whole period. When extrapolating this estimate to the average treatment at the firm level, it corresponds to additional cumulative earnings of 1.4 times their initial annual income over the 7 year period since the program for employees of firms receiving the average treatment. When scaled per year, this corresponds to 20% higher earnings per year for workers at a firm receiving the average treatment. Workers exposed to the program are also significantly less likely to separate from their initial employer, and to be unemployed over the sample period. The total amount of unemployment benefits received by workers in regions with average treatment intensity is 2 percentage points lower than for non-treated regions, as a fraction of initial annual earnings. This result demonstrates both a cost saving dimension of this policy, and how its effects would have been even larger in terms of earnings in the absence of unemployment insurance. We conduct several empirical checks to support our assumption that regional exposure to the loan guarantee program on each side of the border is not correlated with shocks af-

fecting local economic outcomes. First, we find parallel trends in workers' earnings in the years prior to the year 2009. Second, the estimates are robust to the inclusion of regional controls for public debt, taxes, state contributions, and public investment during the crisis. Third, the estimates are only weakly affected when we control for firm-level observable characteristics, such as firm size and firm age, industry-fixed effects, and worker-level observable characteristics, such as age, occupation, and gender.

Given that we can match our worker-level data with firms' balance sheets, we can also evaluate how the program differentially affects workers depending on firms' ex-ante financial constraints. Consistent with the idea that the program allows financially-constrained firms to access bank debt and avoid layoffs resulting from financial distress, we find a strong effect on workers' employment and earnings of financially-constrained firms, but virtually no effect for workers employed by unconstrained firms. This is mainly driven by the fact that unconstrained firms take-up does not seem to respond to regional differences in the intervention intensity.

We then turn to the cross-section of workers and estimate heterogenous treatment effects for separately blue- versus white-collars, young versus old workers, and female versus male employees. Looking at the cross-section of workers, we observe that high wage, young workers, and men, benefit more from the intervention, as the effects on both cumulative earnings and employment are more pronounced for these sub-groups. However, when decomposing along the adjustment margins, this heterogeneity appears to result mostly from labor market frictions outside of the firm initially employing the worker, and not necessarily from the retention decision of this firm when benefiting from a loan guarantee. Therefore the aforementioned sub-groups of workers benefit disproportionately from the program mostly because they exhibit lower mobility across industry and across geographic zones than their counterparts.

We conclude the analysis by providing an aggregate cost-benefit analysis of the loan guarantee program. We find that the program had a positive impact on French aggregate

employment on the order of around 210,000 jobs(-year), while the cost in terms of ex-post default was around 0.7 billion euro. This corresponds to a gross cost to preserve a job(-year) in a range of €3,200. We also estimate savings for the unemployment national fund to be around €1.3 bn, as the loan guarantee program reduced workers' unemployment spells. This translates into a negative net cost for the policy when we include the savings on unemployment benefits. We also investigate whether the program might have the unintended consequence of reducing the reallocation of workers towards more productive jobs. We find no evidence of such hypothesis as workers from the counterfactual do not appear to move towards higher productivity firms or start new firms.

Our research contributes to the literature on government programs and small business lending (Banerjee and Duflo, 2014; Bach, 2014; Ru, 2018), and loan guarantees in particular (Beck et al., 2010; de Andrade and Lucas, 2009; Lelarge et al., 2010; Mullins and Toro, 2016; Brown and Earle, 2017; D'Acunto et al., 2017; de Blasio et al., 2018), by shifting the focus from firm-level to worker-level outcomes. By estimating the difference in long-run outcomes between workers from exogenously treated firms to a relevant control group, our analysis identifies the causal effect of the loan guarantee program on the trajectories of individual workers' earnings and employment.

Second, our article contributes to the empirical debate on the effectiveness of public policies aiming to protect employment in crisis times, such as hiring credits (Cahuc et al., 2018a; Neumark and Grijalva, 2017), and subsidies for short-term work (Cahuc et al., 2018b; Giupponi and Landais, 2018). We show that loan guarantees have a positive impact on workers' employment and earnings, in particular for financially-constrained firms.

Our work also complements a large body of empirical studies estimating the employment effects of credit-supply shocks. Chodorow-Reich (2013) shows that firms with pre-crisis lending relationships with weaker banks face restrictions in credit supply and reductions in employment following the collapse of Lehman Brothers in 2008. Duygan-Bump et al. (2015), Greenstone et al. (2015) and Samuel Bentolila (2018) find that shocks to the supply of bank

credit to (small) businesses during the Great Recession are associated with reductions in employment. Recent studies (Fonseca and Van Doornik, 2019; Barbosa et al., 2019) use longitudinal linked-employer-employee data that allows to estimate the heterogeneous effect of financial shocks on the cross-section of individual workers.

Last, our article relates to a large literature on the long-run consequences of job loss or job market entry timing, starting with the seminal study of Jacobson et al. (1993) (Couch and Placzek, 2010; Davis and Wachter, 2011; Autor et al., 2014; Lachowska et al., 2017; Yagan, 2018). Workers graduating in a recession earn persistently less than those graduating nearby peaks (Kahn, 2010; Oreopoulos et al., 2012). We build on this literature and our contribution is to focus specifically on the long-term effects on worker outcomes of alleviating firms' financial frictions.

Our study proceeds as follows: In Section 2, we provide institutional detail on loan guarantee programs and more specifically about the French one. In section 3, we describe the data we use and detail the identification strategy we implement to establish a causal effect. Section 4 provides our baseline results at the micro-level while Section 5 examines heterogeneity in the consequences of the program by individual characteristics. Section 6 develops a cost-benefit analysis at the macro-level. Section 7 concludes.

2 Institutional Background

2.1 Public Loan Guarantee Programs

Numerous governments, including the US, provide loan guarantees to small firms. These programs are usually implemented through a specialized entity, such as the Small Business Administration (SBA) in the US or Bpifrance in France, which partners with banks. In 2017, the amount of new loans guaranteed respectively by the SBA and Bpifrance was around USD 25 billion in the US, and around USD 4.5 billion in France.

The economic rationale for such programs is typically threefold: mitigating financing

frictions specific to small businesses, fostering economic activity that creates positive externalities, and alleviating firm behavior that can create negative externalities. Access to credit for small firms might be limited by adverse selection Stiglitz and Weiss (1981), moral hazard Holmstrom and Tirole (1997), and transaction costs. Positive externalities from small firms typically include innovation and offering job opportunities in peripheral areas. On the contrary, layoffs might generate negative externalities when frictions on the labor market prevent the efficient reallocation of the workforce.

Loan guarantees by a government-backed entity have several advantages over direct public lending. First, this public intervention design facilitates the delegation of screening and monitoring to private banks. Relying on banks' expertise and infrastructure mitigates the risk for political considerations to drive the allocation of credit. As the guarantees are partial, banks retain skin in the game when screening loans, which limits moral hazard on the side of the banks. A last advantage of the guarantee design is that it does not require the guarantor institution to disburse cash and raise capital, although it has to hold regulatory capital.

One potential limitation of credit guarantee schemes is that they might attract riskier borrowers and worsen the pool of firms accessing external financing. They might also deteriorate banks incentives to properly monitor borrowers in the presence of moral hazard.

2.2 The French Public Guarantor: Bpifrance

Bpifrance is the entity managing public loan guarantee programs in France. Bpifrance (previously named Sofaris, and then Oseo-Garantie) was created in 1982 as a French equivalent of the SBA. Bpifrance is a government-backed entity, whose two shareholders are the French State and the *Caisse des Depots et Consignations* - the long term investing arm of the French government - and aims at financing companies from seed phase to maturity. Bpifrance activities are therefore mostly targeted towards SMEs and encompass investing in equity (VC and Private Equity), lending, extending loan guarantees, and providing grants.[1] Bpifrance

[1]Bpifrance also has an activity of funds of funds to support the VC industry.

does not have a banking licence, and therefore does not collect deposits, but funds itself in the wholesale market.

Bpifrance works with a network of partner banks that include all major French banks, and relies on them to source loan applications. As of 2017, Bpifrance possesses 48 local branches that process the loan guarantee applications provided by the banks.

In the remainder of the paper, we focus on a new loan guarantee program created at the end of the year 2008, which specifically aims at allowing firms to rollover their short-term debt during the credit crunch.

2.3 The Recovery Plan

The French recovery plan of 2009-2010 led to the creation of a large short-term credit guarantee program managed by Bpifrance (under the Oseo-Garantie name at that time). The plan guaranteed €5.3bn of new bank debt between 2008Q4 and 2010Q4, which represents 0.2% of the GDP of France and half of the total guarantees granted by Bpifrance over the same period. The plan targeted new lines of credit with a term between 12 and 18 months, as well as the restructuring of existing short-term debt into new loans with maturity between 2 and 7 years. 4,000 firms received guarantees on their new lines of credit for an amount of €1.8 bn, and 17,000 firms received guarantees on their medium-term new loans for an amount of €3.5 bn. A guarantee extended by Bpifrance covers between 50 and 90% of a loan notional. Bpifrance charges on average an insurance premium of around 1% per annum in exchange for such a guarantee. This cost to the issuer needs to be compared to the ex post default rate: around 10% of recipients failed as of June 2011, which implies that the guarantee was heavily subsidized on average.

