Online Appendix for: The Financial Channels of Labor Rigidities Evidence From Portugal

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A Sample selection

In order to prepare the data for the analysis in our event-study, we need to combine all the different sources of data available, and perform cleaning checks to obtain a relevant sample of analysis depending on variables availability and firms' and banks' characteristics.

Given that the focus of our analysis is predominantly the adjustment of employment and other real variables as a function of the different measures that we label as different sources of "labor rigidities" in the text, the main firm-level dataset around which we combine the other datasets is the QP.

First, we perform some quality checks on the QP and remove workers' for which identifiers are not consistent over time.We then select only workers listed as "employees", full-time, between 16 and 65 years of age, and receiving a full wage in the October of every year (e.g. not on sick leave or other forms of leave).As regards monetary balance-sheet variables, wages and credit variables, we deflate all nominal values in the analysis by the 2013 consumer price index.[1]

In order to define the final sample of analysis we merge all datasets and select firms based on some defined criteria. Given that we are interested in both firm dynamics and employment adjustment, we mostly consider firms present both in QP

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[1]We refer the reader to Section C in the Internet Addendum on the authors' websites for details regarding deflation of nominal values in the productivity estimation.

and CB.We restrict our attention to firms in mainland Portugal, and exclude from the sample industries like agriculture, fishing, energy (extraction, mining and distribution), the construction sector and the financial sector itself. For the event study we only consider firms with a credit relationship with any bank in 2005, which of course must survive until 2009 to be present in the period of time after the credit shock. We focus on firms with at least 9 employees, which is approximately the threshold for the fourth quartile in the distribution of firms' sizes in the years before 2009, and covers more than 60 percent of the workforce in the QP matched to CRC in the pre-period.[2] In order to reduce measurement noise, we consider only firms with no gaps in the data in the pre-period.[3]

We also perform some consistency and sanity checks in selecting the relevant banks to be included in the analysis. More precisely, we exclude from the analysis the very small banks that disappear from the dataset before 2009. We also exclude from the set of banks for which the instrument is computed those banks for which foreign interbank funding is actually intra-banking-group funding from the foreign headquarter to the Portuguese subsidiary.

To limit the influence of outliers in the regressions, we drop firms in the top 2.5 percentile of positive percentage credit variation between the pre- and post-periods, *before* calculating the symmetric growth rate. For the same reason we drop all the firms with a percentage of exposure-amount growth above the top 2.5 percent of the distribution in the exposure level specifications, once again *before* calculating the symmetric growth rate. This effectively amounts to eliminating more than 2.5 percent of firms for those particular regressions, but we still think that this kind of cut is more sensible than leaving the firms in the estimation sample without accounting for all their loans.

Our final sample spans 14,846 firms and 31 banks.[4]

[2]We focus on relatively big firms, at least by Portuguese standards, as we are interested in measuring employment adjustment at the firm level, which becomes increasingly noisy and lumpy for very small firms.

[3]Considering firms already existing in 2005 allows us to have at least 3 years of pre-period in our event study framework. We implicitly exclude entrants in the three years before 2009 from the event study analysis.

[4]Most of the regressions which require also balance-sheet variables consists of 13,804 firms, while the sample of surviving firms consists of 11,802 firms. At least for the employment and balance-sheet items regressions, though, results are virtually unchanged if we just restrict our attention to specifications in which fixed effects that do not require the CB are utilized (see Appendix Section A), and cover the entire sample.

B Average firm level results

Our baseline empirical specification for average firm-level results follows a standard difference-in-differences design. We collapse our dataset at a pre- and post-period level, by averaging our outcome variables over the two periods. Then, we run the following regression:

$$log(Y_{i,t}) = \gamma_i + \tau_t + \left(\beta S_i + \mathbf{\Gamma X_{i,pre}}\right) \cdot \mathbb{1}\{t = Post\} + FE_{i,t} + \varepsilon_{i,t} \quad t \in \{Pre, Post\}. \quad (1)$$

In the specification, $Y_{i,t}$ is the average outcome variable in the period of consideration, γ_i is a firm fixed effect, τ_t is a time fixed effect, S_i is the treatment variable that we instrument in the 2SLS regression with the instrument Z_i, $X_{i,pre}$ are a set of out-of-sample controls at the firm level in 2005, and $FE_{i,t}$ is a further set of fixed effects by pre/post period. We interact controls with a dummy equal to 1 for the post-period years (from 2009 to 2013) to allow differential trends over the post-period (their baseline effect is captured by the firm fixed effect γ_i). Fixed effects in the pre-period are absorbed by the firm fixed effect, and thus their influence captures differential group-specific trends in the post period. We cluster the standard errors at the main bank-industry pair level.

Table 4 reports the results from estimating Equation (1) with the logarithm of the number of employees as an outcome variable. The first column of Table 4 reports the results of a standard difference-in-differences with no additional controls. In the second column, we add the set of fixed effects that we use in all regressions throughout the empirical analysis. In column 3 we add as controls all the variables for which the balance-check test fails (see Figure C.1 in the main Appendix) and in column 4 we get to the main specification that we will use throughout the paper, with the full set of controls. Results in columns 3 and 4 show that the correlation of the instrument in 2005 with some observables does not have a relevant effect on the coefficient of interest. Given that we are averaging the outcome variable over a different number of observations in the post period due to firm exit or attrition from the QP, in column 5 we report the estimated coefficient over a sample of survivor firms. This last estimated coefficient more precisely characterizes the intensive margin of firm adjustment. The first stage effective F-statistic is always above 30 and not far from the 5-percent Nagar bias threshold (which is at 37.42 according to the methodology in Montiel Olea and Pflueger, 2013), showing that the instrument very strongly predicts the variation in credit.[5]

Our preferred estimates range from 0.071 (column 4, full sample) to 0.086 (column

[5]In an acid regression the instrument is not significant, whereas the variation in credit obviously is. Results are available upon request.

5, survivors). To add context to the magnitude of our estimates, in the post-period the predicted treatment after the first stage regression has an average of -0.183 (median -0.204), a standard deviation of 0.565 and a 10–90 percentile range of 1.532. A one negative standard-deviation variation in the treatment would decrease the average firm employment by approximately 4 percentage (log) points (4.9 percentage points according to the survivors' estimate). Given that the average employment variation in our sample is -0.044 (median -0.040) and the standard deviation in employment is 0.288, the shock has significant economic size. The economic impact is even more prominent, given that in the later years in our sample Portugal was suffering from the EU sovereign debt crisis. The debt crisis dynamics may have been correlated with our shock, but they are unlikely to have been predominately determined by it.[6] One standard deviation in our shock explains between 14 and 17 percent of the standard deviation in employment. The amount of variation explained by the shock is comparable to recent related studies Bentolila et al. (2017); Berton et al. (2018).

