CSEF

Centre for Studies in Economics and Finance

WORKING PAPER NO. 533

Relationship Lending on Employment Decisions in Firms' Bad Times

Pierluigi Murro, Tommaso Oliviero and Alberto Zazzaro

June 2019

This version April 2020

University of Naples Federico II

University of Salerno

Bocconi University, Milan

CSEF - Centre for Studies in Economics and Finance
DEPARTMENT OF ECONOMICS – UNIVERSITY OF NAPLES
80126 NAPLES - ITALY
Tel. and fax +39 081 675372 – e-mail: csef@unina.it
ISSN: 2240-9696

CSEF
Centre for Studies in Economics and Finance

WORKING PAPER NO. 533

Relationship Lending on Employment Decisions in Firms' Bad Times

Pierluigi Murro*, Tommaso Oliviero and Alberto Zazzaro*****

Abstract
Using firm-level survey information, we investigate whether relationship lending affects firms' employment decisions when they experience negative shocks on sales. We find that firms maintaining long-lasting relationships with their main bank show a significantly lower sensitivity of employment growth rate to shocks in sales. This result is robust to measurement issues and to an instrumental variable strategy, and is stronger for young, small, human-capital-intensive firms. Our findings indicate that relationship lending acts as an insurance for firms' employees against adverse sales fluctuations, especially for firms whose internal workforce is more valuable and is thus substitutable at larger costs.

Keywords: Employment, relationship banking, insurance

JEL Classification: G32, G38, H53, J65

* LUISS-Guido Carli University. E-mail: pmurro@luiss.it.

** Università di Napoli and CSEF; email: tommaso.oliviero@unina.it

*** Università di Napoli and CSEF; email: alberto.zazzaro@unina.it

Table of contents

1 Introduction

The recent debate on the future of the financial intermediation industry has been mainly centered around the disruptive effects of the new Financial Technology (FinTech) era on the traditional banking business model (Petralia *et al.*, 2019). In particular, one of the highlighted potential consequences of the FinTech revolution is the erosion of the relationship-based dimensions of banking. This can have an impact on firms' financing constraints, but it could also have indirect effects on firms' employees and other suppliers or customers.

The banking literature has commonly recognized the information and insurance benefits of relationship lending for borrowers (Allen and Gale, 1999; Berlin and Mester, 1999; Boot, 2000; Kysucky and Norden, 2016). Maintaining close and long-lasting relationships with the main bank allows firms, especially if informationally opaque, to have easier access to external finance (Petersen and Rajan, 1994; Berger and Udell, 1995), and keep their credit lines and interest payments largely unchanged when facing economy-wide financial downturns (Sette and Gobbi, 2015; Bolton *et al.*, 2016; Beck *et al.*, 2018a) and idiosyncratic adverse liquidity conditions (Hoshi *et al.*, 1990; Rosenfeld, 2014). However, the literature still lacks a comprehensive assessment of the ultimate recipients of close bank relationships beyond the firms' shareholders. In this paper we contribute to fill this gap by analyzing the role of relationship lending on firms' employment decisions. We investigate empirically whether and in what way the employment response of firms to negative shocks on sales is affected by the length of the lending relationships that they have with their main bank.

We focus on negative shocks because it is in bad times that unemployment risk materializes, adversely affecting workers' well-being by generating significant pecuniary and non-pecuniary losses, both while unemployed and upon re-employment (Jacobson *et al.*, 1993; Goldsmith *et al.*, 1996; Clark *et al.*, 2001; Low *et al.*, 2010). Therefore, it is important to explore whether, in what way and how far the liquidity insurance provided by relationship banking reflects on the employment decisions of poorly performing firms.

In theory, the impact of close bank-firm ties on employment response to a negative shock on sales is ambiguous. On the one hand, based on the implicit contract argument, if risk-neutral firms have easy access to financial markets and risk-averse workers face an imperfect labor

market and high labor mobility costs, the former can diversify idiosyncratic risk better than the latter and are able to provide employment insurance by setting an implicit commitment to the terms of the labor contract and employment levels (Baily, 1974; Azariadis, 1975). Furthermore, in presence of firing, hiring and training costs, financially unconstrained firms that face a temporary decline in sales may prefer to hoard unnecessary labor rather than dismiss and re-hire their workforce (Giroud and Mueller, 2017; Caggese *et al.*, 2019). In line with these arguments, long-lasting lending relationships with the main bank could guarantee firms access to finance for paying wages and restructuring investments, without cutting employment.