[INSERT FIGURE 1]

3 Empirical Strategy

3.1 Data

We use three complementary sources of data, which we obtain from Bpifrance and the French Statistical Office (INSEE): an exhaustive file of individual loan guarantees, the exhaustive firm registry, and a matched worker-firm panel covering 1/24th of the French workforce.

3.1.1 Loan Guarantees

We use proprietary data provided by Bpifrance on the whole universe of firms benefiting from loan guarantee programs since 2002. This data provides a unique firm identifier (SIREN), and information on the guarantee characteristics, including the date and amount of the intervention, whether the guarantee was part of the recovery plan, the type of loan underlying the guarantee, and the fraction of the loan covered by the guarantee. The Bpifrance data does not include information on interest rates.

3.1.2 Firm-level tax filings

We use administrative microdata extracted from tax files used by the French Ministry of Finance for corporate tax collection purposes, available until 2015. The data includes the balance sheets and profit and loss statements of the universe of French firms. The data is not publicly available, but is available for academic research through a procedure similar to accessing Census data in the US. We track firms through time with their unique identifying number ascribed by the French Statistical Office (INSEE). We retrieve industry classification using a historical four-digit industry classification code ascribed to each firm by the French Statistical Office itself, which is similar to the SIC coding system in the US. We exclude financial and real estate sectors, as well as utilities, non-profit, and regulated sectors. Unfortunately, there has been a discontinuity in the number of firm-level variables available for researchers in 2010. For the purpose of our analysis, this means that we observe bank

debt only until 2009. This is unfortunate as one part of our analysis is to check whether the loan guarantee program indeed allowed exposed firms to borrow from banks. For our balance-sheet analysis, this implies that we can only estimate the effect of the program on the change in bank loans between 2008 and 2009.

3.1.3 Worker-level data

Last, we rely on matched worker-firm longitudinal data ("DADS Panel"), built by the French Statistical Office (INSEE) from social security contribution declarations of firms. The sample covers all individuals born in October of even-numbered years, i.e. 1/24th of the French workforce. Each year firms declare the employment spells, the number of hours worked, and the associated wages for each worker. The DADS files cover virtually all French wage earners from 2009, except for self-employed workers, if they do not pay themselves a wage.[2] For workers who have multiple jobs in a given year, we aggregate earnings across all jobs and retain the identifier of the employer that accounted for the largest share of the worker's earnings. Data on unemployment benefits are available since 2008, and there is no information on other forms of government benefits.

3.2 Data Filtering

We apply the following filters at the firm and individual level. At the firm level, we first restrict the sample to non-financial SMEs (defined as firms with less than 250 employees) in the for-profit private sector. SMEs represent virtually all the beneficiaries from the recovery plan. Second, for the purpose of our identification strategy, we restrict the firm sample to firms with all their employees in the same region and located within a 10 miles distance to a regional border.

At the worker level, we restrict the sample to workers with high labor force attachment (as

[2]Civil servants from the French central, regional and local administrations (general government), workers from the public health care sector, and workers employed by households (e.g. for house-keeping or child care) are not covered prior to 2009.

e.g. in Autor et al. (2014); Yagan (2018)), in our case workers with earnings above €10,000 in each year 2006, 2007 and 2008. We then focus on workers who were born between 1957 and 1984 and study their outcomes over the period 2008-2015, during which these individuals were between 24 and 58 years old. We finally restrict our analysis to French citizens in order to minimize unobserved employment in foreign countries.

3.3 Descriptive Statistics

Table 1 presents descriptive statistics for the data obtained after filtering.

Panel A provides information on the exposure to the loan guarantee program, both at the regional and firm level. $Guarantee_{region,2009-2010}$ corresponds to the sum of the loan guarantee amount in a given region, divided by the sum of the assets of all firms eligible to the program in this region. On average, the program represented 0.28% of total firm assets in a given region. The generosity of the program however appears to vary significantly across region, with firms from the least generous region having received 0.1% of the total firm assets in guarantee, while firms from the most generous region received 7.5 times more.

Turning to the treatment at the firm level, we observe that 4% of the firms in our sample received a loan guarantee. The average treatment conditional on being treated is therefore equal to the average treatment at the firm level (0.28% of total firm assets) divided by 4%, e.g. 7% of the firm assets.

The worker sample consists of 38,024 individual workers employed full time in 2008 in a firm located within a 10 miles distance to a regional border. The average worker worked for 6.5 years during the 2009-2015 period, and received earnings equal to 6.5 times their initial annual earnings, including 0.2 times their initial annual earnings in unemployment benefits.The average worker is 38 years old, works 1,868 hours and earns €23,630.

We also present a number of firm characteristics measured in 2008. The average firm has 20 employees in 2008, is 18 years old, has assets of €3.3 million, return over assets of 10%, and bank debt representing 15% of its assets.

[INSERT TABLE 1]

3.4 Empirical Design

3.4.1 Setting

Studying the effects of a loan guarantee program faces an immediate empirical challenge: the obtention of a loan guarantee is most likely correlated with firm characteristics, either observables or unobservables. A naive OLS regression of worker outcomes on firm-level guarantee treatment is therefore prone to suffer from endogeneity, most likely a selection of treated firms on distress.

For the purpose of causal identification, we exploit plausibly exogenous variation of loan guarantee volumes at the regional level, interacted with a geographical regression discontinuity design that allows to absorb local economic conditions. Specifically, we predict firms' exposure to the loan guarantee program on each side of regional borders with the average treatment intensity of other firms in the same region.

For this purpose, we obtain the longitude and latitude coordinates of the centroid of each municipality. Using these geographic coordinates, we calculate the minimum distance from the population centroid of the municipality to the regional border. Figure 2 illustrates all the municipalities that are within 10 miles of the border, that is, the municipalities for which the minimum distance from the population centroid of the municipality to the regional border is below 10 miles. These municipalities form a strip of land on both sides of the border of fairly uniform width. Our baseline sample includes all workers working in a firm located in one of these border municipalities.

Figure 2 also displays the treatment intensity at the regional level – that is, the average of total volume of loan guarantees divided by the total value of firm assets in 2008 for each region, previously described in table 1. Our empirical strategy exploits this regional variation in treatment intensity as source of identification.

[INSERT FIGURE 2]

3.4.2 Specifications

Our empirical strategy is akin to a difference-in-difference estimation where areas are differentially exposed to the short-term loan guarantee program. The exclusion restriction relies on the regional loan guarantee exposure only affecting workers' outcomes through the subsidized access to new lines of credit and bank loans offered by the program to their employers in 2009 and 2010. In particular, regional exposure to the program needs to be orthogonal to other local shocks that would otherwise affect workers. This motivates our regional discontinuity approach which largely mitigates the possibility that unobserved local economic shocks might confound our findings.

Our first stage boils down to the following cross-sectional regression:

$$Guarantee_{firm,2009-2010} = \beta.Guarantee_{region,2009-2010} + \delta.X_f + \delta_2.X_w + \delta_3.X_r + \gamma_s + \epsilon_f, \quad (3.1)$$

where $Guarantee_{firm,2009-2010}$ is the ratio of the amount of loan guarantee received by firm f from Bpifrance through the recovery plan over the firm total assets in 2008, $Guarantee_{region,2009-2010}$ is the average of the ratio of loan guarantees under the recovery plan over total assets in region r, X_f is a vector of firm characteristics, and includes the logarithm of firms' total assets in 2008, the logarithm of firm age in 2008, as well as industry fixed effects (for 56 2-digit industries), and γ_s are department-pair fixed effects (a finer geographic division than regions). We cluster the error term, ϵ_f, at the level of regions. We run this regression both at the firm and at the worker level, to ensure both robustness and specification consistency. When running this regression at the worker level, we include X_w, a vector of worker characteristics, and includes worker age and gender in 2008, as well as occupation fixed effects, as additional controls.

We then estimate a similar cross-sectional specification as 3.1 with employment and

earnings outcomes at the worker level as dependent variables:

$$y_{i,2009-2015} = \beta.Guarantee_{r,2009-2010} + \delta_1.X_f + \delta_2.X_w + \delta_3.X_r + \gamma_s + \epsilon_f, \tag{3.2}$$

where y denotes an employment or related outcome over our sample period 2009-2015. Following Autor et al. (2014) and Yagan (2018), one of our main variable of interest – cumulative earnings – are normalized by workers' initial earnings, that is, over the period 2006-2008. β, our coefficient of interest, measures the causal effect of initial regional exposure to the loan guarantee program on workers' outcomes. Importantly, we control for local economic conditions with department-pair fixed effects, which means that our identification comes from within (short) sections of the border band we study.