Table 5 shows the estimates of the elasticity of the wage bill (either full or base wage) in specifications where we control for the full set of controls and fixed effects, and consider both the full sample and the survivors. The estimates have a similar degree of precision as the employment ones, and the wage bill appears to have a higher elasticity to the shock with respect to employment. This might indicate that wages were being cut, or that there were compositional effects in firing/hiring. The flexible components of pay do not display a different volatility to the shock compared to base pay, indicating that firms cannot cut extra compensation more easily than base wages.[7] In the columns (5) and (6) we show the results of estimating a euro-to-euro sensitivity of payroll with respect to the cash-flow shock generated by the credit-supply variation. We scale the level variation in salaries between the pre- and post-periods and the variation in credit at the numerator of S_i in Equation (1) by the pre-period average level of sales. The estimated euro-to-euro sensitivity is 0.17 for the full sample and 0.23 for the survivor sample, which should deliver more precise estimates for the wage bill and employment for the entirety of the post-period. These values are close to standard values estimated in the literature.[8] The last column reports results of running the following linear probability model on a dummy which

[6]Consistently with the evidence presented in Table C.1, the coefficients in these regressions hardly move if we add direct controls for firm-level weighted exposure to sovereign debt at the end of 2009.

[7]This finding is confirmed by results on hours and normal hours, available upon request, which show that estimated elasticities of work hours to the shock are almost identical to the elasticities of employment.

[8]Schoefer (2022) provides a review of the values of the cash-flow dollar-to-dollar sensitivity estimated in the literature. Plausible estimates range from 0.2 to 0.6, and he calibrates his model for the US economy to obtain a 0.25 sensitivity, close to our intensive margin estimate.

is 1 upon firm exit:

$$P(exit_{i,t}) = \tau_t + \beta S_i + \mathbf{\Gamma X_{i,pre}} + FE_{i,t} + \varepsilon_{i,t}, \tag{2}$$

The credit shock has a substantial impact on the chances of firm survival. According to the estimates, a one-percent standard-deviation drop in the predicted treatment would increase the probability of firm exit between 0.63 percentage points per year, against an average exit rate of approximately 5 percent. The difference in the likelihood of firm exit for a firm exposed to the 10^{th} percentile of treatment as opposed to the 90^{th} would be 1.6 percentage points per year.

To assess the timing and persistence of the effects of the credit shock, we run a dynamic specification of the previous difference-in-differences:

$$Y_{i,t} = \gamma_i + \tau_t + \sum_{k \neq 2008} (\beta_k S_i + \mathbf{\Gamma_k X_{i,pre}}) \cdot \mathbb{1}\{t = k\} + FE_{i,t} + \varepsilon_{i,t} \tag{3}$$

where a different treatment coefficient is estimated for each year k. We normalize the treatment to be 0 in 2008, so that all the other treatment coefficients in the regressions can be interpreted as variation in the outcome with respect to its level in 2008. In this specifications the outcome variables are always expressed as ratios of the level of the outcome over its average in the pre-period. This means that the regressions are performed on the percentage change with respect to the average pre-period level of the outcome. We run these event-study regressions on survivor firms only, whom we identify through CB.

As evident from Figure 9, the treatment does not show pre-trends. Moreover, it has persistent effects that accumulate over time, weakly waning only in 2013.[9]

Table 16 shows the results of estimating Equation (1) on balance-sheet and other financial variables for our sample of survivor firms. The outcome variables are total assets, fixed assets (sum of tangible and intangible assets) and current assets, cash, sales, trade credits and debts to suppliers.[10] Total assets appear strongly responsive to the shock, with an estimated coefficient of 0.098, which has similar magnitude as the employment and wage bills coefficients. When we break down the effects by fixed and current assets, we see that the result is entirely driven by current assets, whereas the elasticity of fixed assets is not significantly different from 0, despite the fact that its magnitude is quite comparable to the employment estimate. In a similar fashion, we estimate a sizable and significant (at the 10-percent level) elasticity of trade credits to

[9]These results are qualitatively robust to checking for potential violations in parallel trends as in Rambachan and Roth (2023). Results available upon request.

[10]We take the logarithm of the variables with positive support, and the asinh of the variables that can take negative values.

the credit shock, possibly indicating that negatively hit firms ran down their existing trade credits over time while positively hit firms were willing to let their trade credits stock grow vis-à-vis their customers. We do not identify a significant elasticity for sales, cash or debt with respect to suppliers, possibly indicating that this alternative means of extracting liquidity from suppliers up the production chain was not readily available to firms.[11]

[11]In results available upon request we show that, by using an empirical specification as in Almeida et al. (2011), fixed capital growth is not responsive to short term capital variations, but only to long term credit variations for those firms which had a big share of long term credit (more than 20 percent) maturing right before the shock.

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C Appendix Tables

Table 1: Sample representativeness, 2005 firms with credit, QP

	FTE empl.	Wage bill	ST credit	Sales	# Firms
2006	0.55	0.62	0.58	0.60	0.14
2007	0.58	0.65	0.58	0.62	0.15
2008	0.62	0.67	0.58	0.64	0.16
2009	0.65	0.70	0.61	0.67	0.16
2010	0.66	0.71	0.61	0.68	0.17
2011	0.67	0.71	0.63	0.69	0.18
2012	0.67	0.72	0.64	0.69	0.18
2013	0.69	0.73	0.69	0.70	0.19

Shares of quantities per year, firms active in 2005 (QP) and with credit. Short-term credit is defined as a regular credit exposure with a maturity of less than one year (or a credit line, which is highly liquid and readily accessible). Full-time equivalent employment, salaries and sales from CB, in order to have consistency of representation over time.
By definition the potential set of firms under considerations excludes firm entry after 2005, but takes into account firms' exit from 2005 onwards. This is the reason why the coverage shares are increasing over time.

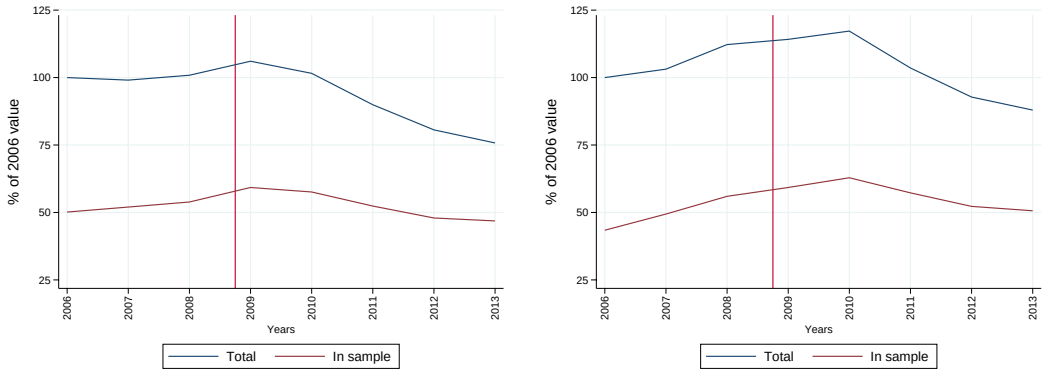
Table 2: Firm level descriptive statistics, sample of analysis - workforce composition