On the other hand, while financially unrestricted firms employ labor and physical capital based on their productivities and costs, financially constrained firms use labor more intensively because informed employees can be an implicit source of external finance (via low initial wages) that is more favorable than uninformed capital suppliers (Garmaise, 2008). In this environment, financially unconstrained firms hit by a negative shock are more likely to lay off unproductive workers. Therefore, if having close banking ties softens firms' financing constraints, long-lasting relationships with the main bank could be associated with a lower probability of retaining employees in response to a sales downturn.

Finally, the relational banks themselves may have an interest in influencing the employment decisions of distressed firms, again with potential insurance or disciplinary effects. Indeed, relational banks can find it advantageous to curb dismissals by poorly performing firms, in order to prevent the negative effects on workers' income and local aggregate demand, which in turn can adversely affect their funding ability and loan portfolio performance (Giannetti and Saidi, 2019; Ogura *et al.*, 2019). At the same time, however, relational banks have more accurate information on borrowing firms and a greater share of their debt. As informed lenders, they can have incentives to pressure distressed firms into rapid restructuring actions, including employee layoffs (Admati and Pfleiderer, 1994; Baglioni *et al.*, 2018).

To empirically address such ambiguous theoretical predictions, we consider a repeated cross-sectional sample of Italian manufacturing firms observed in the (tranquil) period 1995-2006. We exploit the heterogeneities in the intensity of shocks on sales turnover experienced by firms and in the length of their relationships with the main bank. We find that, in the wake of

negative shocks on sales, firms with long-lasting lending relationships reduce their workforce significantly less than other companies. This result supports the implicit contract and labor hoarding hypotheses that there is a positive spillover from the liquidity insurance provided by durable banking relationships to employment retention.

Two major empirical concerns in testing for a causal effect of relationship lending on firms' employment response to negative shocks in sales turnover are the potential reverse causality between sales and performance, and the possibility that unobserved factors are correlated with both the decisions about employment retention and lending relationships. To reduce the problem of reverse causality, we follow the strategy used by Ellul *et al.* (2017) and consider for each firm the shock in the total sales of its industrial sector, excluding the firm's own sales. To take into account possible omitted variables bias, in the spirit of Guiso *et al.* (2004), we instrument relationship banking (measured at the firm level) by exploiting variation in local banking markets in 1936 as resulted from the strict structural regulation of the Italian banking industry set by the banking law in that same year. The assumption is that the geography of bank branches that originated from the law was quasi-randomly distributed, largely uncorrelated with the geographical distribution of economic activity at time, and even more so it is orthogonal to the firms' employment decisions in the recent years.

In the second part of the paper, in order to shed light on the economic mechanism behind our baseline findings, we exploit cross-sectional heterogeneities in firms' individual and labor market characteristics in our sample. We find that the effect of relationship lending for firms' employees against adverse sales fluctuations is especially significant for young and small firms, for which access to external finance is arguably more problematic, and for human-capital-intensive firms, for which workers are arguably more valuable and replaceable at larger costs. Finally, we show that the effect is larger and significant for firms that face tighter legal frictions in the labor market as measured by local judicial inefficiencies. All these results are consistent with a labor hoarding process that follows adverse shocks for firms that engage in longer relations with their main bank.

This paper is related to three different strands of literature. First, our results contribute to the labor and finance literature. A number of recent studies provide robust evidence that

firms linked to banks impaired by the global financial crisis, the sovereign debt crisis in the euro area, or other exogenous financial shocks, have experienced a lower employment growth than other comparable firms that borrow from healthier banks (Chodorow-Reich, 2014; Bottero *et al.*, 2015; Cingano *et al.*, 2016; Acharya *et al.*, 2018; Balduzzi *et al.*, 2018; Bentolila *et al.*, 2018; Berton *et al.*, 2018; Popov and Rocholl, 2018; Barbosa *et al.*, 2019). With the exception of Banerjee *et al.* (2017), who analyze the role of long-lasting bank relationships in shaping the degree of propagation of the 2007-2008 credit crunch on firms' total labor cost, none of the above studies focus on the role of relationship lending. Furthermore, while the above studies are centred on the effect of bank-specific shocks in times of high systemic risk, our analysis focuses on the impact of firms' individual sales shocks during a period of global financial stability and moderate macroeconomic expansion.