The main identifying assumption is that firms, and their workers, are as good as randomly assigned on one side of the border, meaning that workers in firms located on each side of the border would have experienced similar labor market outcomes in the absence of treatment. We first note that if labor markets are frictionless and workers can change their region of employment and obtain identical compensation in alternative firms, we should see no earnings or employment impact at the worker level from differences in their regional exposure to the French loan guarantee program in the period 2009-2010.

We first check that workers and firms are almost indistinguishable based on observables on each side of regional borders in the year before the implementation of the loan guarantee program. For this, we run the same cross-sectional specification as 3.1 with workers' and firms' outcomes as dependent variables, all measured in 2008. We present the results in Appendix Table A.1. The differences in workers' earnings, hours workers, unemployment benefits (Panel A), as well as firm age, firm size, and firm return assets (Panel B), all measured in 2008, between low and high exposed regions are all small and statistically insignificant.

A potential concern is that the variation in intervention exposure we exploit might correlate with other local shocks that affect workers' employment and earnings. We address this

concern in two ways. First, we show that workers' earnings prior to the intervention are uncorrelated with the subsequent regional intensity of the guarantee program, which mitigates concerns over reverse causality and omitted variable bias. Still, variation in the regional treatment intensity during the crisis years 2008Q4-2010Q4 might coincide with other regional shocks happening at the same time, for instance other regional government spending. We therefore include in all our regressions a series of controls that capture changes in public spending at the regional level, X_r. Specifically, we include the regional 2008-10 per-capita change in public debt, state contributions, local public investment, and taxes, respectively.

We also turn to longitudinal linked-employer-employee data in order to control for cross-area sorting. The longitudinal component allows us to measure individuals' employment over time regardless of whether and where in France they migrated. The linked-employer-employee component allows us to control for workers' age, gender, and occupation.

3.5 First-Stage Evidence

3.5.1 Predicting Firm-level Intervention using Regional Volume of Guarantees

We start by establishing the internal validity of our empirical setting. Table 2 displays the regression coefficients of the first stage as described in equation 3.1, at the firm level. In columns 1 to 3, the coefficients on $Guarantee_{region,2009-2010}$ are significant and positive, which confirms that a higher intensity of intervention in a given region translates into a higher intensity of intervention for firms close to the regional borders. We progressively introduce regional, and firm level controls, which leaves the coefficient of interest mostly unchanged. The coefficient of interest is around 0.6, which suggests that the intensity of intervention is comparable in the border area to the rest of the region, with a slight attenuation. Columns 4 to 6, where the dependent variable is an indicator variable for receiving a guarantee, illustrates that the regional intensity is associated with a significantly higher likelihood of receiving a guarantee. Regression results at the worker level are qualitatively and quantitatively consistent, and are reported in table A.2 of the online appendix.

[INSERT TABLE 2]

3.5.2 Balance-Sheet Evidence: Loan Guarantees and the Maturity of Debt

To further strengthen the validity of our first stage, we study whether regional variation in the intervention is associated with the balance sheet effects aimed for by the program and expected from a relaxation of the financial constraint, namely a better access to bank debt. We indeed find that a higher regional exposure to the loan guarantee program is associated with a higher growth in bank debt on firm balance sheet relative to firms from the counterfactual.

For this, we run a specification similar to our first stage where the dependent variable is the growth rate of bank loans over 2008-2009, and the explanatory variable is the regional total amount of guarantee over total firm assets for the year 2009 only. Due to data constraints, we can only observe the debt composition of firms until the end of 2009, and therefore can only measure the effect on bank debt of the first year of the program. Table 3 displays the regression coefficients. Higher exposure to the loan guarantee program is indeed associated with an increase in bank loans on firms' balance sheets. This result is robust to using total debt growth rate over 2008-2010 as a dependent variable and $Guarantee_{region,2009-2010}$ as the explanatory variable, which covers the whole treatment period, but does not zoom in on the part of debt directly affected by the program.

[INSERT TABLE 3]

4 Impact of Loan Guarantees on Earnings and Employment

We begin by examining the impact of exposure to the loan guarantee program on workers' employment and earnings.

4.1 Baseline

We run our baseline specification to study the causal impact of this program on worker employment trajectories. Coefficients are displayed in table 4. Panel A studies cumulative effects over the period 2009-2015, whereas panel B explores the 2015 snapshot. Columns 1 and 5 include only department-pair fixed effects. We progressively add regional controls in columns 2 and 6, firm-level controls in columns 3 and 7, and worker-level controls in columns 4 and 8.

The results illustrate how workers at firms more exposed to the loan guarantee program consistently fair better on both the extensive margin and the intensive margin of employment. We find a positive and statistically significant relation between workers' exposure to the loan guarantee program in 2009-2010, and their average cumulative employment and earnings over the period 2009-2015. First, as shown in columns 1 to 4, higher exposure to the program increases workers' employment rates over the period. Second, more exposed workers receive significantly higher cumulative earnings over 2009-2015.

The effects are economically sizable. Relative to the pre-crisis period, workers from a region with the average treatment experience a total gain in cumulative earnings over the period 2009-2015 of at least 6 percentage points of their initial annual earnings, e.g. around 1% per year, when compared to a hypothetical region with no exposure to the program.[3] The coefficient of interest remains stable across the specifications when progressively adding the controls. When extrapolating this point estimate to the average treatment at the firm level conditional on obtaining a loan guarantee, it translates into additional cumulative earnings for workers of the average treated firm of 1.4 times their initial annual income, over the 7 year period since the beginning of the program for employees of firms receiving the average treatment. When scaled per year, this corresponds to 20% higher earnings per year for workers at a firm receiving the average treatment, which illustrates the large magnitude of

[3]The average regional treatment is equal to 0.28% of total firm assets, which we multiply by the most conservative point estimate of our regression, 22%.

the effect.

In addition to their magnitude, the effects of the loan guarantee program appear to be persistent. In the 2015 snapshot displayed in Panel B, i.e. 7 years after the beginning of the program, the likelihood of employment appear to be still significantly higher for workers initially employed in firms more exposed to the loan guarantee program.[4] This persistence, 7 years after the beginning of the program, speaks to the long shadow of the earning losses that financial frictions can impose on workers when they are not mitigated.

[INSERT TABLE 4]

In table 5, we run a similar specification using an indicator variable for the worker not being employed at the firm where they were working in 2008 as of 2015. The likelihood of separation appears to be significantly lower for workers initially employed in firms more exposed to the loan guarantee program. Comparing the coefficient in column 4 of Table 5 with column 4 in Panel B of table 4 is indicative of the fraction of separated workers from their initial employer that are still not employed versus those who work for another employer as of 2015, a reallocation mechanism that we study in more details in Section 5.

4.2 Effect on Welfare Benefits

In France, earning losses due to involuntary unemployment are partly mitigated by unemployment insurance for a period up to two years. Unemployment benefits cover a fraction of the initial wage, and are subject to eligibility criteria. In our dataset, we can isolate earnings coming from unemployment benefits, which allows us to both estimate what the earning effects would have been for workers in the absence of unemployment insurance, as well as estimate the savings in unemployment benefits for the government that result from offering loan guarantees. We measure the effect of the intervention on worker unemployment benefits

[4]On the other hand, wage per hour appears mostly unaffected. This is consistent with downward-sticky wages, likely due to labor laws.

by using years and amount of unemployment benefits during 2009-2015 as the dependent variable in our baseline specification. Results are displayed in table 6.

Workers from treated firms obtain unemployment insurance for a significantly shorter period of time, and collect significantly lower cumulated amounts of unemployment benefits over the period. In economic terms, the total amount of unemployment benefits received by workers in regions with average treatment intensity is lower by 2 percentage points of their initial earnings than for non-treated regions. This point estimate indicates that in the absence of unemployment insurance, the differential between the two groups would have been one third larger. This finding is consistent with the effect on employment we document, and is of first order importance for the net cost of the intervention that we estimate in Section 6.

[INSERT TABLE 6]

4.3 Dynamics

Studying the dynamics of the effect speaks to the speed of the impact of the loan guarantee program on employment, its persistence, and absence of pre-trends that strengthen the causal interpretation.

In Figure 3, we plot the estimated effect of exposure to the loan guarantee program on worker earnings for each year from 2009 to 2015. Exposure to the loan guarantee program appears to have a strong and immediate beneficial effect on workers' earnings, which remains stable over time, although the effects is less precisely estimated as other factors increasingly play a role.