	Mean	SD	p25	p50	p75
Pre - 2009					
Share of managers	0.13	0.15	0.02	0.09	0.17
Specialized workers	0.33	0.27	0.10	0.24	0.52
Generic workers	0.51	0.31	0.22	0.56	0.79
High education	0.11	0.17	0.00	0.05	0.12
Medium education	0.47	0.24	0.28	0.45	0.65
Low education	0.42	0.29	0.16	0.41	0.65
Under 30	0.25	0.17	0.12	0.22	0.35
Att. incumbents	0.68	0.19	0.58	0.72	0.82
Post - 2009					
Share of managers	0.15	0.18	0.04	0.10	0.19
Specialized workers	0.37	0.27	0.14	0.31	0.56
Generic workers	0.47	0.30	0.20	0.50	0.73
High education	0.13	0.19	0.00	0.07	0.16
Medium education	0.52	0.24	0.34	0.52	0.70
Low education	0.35	0.27	0.10	0.32	0.55
Under 30	0.18	0.16	0.07	0.15	0.27
Att. incumbents	0.55	0.23	0.40	0.58	0.73

Descriptive statistics for the full (unbalanced) sample of analysis, with N=14,864 distinct firms. All workforce decomposition variables from QP.

D Appendix Figures

Figure 1: Credit dynamics in Portugal



(a) Total regular credit

(b) Long-term regular credit

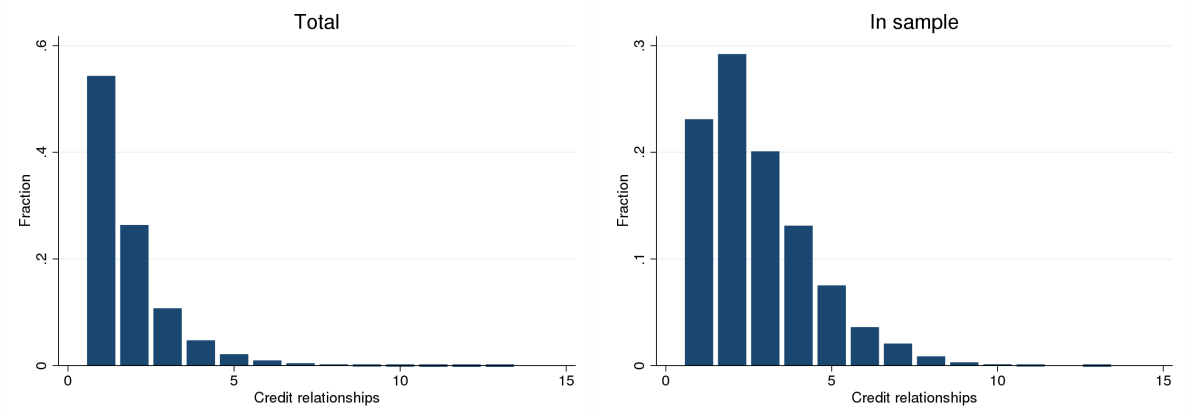
The Figures show the time series for the aggregate amount of total regular (left) and long-term credit (right) for the firms and banks in the sample. Total regular credit is credit not overdue or in renegotiation available to the firm. Long-term credit is any credit exposure with maturity greater than one year, with the exclusion of credit lines with no maturity. The red dotted line splits the sample in pre-period and post-period. Totals are expressed as a percentage total regular credit in 2006.
Source: *Central de Responsabilidades de Crédito* merged with *Quadros de Pessoal* (left), *Central de Responsabilidades de Crédito* merged with *Quadros de Pessoal* and banks' balance sheets (right), authors' calculations and sample selection.

Table 3: Regressions by labor share bins

	(1)	(2)	(3)	(4)
	(7*bins*)		(4*bins*)	
	Employment	*Exit*	*Employment*	*Exit*
$S_i \cdot \mathbb{1}(labsh\_q. = 1)$	-0.023	0.016	-0.032	0.010
	(0.064)	(0.022)	(0.045)	(0.016)
$\mathbb{1}(labsh\_q. = 2)$	0.006	0.013	0.085+	0.004
	(0.042)	(0.016)	(0.049)	(0.016)
$\mathbb{1}(labsh\_q. = 3)$	0.079	0.027	0.104*	-0.016
	(0.057)	(0.020)	(0.042)	(0.013)
$\mathbb{1}(labsh\_q. = 4)$	0.078	0.003	0.095+	-0.066*
	(0.049)	(0.015)	(0.051)	(0.021)
$\mathbb{1}(labsh\_q. = 5)$	0.104*	-0.041*		
	(0.055)	(0.019)		
$\mathbb{1}(labsh\_q. = 6)$	0.133*	-0.051*		
	(0.061)	(0.021)		
$\mathbb{1}(labsh\_q. = 7)$	0.053	-0.080**		
	(0.061)	(0.027)		
Firms	13760	13750	13760	13750

The table reports the coefficients in Figure 2. We estimate a coefficient for each of the seven (columns 1 and 2) or four (columns 3 and 4) labor-share bins, while controlling linearly for baseline effects. Each interacted treatment is instrumented by the interacted instrument. See Appendix A for the list of controls and fixed effects present in the regressions. Given that we cannot control for unobservable characteristics in the exit specifications through firm fixed effects, we characterize the bank-firm matching by augmenting the set of controls with the share of loans that each firm has with micro banks and with banks failing up to 2014. All fixed effects are interacted with a year dummy, while regressors are constant in the exit regressions. In the employment regressions fixed effects and regressors are interacted with the Post dummy. Number of firms: 13,750 (exit) and 13,760 (employment). Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2: Number of credit relationships



The Figure shows the distribution of the number of credit relationships by firm in 2005 for all firms with credit and in the QP (left) and for the firms in the sample of analysis (right).
Source: *Central de Responsabilidades de Crédito* merged with *Quadros de Pessoal*, authors' calculations and sample selection.

Table 4: Employment regressions

	(1)	(2)	(3)	(4)	(5)
			$log(\#emp)_{i,t}$		
S_i	0.066+	0.072*	0.070*	0.071*	0.087*
	(0.040)	(0.033)	(0.033)	(0.034)	(0.035)
Firms	14846	14830	13833	13804	11800
WID F	34.18	38.35	37.66	35.73	36.35
Sample	Complete	Complete	Complete	Complete	Survivors
Fixed effects	No	Yes	Yes	Yes	Yes
Controls	No	No	Fail b.c.	Yes	Yes

The regressions refer to the empirical specification in Equation (1) in the text. All regressions feature firm and time fixed effects. We refer to *Fail b.c.* as the estimation sample in which only the controls for which the balance checks have failed are included and controlled for. See the Appendix Section A for the list of controls and fixed effects in the regressions. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