In this respect, more closely related to our work, other studies explore whether the employment response of firms hit by adverse shocks depends on their financial condition. Ofek (1993), Calomiris *et al.* (1994) and Sharpe (1994) find that highly leveraged firms are more likely to dismiss employees than low leveraged firms after a drop in sales or stock returns. Giroud and Mueller (2017) analyze the employment response of US firms experiencing a decline in local demand during the Great Recession and, in line with the previous literature, they find that the establishments of low leveraged firms engaged in labor hoarding by limiting reduction of the workforce. Consistently, Ersahin and Irani (2020) find that US firms with tighter financial constraints experience significantly larger declines in employment expenditures and employees in response to firm-level negative shocks to collateral values.

However, still largely unexplored in the labor and finance literature are the conditioning effects of bank-firm ties on the employment decisions of underperforming firms. The only exception of which we are aware is Kang and Shivdasani (1997) who analyzes a small sample of 92 Japanese corporations experiencing a sudden, sharp decline in the yearly pretax operating income in the 1986-1990 period. Consistent with a discipline effect, they find that the probability of firing workers in the wake of a liquidity shock is positively associated with the equity ownership by the main bank.

Second, our paper contributes to the empirical literature on the role of firms as employment

insurance providers, beyond public insurance systems.[1] Recent papers have exploited variation in firms' corporate ownership structure as a measure of the degree of commitment that the firm can provide for their workers. They hypothesize that family firms are relatively more able to commit over a long time horizon, and consistently find that they supply more employment insurance than non-family firms (Sraer and Thesmar, 2007; Bassanini *et al.*, 2013; Ellul *et al.*, 2017). We complement these works by providing evidence that another economic mechanism that embeds commitment over implicit labor contracts stems from the liquidity insurance offered by durable lending relationships with the main bank. Finally, our results contribute to the literature about the impact of relationship lending on real outcomes such as firms' growth, capital accumulation, R&D expenditures, innovation and export (Herrera and Minetti, 2007; Alessandrini *et al.*, 2010; Gambini and Zazzaro, 2013; Ferri *et al.*, 2019a).

The rest of the paper is organized as follows. In Section 2 we describe the Italian institutional background. Section 3 presents our data and summary statistics. In Section 4 we show our main empirical results on firms' employment decisions. In Section 5 we extend the analysis to the cost of labor, while in Section 6 we conduct a series of sub-sample evaluations to explore the mechanisms through which relationship banking affects firms' employment decisions. Finally, in Section 7 we provide concluding remarks.

2 Institutional background

Italy provides an ideal context for testing the role of relationship banking on employment decisions in firms' bad times. Similar to other continental European countries, the Italian labor market is historically characterized by large rigidities and high degrees of employment protection, especially in terms of firing restrictions (Berton *et al.*, 2012). According to OECD statistics, from 1997 to 2013, respectively the first and last year analyzed in Giovannini *et al.* (2015), Italy features one of the three highest levels of employment protection legislation (EPL) against individual and collective dismissals of permanent workers in OECD countries, significantly larger than Canada, the U.K. and the U.S., and in line with Belgium, France, Germany, the Netherlands, Portugal and Sweden. Complexity, delays and excessive length of civil proceedings in

[1] See Guiso and Pistaferri (2020) and Pagano (2019) for recent reviews of the related literature.

Italy introduce additional costs and risks for firms deciding on employee dismissals, and for workers deciding on whether to file a lawsuit for unfair dismissal. In response to these rigidities, starting from the second half of the 1990s, the Italian labor market has been affected by a series of legislative changes aimed at increasing flexibility and introducing atypical, fixed-term work arrangements. As a result, the share of temporary employment with atypical contracts increased from 7.2% of total employment in 1995 to 13.01% in 2006 (and 17.02% in 2018), a figure above the average value in European Union countries, similar to that prevailing in Finland, Sweden and France.[2]

Consistent with the theoretical arguments of Bentolilla and Bertola (1990) and Mortensen and Pissarides (1994, 1999), the high level of EPL and firing costs has decreased movement from unemployment into employment and job mobility. In Italy, the average ratio of long-term non-employed individuals to the unemployed labor force in the period 1995-2006 was 58.9% (it was 59% in 2018), almost twice the average ratio of OECD countries in the same period. Furthermore, Jin *et al.* (2016) document that, conditional on job separation, Italian workers show a low probability of re-employment within one year of the period in question and display large and permanent earning losses. These statistics support the external validity of our analysis, showing that the features of the Italian labor market are basically unchanged after our sample period.