[INSERT FIGURE 3 AND FIGURE 4]

We present additional point estimates on the dynamic effects of the intervention in table 7, which displays the yearly effect of loan guarantees on worker earnings (Panel A), and the cumulative effect over time for both earnings (Panel B) and unemployment insurance (Panel C). As shown in Panel A, exposure to the loan guarantee program is associated

with a large and statistically significant effect on annual earnings in each year from 2009 to 2015. This trajectory also means that 7 years after the beginning of the program, untreated workers have still yet to start catching up with the ones that were more exposed to the loan guarantee program. Reassuringly, the coefficients for the year 2004 to 2009 are all insignificant, which supports the absence of pre-trends and a causal effect being at play. As earnings are significantly higher post treatment, the cumulative effect on earnings keeps growing over that period, as exhibited in panel B. The same dynamic is at play for cumulative unemployment benefits, even though the effect stabilizes, as would be expected from the limited time eligibility of unemployment benefit.[5]

[INSERT TABLE 7]

4.4 Firm Heterogeneity and Robustness

We now turn to the heterogeneity of the effect along proxies for firm financial constraints. To robustly capture the degree of financial constraints a firm faces, we split our sample along the three proxies for financial constraints most widely used in the literature: having a low share of tangible assets that can be used as collateral, not paying dividends, and having low cash flows, and run our baseline specification.[6]

We present the regression results in table 8. Consistent with the notion that the loan guarantee program mitigates SMEs financial frictions, the effects on workers employment and earnings we document are more pronounced for low-collateral firms, firms not paying dividends, and firms with low cash flows, all measured in 2008. [7]

[INSERT TABLE 8]

[5]Unfortunately, we cannot test for the presence of pre-trends for unemployment benefits, given that the required data are available in the employment registers only from 2008.

[6]See Fazzari et al. (1988) for an early application of this methodology and Almeida et al. (2004), and Chaney et al. (2012) for recent examples.

[7]By running the first stage along the same dimensions of firm heterogeneity, we observe that the more pronounced effect for financially constrained firms is driven by their higher take-up of the program. Results are displayed in table A.5 in the online appendix.

We also conduct a set of robustness test on our baseline specification, which we report in table A.3 of the online appendix. First, we use a cutoff of 5 miles instead of 10 miles from the regional border for defining a border area, and find consistent results. Second, we exclude Ile-de-France, the region that includes Paris and its suburbs, from our analysis to ensure that our results are not picking up a difference in economic trends between this region and the rest of France. Again, even though the size of the sample substantially drops, our coefficients are virtually unchanged. Third, one may be concerned that the program distorts competition on product markets in favor of more exposed firms, in which case our coefficients could also reflect the reallocation of labor from losers to winners on the product market on each side of the regional borders. We address this concern by removing non-tradable industries from our sample (e.g. restaurants), where demand effects through local competition could indeed confound our estimates. Reassuringly, our baseline results are robust when we restrict the sample to tradable industries only.

5 Tracing Down Labor Market Frictions

Having established the causal effect of the loan guarantee program on worker employment and earnings, we turn to teasing out how much of the effect we document results from labor market frictions versus firm retention policy; and whether firm retention policy and labor market frictions vary with worker characteristics.

5.1 Adjustment Margins

We follow Autor et al. (2014) to disentangle firm retention decisions from labor market frictions by pinning down the adjustment margins of employment in table 9. We isolate from the overall cumulated earnings and years employed effects (displayed in column 1, which corresponds to the results from table 4), the share of this outcome coming from the firm in which the worker is initially employed as of 2008 (column 2) and from other firms

(columns 3 to 6). We flesh out the adjustment coming from employment in other firms by area (columns 3 and 4), and by industry (columns 5 and 6). This exercise allows us to isolate the effect the intervention would have had if there were no margins of adjustment for workers becoming unemployed (the point estimate of column 2), and to identify the main dimensions of adjustment for workers that were not protected by the intervention. For the margin of adjustment, a negative coefficient should be interpreted as a higher reallocation of workers to this destination in the counterfactual than in the treated group.

We present the results in table 9. We find that workers more exposed to the guarantee program receive more in total earnings from their initial firm, but less from other firms. This is consistent with our previous result that firms benefiting from loan guarantees retain more workers. For workers being laid off, moving to another firm in the same industry, and changing areas, appears to be the main margin of adjustment in the counterfactual. Workers who are less geographically mobile therefore benefit disproportionately more from the intervention.

[INSERT TABLE 9]

5.2 Worker-level heterogeneity

Next, we explore the heterogeneity in the effect and adjustment margins according to worker characteristics: low vs. high wage jobs, age, and gender. This heterogeneity analysis allows to identify which groups of worker benefit the most from the program, and whether these differences come from firm retention policy or labor market frictions.

In the three panels of table 10, we compare the impact of exposure to the loan guarantee program on employment and earnings separately for low vs. high wage workers in panel A, young and old workers in panel B, and men and women in panel C. We disaggregate worker outcomes into the following margins: the effect on employment and earnings at the initial employer, as well as the effect on employment and earnings associated with moving to other employers, areas, or industries.

Looking first at the overall effect in column 1, we observe that high wages, young workers, and men, seem to benefit more from the intervention, as the effects on both cumulative earnings and years of employment are more pronounced for these sub-groups.

When decomposing along the adjustment margins, we find that this heterogeneity in effect results from both differences in retention policy and in labor market frictions for these groups.

In panel A, low and high wage workers appear to be as likely to be retained by firms receiving the guarantees. When laid-off, low wage workers from the counterfactual appear however more likely to get employed in another area or in another industry than high-wage workers. There are several possible interpretations for this result. First, firm-specific human capital might be larger for white collar workers. Second, these workers might have higher switching costs, for instance because unemployment stigma is higher when hiring for these jobs. Last, their willingness to adjust might be lower, for instance because they are less financially constrained.

When implementing the same exercise by age in Panel B, we first find that in terms of retention, young workers appear to benefit more from the higher worker retention associated loan guarantees. Adjustment margins appear to be comparable across the two groups.[8]

Last, we compare the employment and earnings trajectories of female versus male workers in Panel C. As shown in column 2, the positive effect of exposure to guarantees on cumulative employment and earnings at the initial firm is larger for male workers, which suggests that firm are prioritizing males in their retention policy. Male workers from the counterfactual also exhibit a higher rate of geographic mobility than female workers.

Overall, our results in the cross-section of workers provide evidence on the distributional consequences of loan guarantee programs and the underlying labor market frictions hindering the reallocation of workers between jobs across employers.

[INSERT TABLE 10]

[8]Note that the oldest workers in our sample are 51 years old in 2008 to avoid confounding effects of retirement decisions.

6 Aggregate Effects and Cost/Benefit Analysis

Moving to the macro-level, we perform an aggregate cost-benefit analysis of the loan guarantee program. As our analysis is conducted at the worker level, we can multiply the average treatment of 0.28% (of total assets) with the coefficient estimated in our baseline specification to calculate the average effect by worker. This calculation corresponds to an average gain of 0.06 years of employment per worker that we attribute to the loan guarantee program. As the full-time employee equivalent employment at SMEs in 2008 in France was 3.7 million, we obtain an estimate of 217,000 job(-years) preserved over the period 2009-15 ($3.7 \times 0.28 \times 0.21$).

This benefit needs to be compared to the cost of the intervention. The ex post cost to Bpifrance of the guarantee program was around €0.7 bn. This total cost therefore translates into an estimate for the gross cost per job(-year) around €3,200.[9]

This cost-per-job is smaller than estimates from the literature on fiscal multipliers in the US (Suárez Serrato and Wingender, 2016; Chodorow-Reich et al., 2012), which place the cost-per-job from government spending closer to $30,000. It is also smaller than estimates from the US loan guarantee program 7.(a) in Brown and Earle (2017), a cost-per-job of around $25,000 (over three years). Closest to our estimate, Cahuc et al. (2018a) find a gross cost per job-year of around €8,000 for hiring credits implemented during the same period in France. While these numbers are not directly comparable, our analysis suggests that loan guarantee programs for short-term debt might be a reasonably cost-effective form of stimulus.

The gross cost per job(-year) we calculate ignores the savings in unemployment benefits and social benefits, as well as the avoided reduction in social contributions resulting from the loan guarantee program.

We can easily adjust for the savings in unemployment benefits that we estimate in section

[9]These cost estimates do not account for potential distortions associated with raising the taxes used to finance the program nor do they account for potential increases in the operating cost of the Bpifrance branches due to the program.

4. Using a discount rate of 10%, and the average treatment associated with a NPV of unemployment benefits of 1.5% of 2008 annual earnings, the savings amount to €350 per worker.[10] When applied to the existing 3.7 millions jobs in 2008, we obtain an estimate of €1.3 bn savings in unemployment benefits, i.e. almost twice the non-discounted value of the ex post losses on the program. This calculation yields a negative net cost for the program and the jobs it helps preserve.

6.1 Preventing an Efficient Reallocation of Workers?

A potential indirect cost of the loan guarantee program is that it might prevent an efficient reallocation of workers, from firms in distress to more productive or new firms. As our data allows to track a worker even when she/he changes job, we can observe to which type of firms workers get reallocated in our counterfactual. In table 11, we study the outcome at other firms of workers from the treated group versus the counterfactual. We find negative coefficients on our treatment variable for low cash flow firms, which means that workers from the counterfactual are more likely to move to this type of firms. We do not find much differences along the firm age dimension, nor on firm creation. These results are hard to reconcile with the hypothesis that the loan guarantee program acts as a barrier to efficient allocation of workers in the economy.