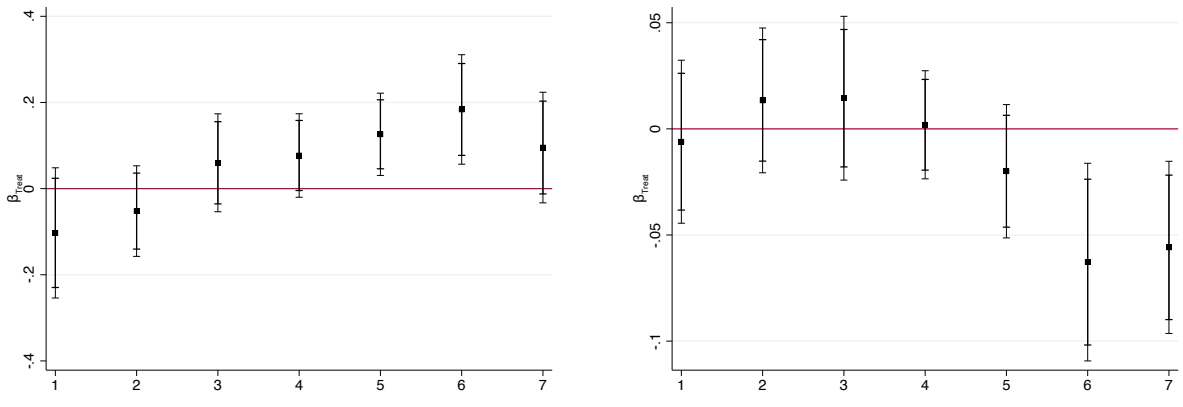
Table 5: Wage bill and exit regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$log(wage\ bill)_{i,t}$		$log(base\ wage\ bill)_{i,t}$		$wage\ bill_{i,t}/sales_{i,pre}$		$P(exit)_{i,t}$
S_i	0.092*	0.115**	0.094*	0.112**	0.168*	0.253**	-0.019+
	(0.038)	(0.041)	(0.038)	(0.040)	(0.083)	(0.083)	(0.011)
Firms	13804	11800	13804	11800	13804	11800	13796
WID F	35.73	36.35	35.73	36.35	42.43	46.43	36.20
Sample	Complete	Survivors	Complete	Survivors	Complete	Complete	

The regressions refer to the empirical specification in equation (1) in the text, except for column 7. The dependent variables are either the total wage bill (columns 1 and 2) or the base wage bill, which does not comprehend extraordinary or overtime payments (columns 3 and 4). In columns 5 and 6 the dependent variable is the ratio of wage bill to the pre-period average value of sales, whereas the treatment is the variation in average short term credit (as for the standard treatment) scaled by the pre-period average value of sales. The coefficients in columns 5 and 6 should be interpreted as dollar-on-dollar cash-flow pass through. The exit regression is a yearly linear probability model. In this specification we add to the controls the share of credit that a firm gets from micro-banks (i.e. excluding the the 10 largest banks) and the share of credit that the firm is getting from the banks failing before 2014, as we try to control indirectly for the unobservable characteristics related to these kinds of matching. See Appendix Section A for the list of controls and fixed effects in the regressions. All regressions feature a full set of 2005-06 controls and f.e., interacted with a *Post* dummies. In the linear probability model fixed effects are interacted with year dummies, whereas 2005-06 controls are not. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 3: Robustness regressions by labor share bins

(a) Residualized labor share



Employment Exit

(b) Wage bill labor share

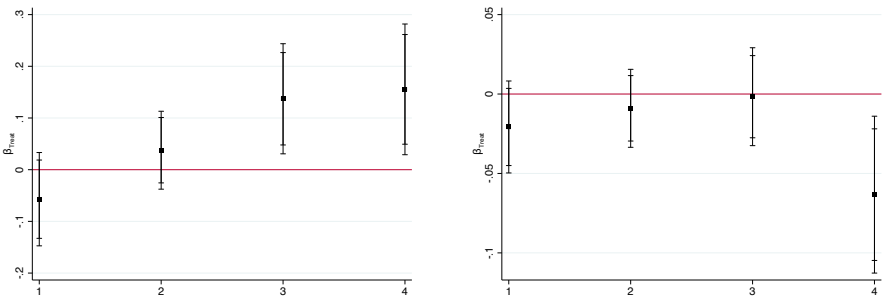
Table 6: Regressions by quartiles of on-the-job training scores

	(1) *Employment*	(2) *Exit*
$S_i \cdot \mathbb{1}(otj\_q. = 1)$	-0.005	-0.012
	(0.040)	(0.014)
$\mathbb{1}(otj\_q. = 2)$	0.123**	-0.002
	(0.041)	(0.025)
$\mathbb{1}(otj\_q. = 3)$	0.110*	-0.024
	(0.046)	(0.018)
$\mathbb{1}(otj\_q. = 4)$	0.143**	-0.036+
	(0.053)	(0.020)
Firms	13756	13746

On-the-job (otj) training is defined as work carried out under the supervision of more experienced workers, and ranges from 1 (short demonstration) to 9 (several years of training). We estimate a coefficient for each of the four otj training quartiles, while controlling by means of a third order polynomial of the otj score. Each interacted treatment is instrumented by the interacted instrument. See Appendix Section A for the list of controls and fixed effects present in the regressions. Given that we cannot control for unobservable characteristics in the exit specifications through firm fixed effects, we characterize the matching of firms to banks by augmenting the set of controls with the share of loans that each firm has with micro banks and with banks failing up to 2014. Additional controls for these specification using O*NET variables comprehend the scores for: required education, required previous experience and required amount of training on site. Results are unchanged if these additional controls are not added. See Section B.7 in the Internet Addendum for a description of each of these variables, and the on-the-job training score as well. All fixed effects are interacted with a year dummy, while regressors are constant in the exit regressions. In the employment regressions fixed effects and regressors are interacted with the Post dummy. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

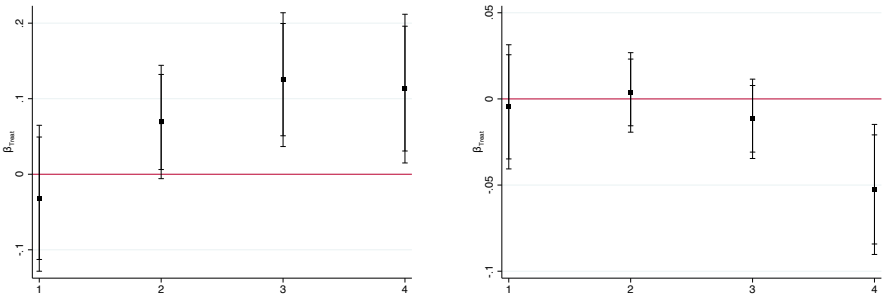
Figure 4: Robustness regressions by labor share bins

(a) Labor share (average of 2007 and 2008)



Employment Exit

(b) Labor share in sales



Employment Exit

(c) Labor share in total costs

Table 7: Employment - wage bill regressions: Manufacturing

	(1)	(2)	(3)	(4)	(5)	(6)
	$log(\#emp)_{i,t}$		$log(Wage\ bill)_{i,t}$		$log(Base\ wage\ bill)_{i,t}$	
S_i	0.118**	0.137**	0.166**	0.187**	0.153**	0.170**
	(0.041)	(0.047)	(0.056)	(0.062)	(0.052)	(0.057)
Firms	6347	5403	6347	5403	6347	5403
WID F	23.76	21.77	23.76	21.77	23.76	21.77
Sample	Complete	Survivors	Complete	Survivors	Complete	Survivors