Moving on to the business structure, Italy features a predominance of small and medium enterprises (SMEs) in the non-financial business sector (NFBS). In 2018, SMEs are 99.9% of NFBS enterprises and account for 78.1% of employment and 66.9% of value added, not very different from figures in 2000 (80% and 71%, respectively).[3] Typically, SMEs suffer from a "financing gap" and, especially in turbulent times, they can face significant obstacles in accessing external finance to fund investments and running costs. Small business lending has a high content of soft information and is often provided on a relational basis. Banks represent the main source of external finance for Italian SMEs, while debt securities and equities are

[2]For young workers between the ages of 15 and 24, the corresponding share of temporary contracts was 17.92% in 1995, 40.91% in 2006 (and 64% in 2018). OECD statistics available at https://data.oecd.org/emp/labour-force.htm.

[3]See ESCB (2007) and European Commission (2019). For an OECD-level comparison in the 90s, see Bartelsman *et al.* (2005).

relatively little used.[4] Overall, the predictions of the implicit contract and the labor hoarding hypotheses, as well as the potential insurance and discipline effects of relational banks, all have a possible fit with the characteristics of the Italian labor market, business sector and banking industry. The dualistic structure of the Italian labor market, characterized by the high dismissal costs of permanent workers and the insecurity of fixed-term employment, the importance of SMEs and their high dependence on bank lending are similar to that observed in other countries of continental Europe. All these aspects make Italy a suitable laboratory for our empirical investigation and enhance the external validity of our findings.

3 Data and summary statistics

3.1 Data Description

Our main data sources are the "Survey of Italian Manufacturing Firms" (SIMF) conducted by the Italian banking group UniCredit-Capitalia and the BvD-AIDA database.[5] We use four waves of the UniCredit-Capitalia survey, each covering a three-year periods ending respectively in 1997, 2000, 2003 and 2006.[6] The SIMF collects detailed information about companies' ownership and governance structures, workforce characteristics and bank-firm relationships, export and internationalization activities, investments in innovation and R&D expenditure. Industry codes (ATECO) at different digits are also reported. Some of these variables (e.g., investments and total sales) are available for each year covered by the survey, while others refer to the three–year period covered by the survey (e.g., innovation activities or commercial partnership)

[4]Between 2000 and 2008 (the main period of our analysis), the share of total debt of NFBS firms made up of debt securities was lower than that in the rest of the euro area countries (4.9% versus 8.8%), while bank loans represented 85.8% (against 85.7% in the euro area; see ESCB (2013)). These figures are not very different from figures in the 2010s (in 2015 only 5.3% of Italian SMEs had bonds outstanding). From 1996 to 2000, just over 200 firms went public by launching an IPO in Italy, and the number was still lower from 2000 to 2013 (Acconcia *et al.*, 2011; Giovannini *et al.*, 2015). According to the World Bank (2001), in 2000 the stock market capitalization of listed domestic companies (as a percentage of GDP), was 67.3% in Italy, compared to 146.9% in the United States or 156.4% in the United Kingdom, but in line with Germany (65.1%).

[5]The SIMF has been widely used in the empirical literature on Italian manufacturing firms, in particular in that on firms' financial constraints and relationship banking. Amongst others, see Herrera and Minetti (2007), Benfratello *et al.* (2008), Alessandrini *et al.* (2009), Presbitero and Zazzaro (2011), Minetti and Zhu (2011), Ferri and Murro (2015) and Murro and Peruzzi (2019).