[INSERT TABLE 11]

7 Conclusion

In this article, we use administrative data at the worker level and examine how exposure to a new loan guarantee program implemented in France during the 2008-2009 financial crisis affects the employment and earnings trajectories of workers over the medium run. We find

[10] We derive the NPV of unemployment benefits from the (yearly difference in the) coefficients presented in Panel C of Table 6, that is $\frac{0.01}{1.1} + \frac{0.005}{1.1^2} + \frac{0.003}{1.1^3} + \frac{0.032}{1.1^4} + \frac{0.024}{1.1^5} + \frac{0.011}{1.1^6} + \frac{-0.001}{1.1^7}$ multiplied by 0.28, the average regional treatment intensity.

that the guarantees result in a significantly higher likelihood of being employed over the seven years following the intervention, which translates into significantly higher cumulated earnings. Consistent with the idea that the program allows financially-constrained firms to rollover their short-term debt and avoid excessive layoffs, we find a strong effect on employment and earnings trajectories of workers initially employed by financially-constrained firms, but virtually no effect for workers employed by unconstrained firms.

We then turn to the cross-section of workers, and observe that white collars, young workers, and men, benefit more from the intervention, as the effects on cumulative earnings and employment are more pronounced for these sub-groups. However, when decomposing along the adjustment margins, this heterogeneity appears to result mostly from labor market frictions outside of the firm initially employing the worker, and not from the retention decision of this firm when benefiting from a loan guarantee. Finally, we perform an aggregate cost-benefit analysis of the loan guarantee program, and estimate the gross cost to preserve a job(-year) to be around €3,200 and a negative net cost when we include the savings on unemployment benefits. Overall, our findings suggest that loan guarantees might be a cost-effective policy for sustaining employment in downturns, in particular in contexts where financial shocks hinder SMEs access to external funds.

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8 Graphs and tables

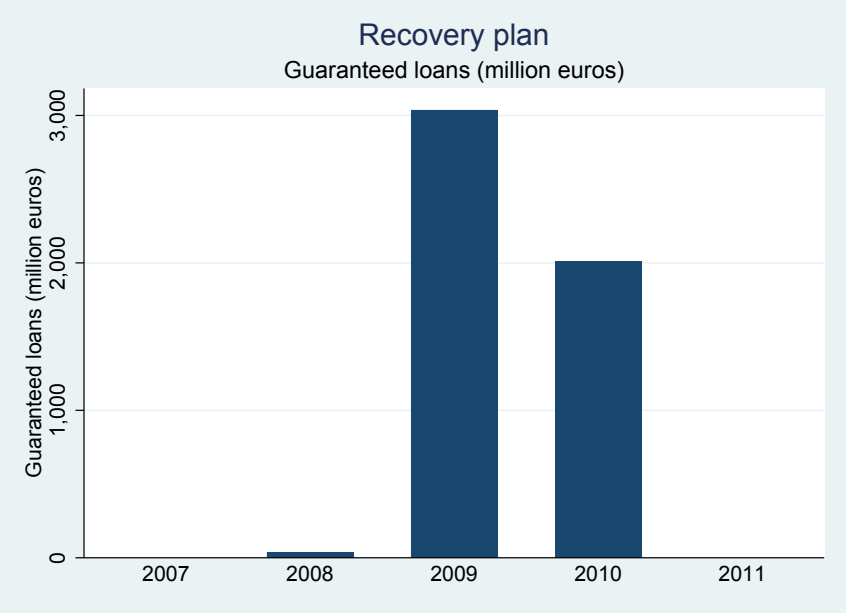

Figure 1
Yearly Volume of Guarantees of the Recovery Plan

Note: This figure displays the total volume of guarantees by Bpifrance as part of the recovery plan.

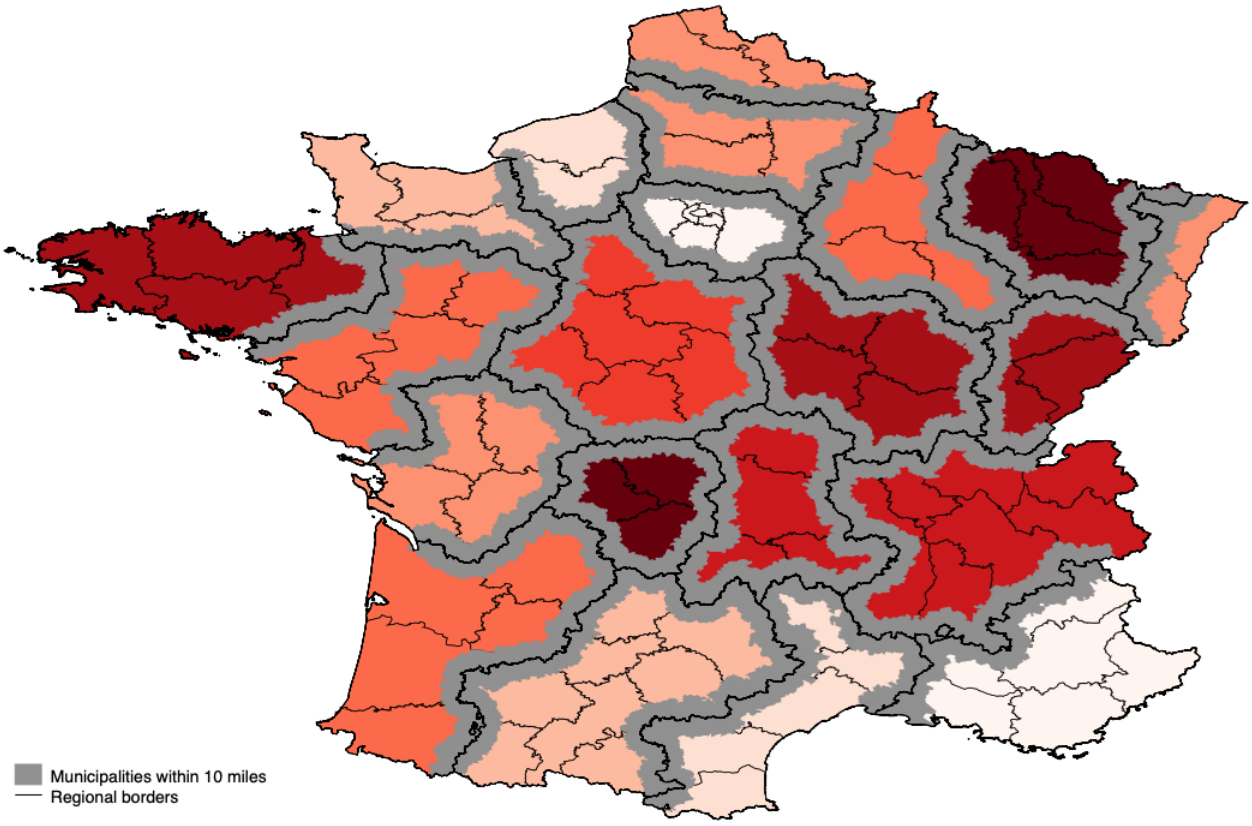

Figure 2
Regional Intensity of Loan Guarantee Intervention

Note: This figure displays the regional intensity of intervention by Bpifrance, as measured by the average firm ratio of the amount of loan guarantees received in 2009-2010 over assets in 2008 across all SMEs in that region. The grey area corresponds to municipalities within 10 miles of a regional border. Thin lines in black represent department boundaries within regions.

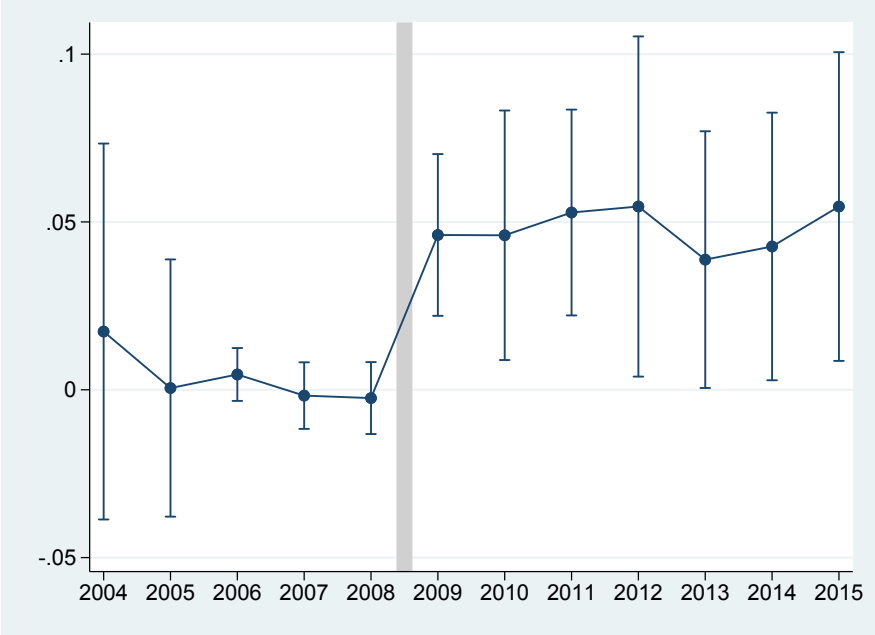

Figure 3
Dynamics: Effect on Earnings

Note: This figure plots regression coefficients and 95% confidence intervals from twelve regressions of earnings that a worker obtains in the year indicated on the x-axis, expressed in percentage points of the worker's average annual earnings in 2006-2008, on our measure of regional exposure to the 2009-2010 loan guarantee program, $\text{Guarantee}_{region,09-10}$. All regressions include department-pair fixed effects, the distance from the regional border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population).