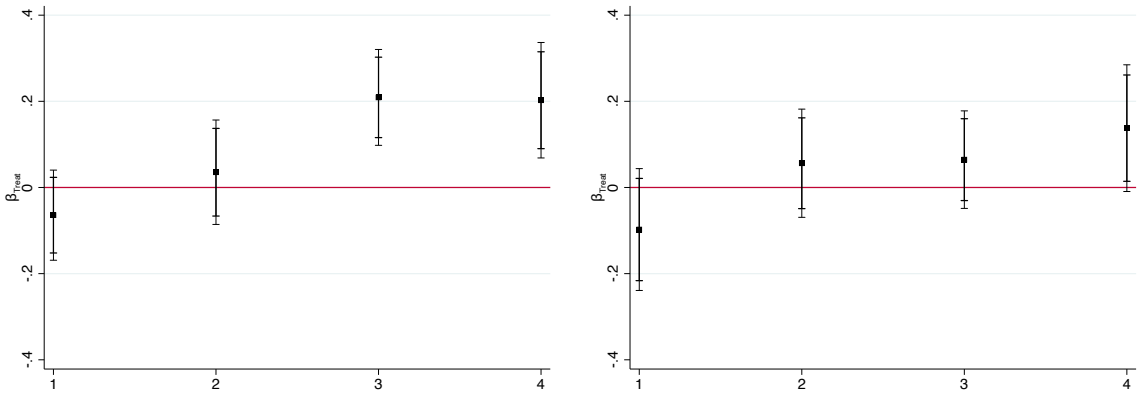
The regressions refer to the empirical specification in Equation (1) in the text. The dependent variables are the logarithm of: the number of employees (columns 1 and 2), the total wage bill (columns 3 and 4) or the base wage bill, which does not comprehend extraordinary or overtime payments (columns 5 and 6). See the Appendix Section A for the list of controls and fixed effects in the regressions. All regressions feature the full set of fixed effects and controls. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Heterogeneous employment regressions: Qualifications

	(1)	(2)	(3)	(4)	(5)	(6)
	$Managers_{i,t}$		$Spec.\ workers_{i,t}$		$Generic\ workers_{i,t}$	
S_i	0.075	0.136	0.339**	0.402**	0.077	0.107
	(0.103)	(0.107)	(0.129)	(0.135)	(0.063)	(0.066)
Firms	11404	9757	13000	11154	13174	11270
WID F	32.05	36.02	37.40	38.16	36.79	38.74
Sample	Complete	Survivors	Complete	Survivors	Complete	Survivors

The dependent variable in these regressions is the ratio of the number of specific workers to the average level of the pre-period corresponding amount. As such, the regressions are defined only for the firms for which the kind of worker is present in the pre-period (even if missing values for some years are possible). Workers' categories are derived by aggregating the 9 levels of qualification defined by the Portuguese Law (Decree-Law 380-80). The levels are based on the nature and complexity of the tasks performed by the workers within the firm. Generic workers carry out basic, routine and/or repetitive tasks that do not require any particular decision making. Specialized workers (team-leaders) on the other hand deal with more complex tasks that might require discretionary decision-making. Managers directed the general policy and are in charge of defining strategies and organization of the firm. The outcome variable is winsorized at the top 1% level. See the Appendix Section A for the list of controls and fixed effects in the regressions. All regressions feature the full set of fixed effects and controls. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 5: Balance sheet items and sales regressions by labor-share bins



(a) Total assets

(b) Total sales

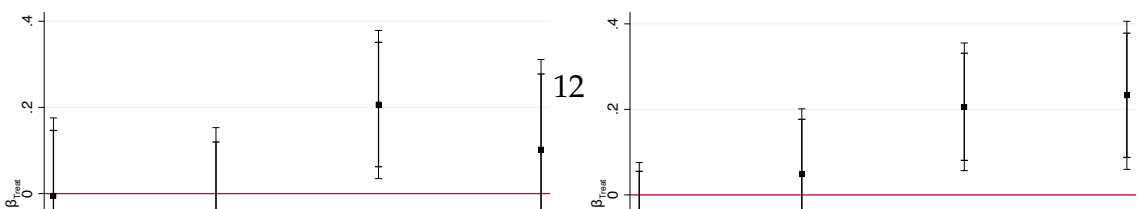
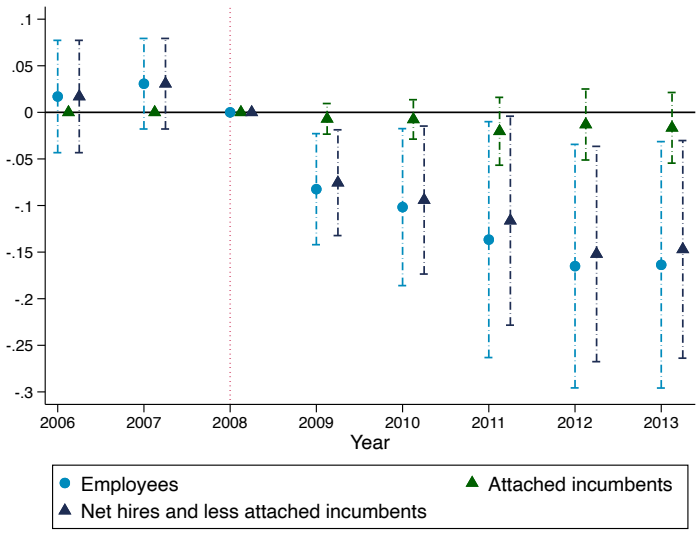


Table 9: Heterogeneous employment regressions: Age cohorts

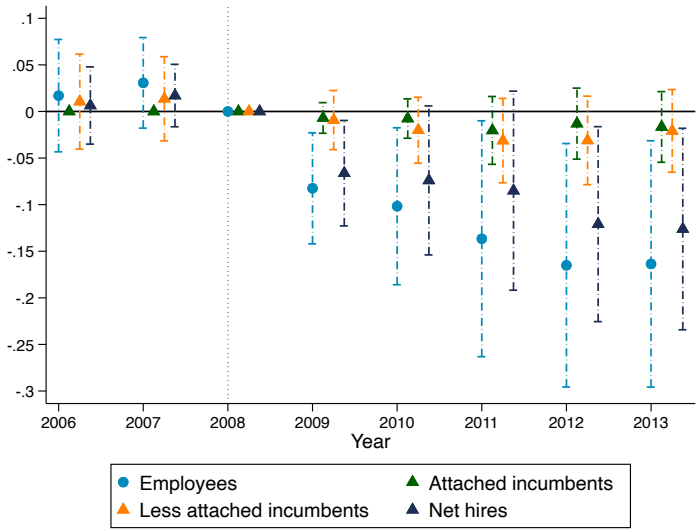
	(1)	(2)	(3)	(4)	(5)	(6)
	Young $w_{\cdot i,t}$		*Prime age* $w_{\cdot i,t}$		*Old* $w_{\cdot i,t}$	
S_i	0.171+	0.223*	0.087**	0.101**	0.078	0.040
	(0.098)	(0.102)	(0.030)	(0.031)	(0.058)	(0.054)
Firms	13208	11313	13804	11800	10677	9122
WID F	32.01	32.55	35.73	36.35	29.42	35.61
Sample	Complete	Survivors	Complete	Survivors	Complete	Survivors