[6]Later waves of Unicredit surveys on Italian manufacturing firms cover the financial crisis started in 2008. To avoid confounding effects due to the crisis, we thus preferred to consider the four waves covering the period 1995-2006.

or to the last year (e.g., legal form and ownership structure, the relationships with banks and access to credit). The dataset includes a random, representative sample of all manufacturing firm with 10 to 500 employees – stratified by five classes of employees, the four Pavitt's industry categories (supplier-dominated, scale intensive, specialized suppliers, science-based) and two geographical areas (North and Center-South) – and the universe of Italian manufacturing firms with more than 500 employees. In all, approximately 4,000 firms were interviewed in each survey wave. For all the surveyed firms, we are able to attach balance-sheet information provided by BvD-AIDA, the most comprehensive source of financial information for Italian companies.

Table 1 displays summary statistics of the variables used in the empirical analysis (for all firms, by sales variation and by lending duration). The mean level of total assets is 20.3 million euro, while the median is about 5 million euro (in terms of employees, the average number is 108 and the median 32). On average, the businesses in our sample are 25.7 years old, with a median of 21. With regard to the firms' legal structure, 56.4% of the firms are private limited companies, 2% are publicly listed and the rest are public limited companies. The firms' geographic distribution shows that 68.4% of firms are located in the North of Italy, while 17.9% of the firms are in the Center and 13.7% in the South. According to Pavitt's taxonomy (Pavitt, 1984), the distribution among sectors exhibits the predominance of businesses operating in traditional manufacturing sectors (48.7%). Finally, we also use data from the Bank of Italy on the presence of banks in local markets and data provided by the Italian National Statistics Office (ISTAT) for the control variables at the provincial level.

3.2 Employment decisions

The main employment decision of firms that we explore is the number of employees as reported in the AIDA database. Specifically, we consider the growth rate of firm employees in the last year of each survey. The average employment growth rate in our sample is 2%, while the median is zero. For 21.4% of the firms the size of the hired workforce decreases, while for 32.8% it increases and for 45.8% it remains steady. Figure 1 plots the average employment growth rate of our sample firms across Italian provinces. It shows that the variable has large

variation across space but it does not correlate with the economic and financial gaps between northern and southern regions.

We then consider the growth rates of total employment expenditures and the average cost of the hired workforce in the last year of the surveys. Also in this case, data are drawn from the firms' financial statements reported in the AIDA database. On average, the firms in our sample display a 5.8% increase in total labor costs, while the average cost of labor increases by 4.1% (the median values are 4.7% and 3.4%, respectively).

3.3 Firms' sales shock

In our baseline regression analysis, we measure the shock on firms' sales by an indicator variable that takes the value 1 if, in the last year of the survey, the firm experienced a drop in the sales turnover equal to or greater than 5%, and zero otherwise (*Shock on sales 5%*). Later in the paper, we check the robustness of the baseline results to other measures of the shock on firms' sales. First, we consider the continuous variable *Change in sales*, which is equal to the negative percentage change in sales turnover in the last year of the survey. Second, we construct the dummy *Lagged shock on sales 5%* by using lagged data on sales growth in the second year of each survey. Finally, we use the dummy *Shock on sales 10%* that takes the value 1 if firms' sales turnover decreases by at least 10% in the last year of the survey.

In our sample, in the last year of the survey, the firms' total sales turnover increases by 7.5% (see Table 1). However, for 23.5% of firms sales decreases by more than 5%, and for 15.4% of firms the drop is greater than 10%. Looking at employment decisions, as we expect, firms experiencing a shock on sales turnover reduce both the number of employees and total labor costs. On average, the percentage cut in employees and wages is the same, 1.5%, such that the average cost of labor remains broadly constant. This suggests that firms tend to respond to shocks by shrinking the internal workforce without making significant changes to its composition. By contrast, firms experiencing a positive trend in sales turnover increase total labor expenditures much more than the number of employees (8.3% versus 3.1%), consistent with an increase in the use of overtime work and a skilled workforce.