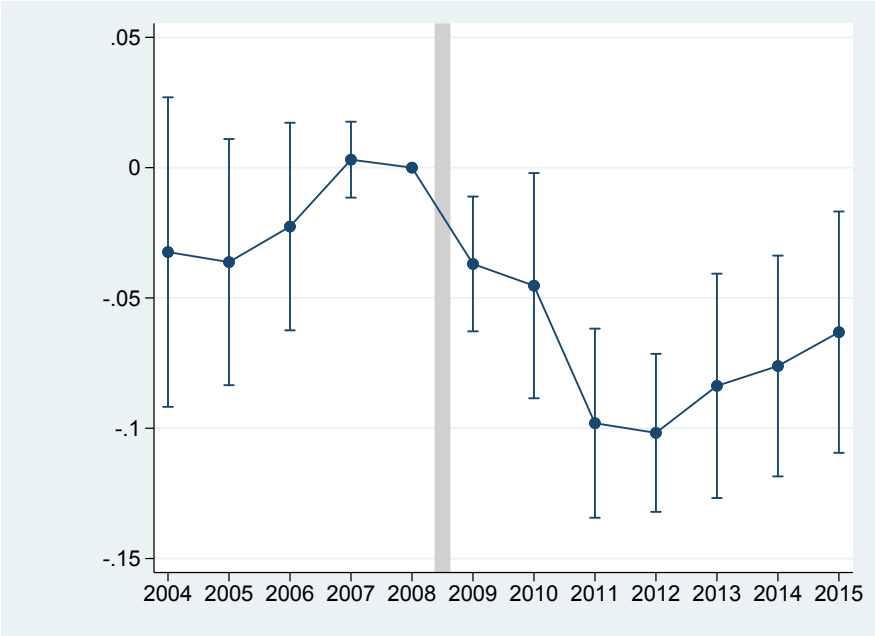

Figure 4
Dynamics: Effect on Separations

Note: This figure plots regression coefficients and 95% confidence intervals from twelve regressions of the likelihood that a worker does not work for the employer in 2008 in the year indicated on the x-axis on our measure of regional exposure to the 2009-2010 loan guarantee program, $\text{Guarantee}_{region,09-10}$. All regressions include department-pair fixed effects, the distance from the regional border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population).

Table 1
Summary Statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	Obs.	Mean	SD	p1	p50	p99
Panel A: Loan guarantee exposure						
$\text{Guarantee}_{region,09-10}$ (over assets in %)	21	0.280	0.156	0.099	0.240	0.759
$\text{Guarantee}_{firm,09-10}$ (over assets in %)	28,587	0.315	1.742	0.000	0.000	12.956
Guarantee (1/0)	28,587	0.040	0.195	0.000	0.000	1.000
Panel B: Main outcome variables, 2009-2015						
$\text{Years Employed}_{2009,2015}$	38,024	6.520	1.284	1.000	7.000	7.000
$\text{Earnings}_{2009,2015}$	38,024	6.507	2.160	0.169	7.090	11.019
Unemployment Benefits $_{2009,2015}$	38,024	0.216	0.477	0.000	0.000	2.155
Panel C: Worker characteristics in 2008						
Earnings	38,024	23,630	12,816	12,084	20,680	71,540
Hours	38,024	1,868	215	1,150	1,839	2,470
Age	38,024	38	7.7	24	39	51
Panel D: Firm characteristics in 2008						
$\frac{BankDebt}{TotalAssets}_{08}$	27,160	0.152	0.211	0.000	0.069	0.851
$\frac{BankDebt}{TotalDebt}_{08}$	22,880	0.650	0.374	0.000	0.808	1.000
$\frac{\Delta_{08-09}BankDebt}{BankDebt_{08}}$	20,789	-0.043	0.255	-0.955	0.000	0.826
Nb Employees	28,587	20.464	29.835	0.000	9.750	163.750
Assets (€'000s)	28,587	3,290	79,462	41	731	30,188
ROA	28,587	0.104	0.192	-0.656	0.100	0.749
Firm Age	28,587	18.042	13.014	1.000	16.000	54.000
Dividend/Sales	28,544	0.016	0.037	0.000	0.000	0.222
PPE/Assets	28,587	0.567	2.989	0.000	0.386	2.621

Note: This table presents summary statistics at the regional and firm level (Panel A), at the worker level (Panel B, C), and firm level (Panel D). The sample includes 1/24th of employees who were working in firms located within a 10 miles distance to a regional border in 2008.

Table 2
First Stage

	(1)	(2)	(3)	(4)	(5)	(6)
	Guarantee$_{firm,09-10}$			Guarantee (1/0)		
Guarantee$_{region,09-10}$	0.650***	0.707***	0.701***	0.066***	0.071***	0.069***
	(4.70)	(6.03)	(5.73)	(4.42)	(5.64)	(5.40)
Distance to border	0.000	-0.000	0.001	0.000	0.000	0.000
	(0.01)	(-0.10)	(0.37)	(0.66)	(0.54)	(1.02)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y		Y	Y
Firm-level Controls			Y			Y
Observations	28587	28587	28587	28587	28587	28587
R^2	0.009	0.009	0.024	0.009	0.010	0.029

Note: This table reports the results of the first stage OLS regressions. The dependent variable is the amount of guaranteed loans the firm received due to the 2009-2010 recovery plan scaled by 2008 firm assets in columns (1) to (3), and a dummy variable equal to one if the firm received any loan guarantee from the recovery plan in 2009-2010 in columns (4) to (6). The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects. Changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population) are added in columns (2) and (5). Firm-level controls added in columns (3) and (6) include log of assets, log of firm age, and two-digit industry fixed effects. Firm controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 3
Balance-Sheet Effects

	(1)	(2)	(3)
	$\frac{\Delta_{08-09} BankDebt}{BankDebt_{08}}$		
$\text{Guarantee}_{region,09}$	0.147**	0.172**	0.180**
	(2.39)	(2.48)	(2.61)
Department-Pair FE	Y	Y	Y
Regional Controls		Y	Y
Firm-level Controls			Y
Observations	19103	19103	19103
R^2	0.006	0.007	0.013

Note: This table reports OLS regression results of the effect of loan guarantees on firms' bank debt. The dependent variable is the change in bank debt from 2008 to 2009, scaled by 2008 bank debt. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) adds changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Column (3) adds firm-level controls (log of assets, log of firm age, and two-digit industry fixed effects). Firm controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 4
Employment Effects: Baseline

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Cumulative effects	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.233***	0.256***	0.216***	0.214***	0.296***	0.329***	0.238**	0.220**
	(3.13)	(3.14)	(2.97)	(2.87)	(3.51)	(3.54)	(2.65)	(2.29)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.006	0.006	0.028	0.035	0.007	0.007	0.042	0.053
Panel B: In 2015	Employed $_{15}$				Earnings $_{15}$			
Guarantee$_{region,09-10}$	0.042**	0.044***	0.033**	0.032**	0.059**	0.055**	0.033	0.027
	(2.82)	(2.87)	(2.22)	(2.09)	(2.81)	(2.48)	(1.49)	(1.19)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.007	0.007	0.035	0.038	0.006	0.006	0.038	0.052

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on worker-level outcomes. Panel A presents the cumulative effects on years employed and earnings 2009-2015. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Panel B presents the effects on employment and earnings in 2015. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Columns (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 5
Separation

	(1)	(2)	(3)	(4)
	Separation			
$\text{Guarantee}_{region,09-10}$	-0.058**	-0.077***	-0.050**	-0.056**
	(-2.19)	(-3.36)	(-2.21)	(-2.48)
Department-Pair FE	Y	Y	Y	Y
Regional Controls		Y	Y	Y
Firm-level Controls			Y	Y
Worker-level Controls				Y
Observations	38024	38024	38024	38024
R^2	0.010	0.011	0.050	0.063