The dependent variable in these regressions is the ratio of the number of specific workers to the average level of the pre-period corresponding amount. As such, the regressions are defined only for the firms for which the kind of worker is present in the pre-period (even if missing values for some years are possible). The age categories are: young workers (between 16 and 30), prime age workers (between 30 and 55) and old workers (between 56 and 65). Age cohorts are fixed over the period of analysis and defined depending on the age of the worker in 2008. The outcome variable is winsorized at the top 1% level. See Appendix Section A for the list of controls and fixed effects in the regressions. All regressions feature the full set of fixed effects and controls. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 6: Employment adjustment by tenure



(a) Attached incumbents vs. all other workers



(b) Attached incumbents vs. less attached incumbents and net hires

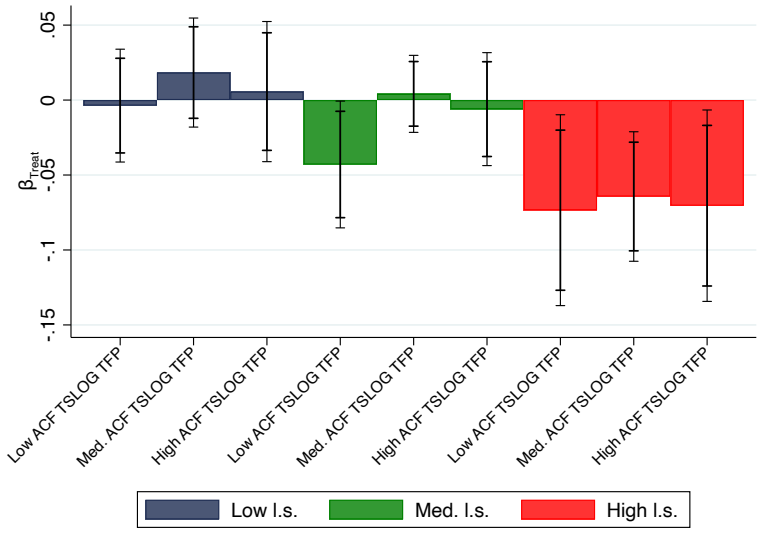
The dependent variables in these regressions are the ratio of the number of employees of the specific category over the average number of employees in the pre-period (2006-2008). By construction, the sum of the coefficients of each regression should be

Table 10: Employment and Exit regressions: collective agreements renewals

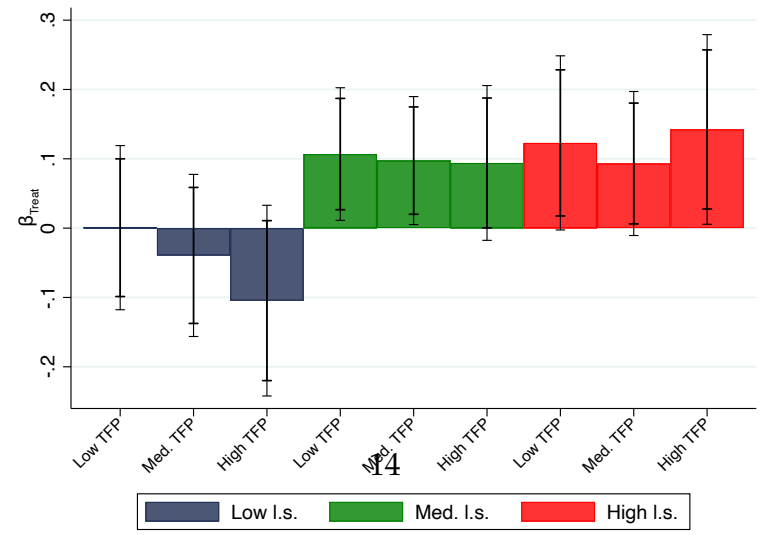
	(1)	(2)	(3)	(4)
	$log(\#emp)_{i,t}$		$P(exit)_{i,t}$	
S_i	0.071*	0.102*	-0.019+	-0.001
	(0.034)	(0.041)	(0.011)	(0.012)
$S_i \cdot jren_{1y}$		-0.073		-0.044*
		(0.051)		(0.020)
Firms	13804	13804	13796	13796
WID F	35.73	13.12	36.20	15.15

The dependent variable for columns 1 and 2 is the logarithm of the number of employees, whereas for columns 3 and 4 it a dummy equal to 1 if in the specific year the firm exits the market. The exit regression is a yearly linear probability model. In this specification we add to the controls the share of credit that a firm gets from micro-banks (i.e. excluding the the 10 largest banks) and the share of credit that the firm is getting from the banks failing before 2014, as we try to control indirectly for the unobservable characteristics related to these kinds of matching. Columns 1 and 3 report baseline estimates in Appendix Tables 4 and 5. Columns 2 and 4 report results of specifications with heterogeneous effects for firms which have renewed their collective bargaining agreement in the last year, where treatment and instrument are interacted with a dummy for this characteristic. Coefficients need to be interpreted as deviations from average ones. See Appendix Section A for the list of controls and fixed effects in the regressions. Regressions in columns 1 and 2 feature a full set of 2005-06 controls and fixed effects, interacted with a *Post* dummies. In the linear probability model fixed effects are interacted with year dummies, whereas 2005-06 controls are not. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 7: Regressions by labor-share and TSLOG-ACF-productivity bins