3.4 Relationship lending

Our second key explanatory variable is the strength of the bank-firm relationship, measured by the duration of the relationship with the main bank. The survey asks each firm "for how many years has this been the main bank with which the firm operates?". The variable *Relationship length* is the natural logarithm of the length in years of the relationship between the firm and its main bank. The length of the lending relationship is regarded by the empirical banking literature as a good proxy of the strength of bank-firm ties and the use of relational lending technologies (Kysucky and Norden, 2016; Duqi *et al.*, 2018; Beck *et al.*, 2018b). The idea is that banks, by monitoring the borrowing firm, the movements of its accounts and the compliance with its contractual obligations and covenants, have the opportunity to obtain exclusive soft information through repeated interactions over time (Petersen and Rajan, 1994; Boot, 2000; Drexler and Schoar, 2014).

However, the bank's information advantages may not vary continuously with the duration of the lending relationship with the firm. In addition, the duration of the lending relationship is mechanically influenced by the age of the firm. This contributes to undervalue the strength of the relationship with young firms, which banks could instead know in depth as their main debt holders since the foundation, and to overvalue the strength of the relationship with mature firms, whose debt is held by multiple banks.

To take into account the fact that the strength of the bank-firm relationship can vary non-continuously with the length of the lending relationship and that firms can resort to multiple lending, we check the robustness of our result by using, alternatively, an indicator variable equal to one if the duration of the relationship is longer than 10 years and zero otherwise (*Relationship length over 10*), and a threshold variable that is equal to the logarithm of the years of the lending relationship with the main bank if the share of total debt with this bank is at least 30% and zero otherwise (*Relationship length 30%*).

In our sample, the average duration of the lending relationship with the main bank is 16.8 years (the median is 15), and for 59% of firms it is longer than 10 years.[7] These figures are

[7]Our data are consistent with those obtained by other studies analyzing relationship lending. For example, using the EFIGE Survey on a sample of European manufacturing firms, Ferri *et al.* (2019b) find that in 2007-2009 the average duration of the lending relationship with the main bank was 15.85 (with a median value of 12 years).

statistically the same for firms hit by a drop in sales and the others. Interestingly, main-bank-related firms (i.e., the firms for which *Relationship length over 10* $= 1$) are on average more cautious in their employment decisions, increasing the number of employees and salaries paid significantly less than firms that do not have relational ties with a main bank (1.7% versus 2.5% for the growth rate of employees and 5.1% versus 7.1% for the growth of labor costs).

3.5 Additional Variables

In the regression analysis, we control for a number of variables that potentially affect the employment decisions of firms and can be correlated with our key explanatory variables. First, to account for the fact that larger and older firms could have a different propensity to change the workforce, we include firm size, measured as the log of total assets, and age (years from a firm's inception). In addition, we include a dummy variable indicating whether a firm is a corporation.

Second, following the studies suggesting that employment stability in family firms is greater (Mueller and Philippon, 2011; Bach and Serrano-Velarde, 2015; Ellul *et al.*, 2017), we add a dummy variable equal to one if the main shareholder of the firm is an individual or a family. Moreover, to consider the effects of access to internal capital markets we include a dummy that takes the value 1 if the firm belongs to a business group and zero otherwise.

As the firm's financial position and economic performance may significantly affect firms' workforce dynamics, we include the firm's level of indebtedness, proxied by the leverage indicator (computed as total debt over equity), and the firm's profitability, measured by return on equity (ROE).

Finally, to control for unobservable industry, time and local market fixed effects, we include sector dummies based on a two–digit ATECO classification, survey dummies and provincial dummies.[8] From Table 1, firms experiencing a 5% or greater reduction of sales (*Shock on sales5%* = 1) are significantly smaller on average, more likely family-owned and less profitable than firms in good times. Small and family-owned firms are also more likely to have long-lasting relationship with the main bank, as well as stand-alone firms. In addition, main-bank-

[8]Provinces are local entities with the size of U.S. counties. There are 103 provinces, grouped into 20 regions.

related firms are, on average, older, more levered and less profitable.

4 Empirical analysis

This section presents our empirical methodology and results. The main question is to establish the effect of relationship lending on the firms' workforce variation when companies are experiencing an adverse shock to their sales turnover and, consequently, to their capability of generating internal liquidity through normal business operations. As theory suggests, relationship lending could provide insurance against firms' individual adverse shocks, which can result in an incentive either to retain employees or to restructure the organization cutting redundant workers. Our aim is to test whether companies with durable lending relations show a sensitivity of changes in workforce to shocks on sales that is lower or higher compared to companies that engage relatively more in transactional lending. In the next subsections, first we present the baseline regression analysis. Then we show some robustness tests and discuss the endogeneity concerns. Finally, we present some heterogeneity tests which, by exploiting the cross-sectional variation within companies in our sample, shed light on the economic mechanisms behind our baseline findings.