Note: This table reports OLS regression results of the effect of loan guarantees on workers' likelihood to separate from the initial employer. The dependent variable is a dummy equal to one if the worker did not work the entire period from 2009-2015 at the initial firm in 2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) adds changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Column (3) adds firm-level controls (log of assets, log of firm age, and two-digit industry fixed effects). Column (4) adds worker-level controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 6
Unemployment Insurance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Years with UB $_{09,15}$				UB $_{09,15}$			
Guarantee$_{region,09-10}$	-0.197**	-0.249***	-0.230***	-0.239***	-0.065*	-0.085***	-0.078***	-0.080***
	(-2.13)	(-2.90)	(-2.92)	(-3.04)	(-1.85)	(-2.94)	(-3.12)	(-3.11)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.011	0.011	0.039	0.049	0.012	0.012	0.037	0.046

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on unemployment benefits. Columns (1) to (4) show the effects on years with positive unemployment benefits. Columns (5) to (8) show the effects on cumulative unemployment benefits. Cumulative unemployment benefits are the sum of unemployment benefits 2009-2015 scaled by average annual earnings 2006-2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Columns (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 7
Dynamics

Panel A: Yearly Earnings	04	05	06	07	08	09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$	0.017	0.001	0.005	-0.002	-0.002	0.046***	0.046**	0.053***	0.055**	0.039**	0.043**	0.055**
	(0.65)	(0.03)	(1.21)	(-0.36)	(-0.48)	(3.99)	(2.58)	(3.59)	(2.25)	(2.11)	(2.23)	(2.48)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.010	0.009	0.006	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.006	0.006
Panel B: Yearly Separations	04	05	06	07	08	09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$	-0.022	-0.028	-0.017	0.004		-0.040***	-0.048**	-0.102***	-0.107***	-0.091***	-0.084***	-0.071***
	(-0.75)	(-1.14)	(-0.89)	(0.50)		(-3.07)	(-2.13)	(-5.31)	(-6.46)	(-3.97)	(-3.71)	(-3.02)
Observations	38024	38024	38024	38024		38024	38024	38024	38024	38024	38024	38024
R^2	0.010	0.008	0.008	0.005		0.007	0.009	0.011	0.011	0.010	0.011	0.011
Panel C: Cum. Earnings						09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$						0.046***	0.090***	0.140***	0.195***	0.234***	0.276***	0.329***
						(3.99)	(3.35)	(4.64)	(4.32)	(3.84)	(3.67)	(3.54)
Department-Pair FE						Y	Y	Y	Y	Y	Y	Y
Regional Controls						Y	Y	Y	Y	Y	Y	Y
Observations						38024	38024	38024	38024	38024	38024	38024
R^2						0.007	0.007	0.007	0.007	0.007	0.007	0.007
Panel D: Cum. Unemployment Insurance						09	10	11	12	13	14	15
$\text{Guarantee}_{region,09-10}$						-0.011***	-0.016**	-0.019**	-0.051***	-0.075***	-0.086***	-0.085***
						(-5.20)	(-2.37)	(-2.49)	(-4.88)	(-4.97)	(-3.82)	(-2.94)
Department-Pair FE						Y	Y	Y	Y	Y	Y	Y
Regional Controls						Y	Y	Y	Y	Y	Y	Y
Observations						38024	38024	38024	38024	38024	38024	38024
R^2						0.006	0.007	0.007	0.011	0.012	0.012	0.012

Note: This table reports the effect of loan guarantees on earnings, separations, and unemployment benefits by year. Panel A reports yearly earnings, Panel B yearly separations from the initial employer in 2008, Panel C cumulative earnings, and Panel D cumulative unemployment benefits, all scaled by average earnings in 2006-2008. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1% respectively.

Table 8
Firm Heterogeneity: Financial Constraints

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Years Employed $_{09,15}$					
	Tangibility		Dividends		Cash-Flows	
	Low	High	No Div	Div> 0	Low	High
Guarantee$_{region,09-10}$	0.349**	0.122	0.274***	0.075	0.412***	0.021
	(2.62)	(1.46)	(3.06)	(0.79)	(4.55)	(0.22)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y
Observations	18890	19127	24037	13981	18885	19134
R^2	0.042	0.041	0.038	0.036	0.037	0.047
	Panel B: Cumulative Earnings $_{2009,2015}$					
	Tangibility		Dividends		Cash-Flows	
	Low	High	No Div	Div> 0	Low	High
Guarantee$_{region,09-10}$	0.312*	0.087	0.339***	-0.028	0.523***	-0.013
	(1.98)	(0.83)	(2.87)	(-0.19)	(3.87)	(-0.08)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y
Observations	18890	19127	24037	13981	18885	19134
R^2	0.060	0.062	0.053	0.053	0.072	0.058

Note: This table reports the effect of loan guarantees on worker employment and earnings trajectories for sub-samples along proxies for financial constraints. Panel A presents the effects on years employed and Panel B on cumulative earnings 2009-2015. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Column (1) and (2) show the results for sub-samples of firms below and above the median firm tangibility (property, plant, and equipment over total assets), respectively. Column (3) and (4) split the full sample based on a dummy variable equal to one if the firm paid dividends in 2008. Column (5) and (6) show the results for sub-samples of firms below and above the median firm profitability (profit scaled by assets) in 2008, respectively. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population), firm (log of assets, log of firm age, and two-digit industry fixed effects), and worker controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 9
Adjustment Margins

	(1)	(2)	(3)	(4)	(5)	(6)
	Worker Outcomes (09-15):					
	all firms	initial firm	other firm same area	other firm other area	other firm same industry	other firm other industry
Overall (N=35,644)						
Cumulative earnings	0.220**	0.434***	-0.007	-0.210	-0.188**	-0.028
	(2.29)	(3.56)	(-0.10)	(-1.55)	(-2.18)	(-0.38)
Years employed	0.214***	0.483***	0.042	-0.182	-0.201**	0.047
	(2.87)	(4.53)	(0.59)	(-1.16)	(-2.22)	(0.54)

Note: This table reports the effect of loan guarantees on employment and earnings at the initial firm and at other firms. Cumulative earnings are the sum of earnings 2009-2015 scaled by average annual earnings 2006-2008. Column (1) shows the effect across all firms. Column (2) measures employment and earnings at the initial firm (in 2008). Column (3) measures employment and earnings at other firms which are located in the same municipality as the initial firm. Column (4) measures employment and earnings at other firms which are located in a different municipality than the initial firm. Column (5) measures employment and earnings at other firms in the same two-digit industry as the initial firm. Column (6) measures employment and earnings at other firms in different two-digit industries than the initial firm. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population), firm (log of assets, log of firm age, and two-digit industry fixed effects), and worker controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 10
Heterogeneous Effects across Workers

	(1)	(2)	(3)	(4)	(5)	(6)
	Worker Outcomes (09-15):					
	all firms	initial firm	other firm same area	other firm other area	other firm same industry	other firm other industry
Low Wage (N=18,998)						
Cumulative earnings	0.100	0.466**	-0.094	-0.262	-0.258**	-0.088
	(1.05)	(2.15)	(-1.17)	(-1.50)	(-2.20)	(-0.73)
Years employed	0.217**	0.580**	-0.019	-0.205	-0.225*	-0.009
	(2.72)	(2.73)	(-0.21)	(-1.12)	(-1.82)	(-0.07)
High Wage (N=19,019)						
Cumulative earnings	0.329	0.439*	0.051	-0.180	-0.115	-0.022
	(1.49)	(2.00)	(0.42)	(-1.02)	(-0.79)	(-0.17)
Years employed	0.176	0.395**	0.067	-0.188	-0.177	0.045
	(1.34)	(2.22)	(0.51)	(-0.88)	(-1.09)	(0.32)
Young (N=19,649)						
Cumulative earnings	0.370**	0.594***	-0.037	-0.197	-0.225*	-0.004
	(2.18)	(2.96)	(-0.35)	(-1.02)	(-1.91)	(-0.03)
Years employed	0.291***	0.521***	-0.003	-0.178	-0.210	0.040
	(3.45)	(3.21)	(-0.02)	(-0.85)	(-1.63)	(0.25)
Old (N=18,368)						
Cumulative earnings	0.033	0.250	0.016	-0.231*	-0.156	-0.063
	(0.37)	(1.53)	(0.15)	(-2.07)	(-1.48)	(-0.70)
Years employed	0.118	0.444**	0.091	-0.186	-0.193*	0.059
	(1.57)	(2.72)	(0.99)	(-1.26)	(-1.78)	(0.56)
Women (N=10,639)						
Cumulative earnings	-0.004	0.145	-0.050	-0.058	-0.224*	0.106
	(-0.03)	(0.54)	(-0.40)	(-0.41)	(-1.91)	(0.70)
Years employed	0.224**	0.360	0.139	-0.142	-0.165	0.114
	(2.68)	(1.51)	(1.13)	(-0.68)	(-1.41)	(0.60)
Men (N=27,377)						
Cumulative earnings	0.312**	0.582***	0.023	-0.310*	-0.174	-0.106
	(2.35)	(3.66)	(0.30)	(-1.76)	(-1.34)	(-1.08)
Years employed	0.216**	0.555***	0.023	-0.234	-0.215	0.004
	(2.37)	(4.02)	(0.28)	(-1.27)	(-1.55)	(0.04)

Note: This table reports the effect of loan guarantees on employment and earnings at the initial firm and at other firms for subgroups of workers. See table 9 for detailed descriptions. Young (old) is a dummy equal to one for workers aged 22-39 (40-51) in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table 11
A Barrier to Efficient Worker Allocation?