(a) Exit



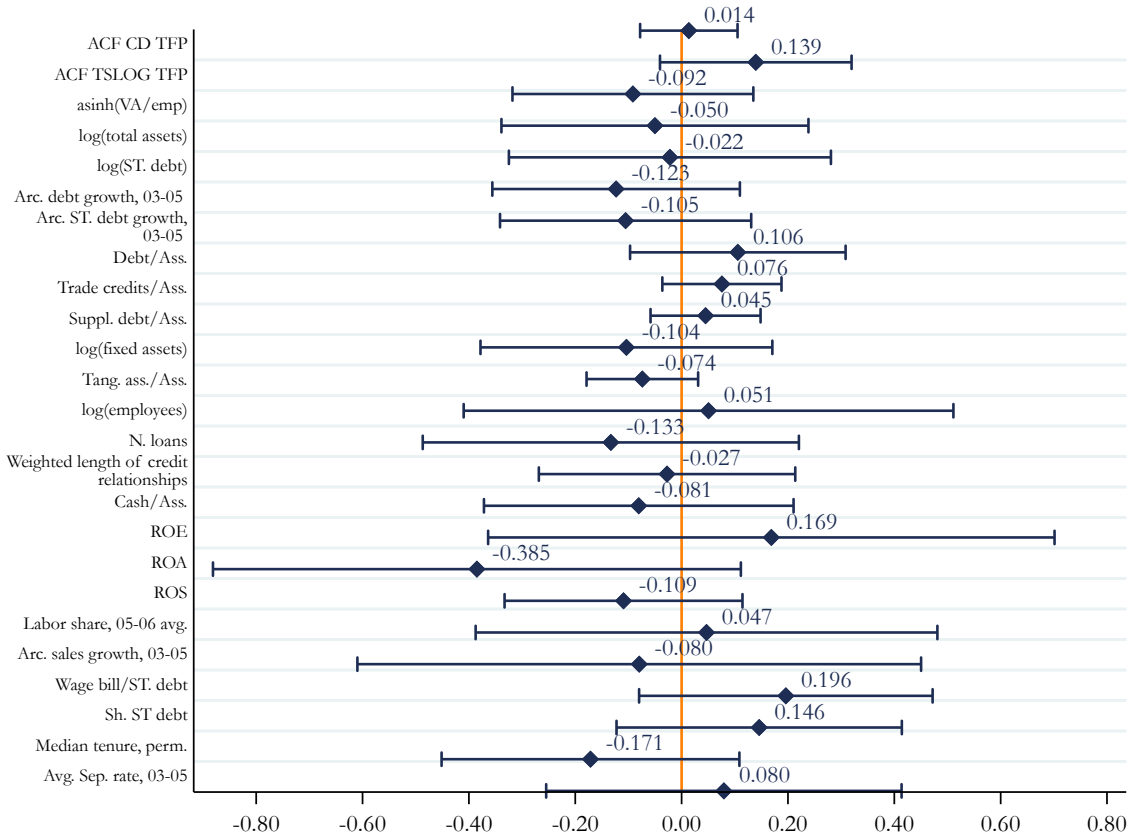
(b) Employment

Table 11: Regressions by TSLOG productivity bins (Ackerberg et al. (2015))

	(1) $log(\#emp)_{i,t}$	(2) $P(exit)_{i,t}$
S_i, *Low TFP*	0.080*	-0.033*
	(0.039)	(0.015)
, *Med. TFP*	0.077*	-0.014
	(0.037)	(0.012)
, *High TFP*	0.073	-0.022
	(0.045)	(0.017)
Firms	13285	13277
WID F	11.15	11.59
Firm FE	Yes	No

See Section A for a list of the added controls and fixed effects present in the regressions. All regressions feature the full set of fixed effects and controls. In addition to that specification we control for average TFP in 2005 and 2006, estimated by the Ackerberg et al. (2015) methodology by means of a three factors of production gross output translog production function. TFP can be estimated for less firms than in the full samples depending on availability of the variables to compute it in CB. Given that we cannot control for unobservable characteristics in the exit specifications through firm fixed effects, we characterize the bank-firm matching by augmenting the set of controls with the share of loans that each firm has with micro banks and with banks failing up to 2014. We control linearly for the baseline effect of productivity. In the exit specification the fixed effects are interacted with year dummies, whereas the controls are kept constant and not interacted with any year dummy. In the employment specifications all variables are interacted with a post-period dummy. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 8: Balance checks (Borusyak et al., 2022)



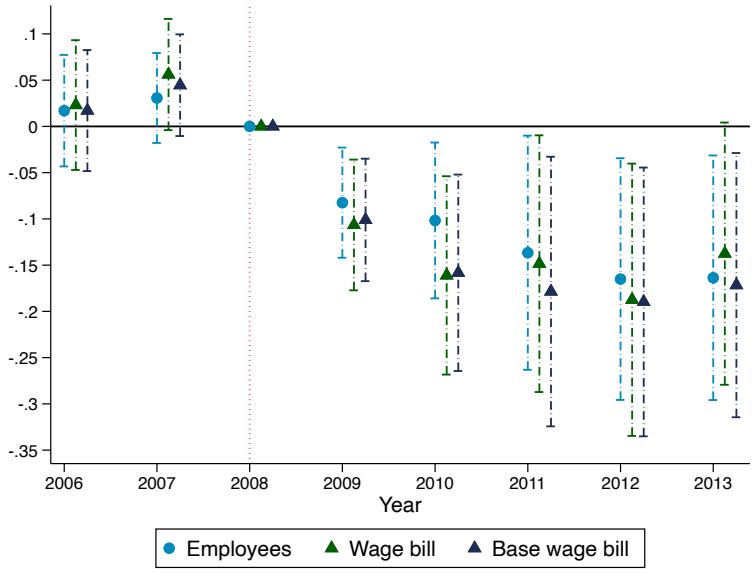
The Figure shows the coefficients (with 95% confidence intervals) of pairwise regressions of the standardized value of each variable in 2005 (unless reported otherwise) on the (standardized value of the) instrument Z_i. The regressions are run at the bank level, and all regressors are weighted bank exposures to firm characteristics, according to the method exposed in (Borusyak et al., 2022). Before weighting firm characteristics at the bank level, the variables are regressed on the fixed effects used throughout the analysis in the paper (see Section A for a list), and residuals are calculated and used in the analysis. Standard errors robust to heteroskedasticity.

Table 12: Regressions by labor-share and productivity bins

	(1) *Employment*	(2) *Exit*
S_i, *Low Lab.Sh., Low TFP*	-0.078	-0.001
	(0.068)	(0.021)
S_i, *Low Lab.Sh., Med. TFP*	-0.066	0.016
	(0.066)	(0.020)
S_i, *Low Lab.Sh., High TFP*	-0.021	0.011
	(0.052)	(0.018)
S_i, *Med. Lab.Sh., Low TFP*	0.099*	-0.022
	(0.046)	(0.015)
S_i, *Med. Lab.Sh., Med. TFP*	0.120*	-0.012
	(0.049)	(0.014)
S_i, *Med. Lab.Sh., High TFP*	0.069	-0.001
	(0.060)	(0.021)
S_i, *High Lab.Sh., Low TFP*	0.085	-0.078**
	(0.058)	(0.025)
S_i, *High Lab.Sh., Med. TFP*	0.117**	-0.063*
	(0.067)	(0.030)
S_i, *High Lab.Sh., High TFP*	0.175**	-0.079*
	(0.066)	(0.036)
Firms	13258	13248

We estimate a coefficient for each of the nine interacted bins, while controlling linearly for baseline effects and their interaction. Each interacted treatment is instrumented by the interacted instrument. Labor share is defined as the ratio between employment-related costs and total value added (average of 2005-2006 levels). Productivity is estimated on a 3-inputs gross output Cobb-Douglas production function following Ackerberg et al. (2015), by 2-digit industrial sectors. See the Online Appendix Section A for the list of controls and fixed effects present in the regressions. Given that we cannot control for unobservable characteristics in exit specifications through firm fixed effects, we characterize the matching of firms to banks by augmenting the set of controls with the share of loans that each firm has with micro banks and with banks failing up to 2014. All fixed effects are interacted with a year dummy, while regressors are constant in the exit specifications. In the employment specifications All fixed effects and controls are interacted with a *post* dummy. Sample size depends on availability of non-missing variables in CB. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 9: Employment and wage bill regressions: event study



The dependent variables in these regressions are the ratio of the number of employees (wage bill) over the average of their level in the pre-period (2006-2008). In the specifications the coefficient for the year 2008 are normalized to 0, so that all the other coefficients have to be interpreted as the effect on the percentage variation of employment or wage bill with respect to the 2008 level. The sample includes only survivor firms (N = 11,801), but is not balanced. The graph displays the effect of a negative shock. See Appendix Section A for the list of controls and fixed effects in the regressions. All regressors and fixed effects are interacted with a year dummy. 95% confidence intervals displayed, standard errors clustered at the bank-industry pair level.