4.1 Baseline specification

Our proposed model estimates the sensitivity of firms' employment to shocks in sales, and whether such elasticity depends on the intensity of relationship lending. We rely on repeated cross-section data from four waves of the UniCredit-Capitalia survey. The dependent variable is the percentage change in each company's workforce. The main independent variables are a measure of firm idiosyncratic shock in sales, a measure of the strength of relationship lending and their interactions. Both dependent and independent variables are measured in the last year of the survey. The baseline specification of our regression analysis is:

$$\Delta n_{it} = \beta_1 R_{it} + \beta_2 R_{it} \times S_{it} + \beta_3 S_{it} + \gamma X_{it} + \mu_t + \mu_j + \mu_p + \epsilon_{it}, \quad (1)$$

where the subscripts i, t, j and p index, respectively, firms, time (last year of the survey),[9] industry and province of the firms' headquarters. R_{it} is measured by the length (natural logarithm of the years) of a continuous relationship between each firm i and its main bank at year t. In our baseline analysis, we measure the shock in sales (S_{it}) by constructing a dummy variable that identifies whether a company i at time t faces an annual change in sales that is lower than minus 5%.[10]

Coefficients β_1 and β_3 in equation (1) measure the average direct impact on changes in the internal workforce of, respectively, the length of the lending relation and the shock in sales. Our main coefficient of interest β_2 measures how the sensitivity of firms' employment to annual shock in sales varies depending on the degree of relationship lending the firm engages in. In our baseline specification we include the set of control variables X_{it} described in section 3.5 that are potentially correlated with our main independent variables of interest. Finally, by including survey and sector fixed effects we exploit only within-industry and within last-year-of-the-survey variation, while the inclusion of province fixed effects aims to capture all possible determinants of employment dynamics that are common to all firms located in the same province.

Estimation results are reported in Table 2. In column (1) we present regression results for a specification that does not include controls, except for survey dummies. The negative estimated coefficient β_1 suggests that the closer the relationship of the firms with their main bank, the smaller the annual growth rate of employment, whereas the negative estimated coefficient for *Shock on sales 5%* is consistent with firms responding to shocks on sales by reducing employment (or slowing its growth). The positive estimated coefficient attached to the interaction term, β_2, indicates that the negative impact of shock in sales on firms' workforce is smoothed by the length of the bank-firm relationship. To be precise, the baseline estimates in column (1) indicate that a negative shock in sales is associated with large drops in firms' workforce, that is about 7.5 pp reduction relative to the other firms; one standard deviation in relationship length (12 years, as displayed in Table 1) mitigates the annual drop in the workforce of firms hit by

[9] By including time fixed effects, which identify the last year of the survey, our estimates are based on within-survey cross-sectional variation.

[10] In the following section we provide robustness checks regarding the measurement of both independent variables.

negative sales shocks in sales by more than 1 pp.

The coefficient estimates in column (1) remain broadly unchanged in magnitude and significance when additional controls are progressively included in the regression model: sector dummies (column 2), provincial dummies (column 3) and additional observables X_{it} (column 4). The fact that our estimates of β_2 and β_3 are very similar across specifications, both in magnitude and significance, suggests that our measure of shock in sales is hard to correlate with other observables. Residual concerns for the reliability of our finding are thus related to the measurement of our independent variables and to possible endogeneity concerns which are specifically addressed in the subsequent sections.

4.2 Robustness checks

In this section, we discuss measurement issues related to the definition of the main independent variables. Our results are reported in Table 3. First, we consider the sensitivity of our estimates to alternative measures of the shock in sales, S_{it}, keeping the measure of relationship lending as in the baseline specification (columns 1 to 4). In column (1), S_{it} is measured continuously by the annual percentage change in sales; in order to have a more direct comparison with the baseline estimates, we take the negative value of this variable. The advantage of using a continuous variable is that we do not rely on arbitrary choices of the threshold to define an idiosyncratic shock in sales; the disadvantage is that tiny annual changes in sales do not capture events that may induce the companies to change their workforce. Our results show that the estimated β_2 is positive and statistically significant, confirming that relationship lending mitigates the employment response of firms to negative shocks.