	(1)	(2)	(3)	(4)	(5)	(6)
	Outcomes at Other Firms (2009-2015): depending on firm type					
	Cash-Flows		Firm Size		Firm Creation	
	High	Low	Big	Small	New	Existing
Cumulative earnings	-0.011	-0.227*	-0.075	-0.163	-0.076	-0.162
	(-0.09)	(-1.92)	(-0.56)	(-1.51)	(-0.80)	(-1.24)
Years employed	-0.038	-0.243*	-0.107	-0.184	-0.060	-0.206
	(-0.31)	(-1.89)	(-0.84)	(-1.56)	(-0.59)	(-1.69)

Note: This table reports the effect of loan guarantees on employment and earnings at other firms for subgroups of workers. Columns (1) and (2) show worker outcomes at firms with profitability above and below the initial firm in 2008, respectively. Columns (3) and (4) show worker outcomes at firms larger and smaller than the initial firm, respectively. Columns (5) and (6) show worker outcomes at firms created after 2008 and existing firms in 2008, respectively. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Online Appendix

A DATA ACCESS

The French employment registers (DADS) and the fiscal data (FICUS-FARE), used in this paper, can be accessed by researchers. Authorization must be obtained from the *comité du secret*. The procedure is described at https://www.comite-du-secret.fr. Then researchers use a remote secure server (CASD) to work on the data. The "BPI files" that contain information on the firms receiving guarantees, is produced and owned by the Banque Publique d'Investissement.

B Tables

Table A.1
Placebo Analysis: Effects Before the Reform?

Panel A : Worker Characteristics	Ln(Wage)_{08}	Ln(Hours)_{08}	Ln(UI)_{08}
$\text{Guarantee}_{region,09-10}$	-0.032	-0.001	0.021
	(-1.28)	(-0.16)	(0.44)
Department-Pair FE	Y	Y	Y
Regional Controls	Y	Y	Y
Observations	38024	38024	38024
R^2	0.045	0.008	0.005
Panel B : Firm Characteristics	Ln(FirmAge)_{08}	Ln(FirmSize)_{08}	$\text{EBITDA/Assets}_{08}$
$\text{Guarantee}_{region,09-10}$	0.066	0.249	0.006
	(1.24)	(1.70)	(0.77)
Department-Pair FE	Y	Y	Y
Regional Controls	Y	Y	Y
Observations	28587	28587	28587
R^2	0.012	0.012	0.007

Note: This table reports OLS regressions of worker and firm characteristics in 2008 on loan guarantees under the recovery plan in 2009-2010. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, and changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.2
First Stage: Worker Level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Guarantee$_{firm,09-10}$				Guarantee (1/0)			
Guarantee$_{region,09-10}$	0.681**	0.739***	0.706***	0.703***	0.062**	0.069**	0.062**	0.061**
	(2.63)	(3.09)	(3.11)	(3.07)	(2.20)	(2.46)	(2.38)	(2.36)
Distance to border	-0.006	-0.007	-0.002	-0.002	-0.000	-0.000	0.000	0.000
	(-0.83)	(-0.90)	(-0.36)	(-0.36)	(-0.11)	(-0.21)	(0.55)	(0.54)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38024	38024	38024	38024	38024	38024	38024	38024
R^2	0.015	0.015	0.034	0.034	0.017	0.017	0.041	0.041

Note: This table reports the results of the first stage OLS regressions at the worker level. The dependent variable is the amount of guaranteed loans the firm received due to the 2009-2010 recovery plan scaled by 2008 firm assets in columns (1) to (4), and a dummy variable equal to one if the firm received any loan guarantee from the recovery plan in 2009-2010 in columns (5) to (8). The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population) are added in columns (2) and (6). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.3
Employment Effects: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Distance <= 5 miles	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.206**	0.233**	0.262***	0.263***	0.323**	0.248*	0.276**	0.265*
	(2.20)	(2.35)	(2.95)	(2.92)	(2.69)	(1.79)	(2.30)	(2.07)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	18680	18680	18680	18680	18680	18680	18680	18680
R^2	0.011	0.012	0.038	0.046	0.010	0.010	0.049	0.060
Panel B: Excluding Regional Pairs with Ile-de-France	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.249**	0.272***	0.275***	0.268***	0.257**	0.305**	0.312**	0.306**
	(2.90)	(2.99)	(3.21)	(3.04)	(2.61)	(2.83)	(2.75)	(2.40)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	24851	24851	24851	24851	24851	24851	24851	24851
R^2	0.008	0.008	0.031	0.037	0.008	0.008	0.045	0.056
Panel C: Excluding Non-Tradable Industries	Years Employed $_{09,15}$				Earnings $_{09,15}$			
Guarantee$_{region,09-10}$	0.253***	0.274***	0.227**	0.207**	0.496***	0.495***	0.388**	0.333*
	(3.33)	(3.03)	(2.37)	(2.17)	(4.09)	(3.47)	(2.44)	(2.04)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	17200	17200	17200	17200	17200	17200	17200	17200
R^2	0.009	0.009	0.025	0.032	0.012	0.013	0.047	0.063

Note: This table reports robustness tests for the baseline results. See table 4 for detailed descriptions.

Table A.4
Hours

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Hours Worked $_{09,15}$				Hours $_{15}$			
Guarantee$_{region,09-10}$ Treatment	0.393***	0.454***	0.381***	0.390***	0.065***	0.065***	0.049***	0.049**
	(4.37)	(5.28)	(4.94)	(4.80)	(3.74)	(3.73)	(2.92)	(2.81)
Department-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Regional Controls		Y	Y	Y		Y	Y	Y
Firm-level Controls			Y	Y			Y	Y
Worker-level Controls				Y				Y
Observations	38021	38021	38021	38021	38021	38021	38021	38021
R^2	0.009	0.009	0.041	0.044	0.007	0.007	0.035	0.038

Note: This table reports reduced-form OLS regression results of the effect of loan guarantees on hours worked. Columns (1) to (4) show the cumulative effects on hours worked 2009-2015. Cumulative hours worked are the sum of hours 2009-2015 scaled by average annual hours worked 2006-2008. Columns (5) to (8) present the effects on hours worked in 2015. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects and distance to the border. Column (2) and (6) add changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population). Firm-level controls added in columns (3) and (7) include log of assets, log of firm age, and two-digit industry fixed effects. Worker-level controls added in columns (4) and (8) include worker age, gender, and occupation fixed effects. Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.

Table A.5
Firm Heterogeneity: First Stage

	$\text{Guarantee}_{firm,09-10}$					
	Tangibility		Dividends		Cash-Flows	
	Low	High	No Div	Div> 0	Low	High
$\text{Guarantee}_{region,09-10}$	0.720**	0.521**	1.276***	-0.096	1.116***	0.176
	(2.11)	(2.49)	(4.71)	(-0.28)	(2.95)	(1.34)
Department-Pair FE	Y	Y	Y	Y	Y	Y
Regional Controls	Y	Y	Y	Y	Y	Y
Firm-level Controls	Y	Y	Y	Y	Y	Y
Worker-level Controls	Y	Y	Y	Y	Y	Y
Observations	18890	19127	24037	13981	18885	19134
R^2	0.046	0.052	0.042	0.061	0.053	0.044

Note: This table reports first stage OLS regression results for sub-samples along proxies for financial constraints. The dependent variable is the amount of loans a firm received under the recovery plan 2009-2010, scaled by firm assets in 2008. Column (1) and (2) show the results for sub-samples of firms below and above the median firm tangibility, respectively. Column (3) and (4) split the full sample based on a dummy variable equal to one if the firm paid dividends in 2008. Column (5) and (6) show the results for sub-samples of firms below and above the median firm profitability (profit scaled by assets) in 2008, respectively. The main explanatory variable is the average regional ratio of loans guaranteed under the recovery plan in 2009-2010 scaled by assets, computed excluding firms within 10 miles of a regional border. All regressions include department pair fixed effects, distance to the border, changes in regional controls from 2008 to 2010 (local taxes, equipment expenditures, public debt, and state contribution, all scaled by population), firm (log of assets, log of firm age, and two-digit industry fixed effects), and worker controls (worker age, gender, and occupation fixed effects). Firm and worker controls are measured in 2008. Standard errors are clustered by region. *, **, and *** denote significance at the 10%, 5%, and 1%, respectively.