Table 13: Reallocation and TFP by labor share - full dataset

	(1) $exit_{i,t}$	(2) $\Delta \log(emp)_{i,t+1}$	(3) $\Delta \log(ftemp)_{i,t+1}$	(4) $\Delta \log(fixed\ cap.)_{i,t+1}$
$TFP_{i,t} \cdot \mathbb{1}(labsh\_q. = 1)$	-0.0370***	0.0298***	0.0267***	0.0183+
	(0.0049)	(0.0069)	(0.0067)	(0.0105)
$\mathbb{1}(labsh\_q. = 2)$	-0.0390***	0.0339***	0.0325***	0.0249*
	(0.0051)	(0.0070)	(0.0069)	(0.0115)
$\mathbb{1}(labsh\_q. = 3)$	-0.0400***	0.0352***	0.0334***	0.0274*
	(0.0053)	(0.0069)	(0.0070)	(0.0110)
$\mathbb{1}(labsh\_q. = 4)$	-0.0454***	0.0444***	0.0413***	0.0322**
	(0.0049)	(0.0069)	(0.0070)	(0.0105)
$Post\ Lehman_t \cdot \mathbb{1}(labsh\_q. = 1)$	0.0005	-0.0001	0.0000	-0.0014
	(0.0010)	(0.0035)	(0.0032)	(0.0048)
$\mathbb{1}(labsh\_q. = 2)$	0.0005	-0.0049	-0.0055	-0.0107
	(0.0008)	(0.0036)	(0.0034)	(0.0066)
$\mathbb{1}(labsh\_q. = 3)$	0.0011	-0.0059	-0.0064	-0.0062
	(0.0010)	(0.0042)	(0.0041)	(0.0056)
$\mathbb{1}(labsh\_q. = 4)$	0.0027+	-0.0095***	-0.0087**	-0.0119*
	(0.0015)	(0.0027)	(0.0028)	(0.0056)
$asinh(VA/emp)_{2005-2008}$	-0.0112***	-0.0031*	0.0014	0.0077+
	(0.0011)	(0.0013)	(0.0013)	(0.0040)
Firms	178294	170044	169324	176376
N	802568	767934	762156	845980
Industry fixed effects	Yes	Yes	Yes	Yes
Labor share quartile by post-Lehman FE	Yes	Yes	Yes	Yes

The regressions refer to the empirical specification in equation (12) in the text. A different coefficient is jointly estimated for each labor share bin, and a variation of slope is estimated for the years post 2008. Labor share is computed as the average ratio of employment costs over value added for the years from 2005 to 2008. In all specifications a control for the average value added per employee in the period from 2005 to 2008 is added. All regressions feature 3-digits industry fixed effects, and labor share quartile by post-Lehman dummy fixed effects. The sample consists of all firms in QP matched with CB for which TFP can be computed (with the exclusion of the energy and construction sector). All variables refer to the outcomes from t to $t+1$. We measure employment either as total headcount of full time equivalent employment, as reported in CB. The exit regression excludes the year 2005, given the CB structure. Standard errors clustered at the 3-digits industry level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Wedge regressions

	(1) $Lab.\ wedge_{i,t}$	(2) $Cap.\ wedge_{i,t}$	(3) $Mat.\ wedge_{i,t}$
S_i	-0.0088+	0.0023	-0.0136
	(0.0046)	(0.0049)	(0.0083)
Firms	11708	12821	12986
WID F	29.42	35.47	35.00
Sample	Complete	Complete	Complete

Outcome variables are winsorized at 0.5^{th} and 99.5^{th} percentiles. See Section A for a list of the added controls and fixed effects present in the regressions. All regressions feature the full set of fixed effects and controls. Regressions are run on the full sample for all firms for which it was possible to calculate the input wedges. Standard errors clustered at the bank-industry pair level.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: Robustness: instrument effects on credit post 2010

	(1)	(2)	(3)	(4)	(5)
			$\Delta D_{st,2013-2010}$		
$\Delta\ D_{st,2010-2006}$	-0.220***	-0.231***	-0.252***	-0.253***	-0.250***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)
Z_i	0.240	-0.041	-0.142	-0.170	-0.147
	(0.277)	(0.257)	(0.259)	(0.261)	(0.260)
W. Sov.				-0.990+	
share in Q4-2009, 2005 banks				(0.589)	
W. Sov.					-1.235*
share in Q4-2009, 2009 banks					(0.629)
Firms	12883	12865	12059	12059	11880
Fixed effects	No	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes	Yes

The regressions refer to the empirical specification in equation (B.2) in the text. See Appendix Section A for the list of controls and fixed effects in the regressions. The sample consists of firms with (short-term) credit relationships in 2010. Columns 4 and 5 control directly for firms (weighted) exposure to banks average sovereign debt holdings over assets in 2009 (Q4), either considering banks with which the firms has a relationship in 2005 (4) or 2009 (5). Standard errors clustered at bank-industry pair level.

$^{+}\ p < 0.10, ^{*}\ p < 0.05, ^{**}\ p < 0.01, ^{***}\ p < 0.001$

Table 16: Balance sheet and financials regressions

	(1) $log(assets)_{i,t}$	(2) $log(sales)_{i,t}$	(3) $arsinh(cash)_{i,t}$	(4) $arsinh(trade\ credits)_{i,t}$	(5) $arsinh(suppliers'\ debt)_{i,t}$	(6) $log(fixed\ assets)_{i,t}$	(7) $log(current\ assets)_{i,t}$
S_i	0.098*	0.041	-0.128	0.409+	0.020	0.062	0.109*
	(0.041)	(0.044)	(0.129)	(0.225)	(0.117)	(0.071)	(0.054)
Firms	11800	11552	11800	11800	11800	11797	11790
WID F	36.35	35.81	36.35	36.35	36.35	36.32	36.75

When the *arsinh* is used, the variable is expressed in net terms and can take negative values. Outcome variables are winsorized. Variables expressed in logs that can take only positive values are right-tail winsorized at the 97.5^{th} percentile. Variables expressed as arsinh are winsorized on both tails, at the 1^{st} and 99^{th} percentiles. Sample size varies depending on the availability of the balance sheet item in a consistent way in CB (after harmonization of balance sheet data across the two different accounting systems, pre- and post- 2010). The regressions are carried out on the sample of firms surviving up to 2013. See Appendix Section A for a list of the added controls and fixed effects present in the regressions. All regressions feature the full set of fixed effects and controls. Standard errors clustered at the bank-industry pair level.

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$