A second concern is related to the fact that our baseline definition of shock in sales cannot capture the entire effects on changes in workforce because the adjustments of the labor force may require some time. In order to allay such a concern, in column (2) of Table 3 we show estimates when the variable S_{it} is a dummy variable based on the lagged value of the change in sales. Baseline results are confirmed also in this case.

In column (3) we also show the robustness of our baseline results by using an alternative threshold for the definition of the shock in sales (at minus 10%). Both the magnitude and sig-

nificance of coefficients for S_{it} and $R_{it} \times S_{it}$ are virtually identical to those in the baseline specification, suggesting that a 5% decrease in sales turnover properly captures employment-relevant shocks. Finally, in column (4), to focus on firms without a long trend of sales reduction, we use our baseline definition of shock in sales excluding those firms that experienced a negative change in sales in the second year of the survey. Also in this case, the results remain unchanged.[11]

As a second set of robustness checks, we provide empirical estimates based on alternative measures of relationship lending, keeping the baseline definition of the shock in sales. In column (5) of Table 3, we replicate the analysis by measuring the strength of bank-firm relations with a dummy that takes value the one if the number of years of the relation is above 10 and zero otherwise, confirming baseline results. In column (6) of Table 3, we measure relationship lending by interacting the length of the relationship with a dummy variable that identifies whether the share of credit from the main bank is above 30%. In this way, we aim to dampen the mechanical effect of firm age on the length of the banking relationship by taking into account the contribution of banks to the total debt of firms. These last tests confirm the significant employment-insurance role of relationship lending.

4.3 Endogeneity issues

The reliability of the OLS baseline estimates hinges on the assumption that, once controlling for observable variables and survey, sector and provincial fixed effects, our independent variables do not correlate with the residuals. There are two major threats to this assumption in our empirical setting: i) the potential reverse causality between the sales performance of each firm and its growth of the internal workforce, and ii) the possibility that unobserved factors are correlated with both the decisions about employment and relationship lending.

4.3.1 Addressing reverse causality

The issue of reverse causality arises in cases when the decrease of sales experienced by a firm is the result of a negative shock to labor productivity; this may in turn affect the optimal level

[11] In an untabulated regression, we use an alternative measure of the idiosyncratic shock based on the annual change in cash flows rather than sales. Results, available upon request, are qualitatively similar.

of the workforce and has a final negative effect on firms' production capacity and sales. To address this issue, we follow Ellul *et al.* (2017) and consider a measure of the shock in sales that is based on each firm's individual exposure to sectoral sales shock. In particular, we build the variable *Sectoral change in sales* as the percentage changes in sales in the industrial sector to which firm i belongs, after subtracting the sales of firm i itself. We take the negative value of this variable to keep a consistent interpretation of the sign of the estimated coefficients with respect to the baseline. Implementing this strategy, we overcome potential reverse causality effects from the growth rate of firms' workforce to the growth rate of firms' sales.

In columns (1) and (2) we report empirical estimates that consider the sectoral change in sales as an alternative measure of the shock, while keeping the baseline measure of relationship lending. Notice that in column (1) we include survey, sector and provincial fixed effects, while in column (2) we incrementally include the set of controls X_{it}. Our results show that the estimated β_2 coefficient is positive and statistically different from zero, confirming the reliability of the baseline estimates.

4.3.2 Addressing the omitted variables bias

A second endogeneity concern is related to the potential bias caused by the presence of omitted variables correlated with the strength of relationship lending. There could in fact be unobserved variables that jointly affect the propensity of companies to engage in tight and prolonged relationships with the main bank and, at the same time, affect the sensitivity of firm employment decisions to short-run shocks to sales. In fact, in the presence of a control variable that aims to capture this potential source of correlation, such as the family governance of a firm or belonging to a business group, and in the presence of geographical and sector fixed effects, this second endogeneity concern can be confidently regarded as "residual". However, in testing the effect of relationship lending on firms' workforce changes, we cannot exclude the possibility that unobserved factors bias our baseline estimates. For example, the scarce ability/willingness of firms to introduce changes in the internal and external organizational environment could explain both the propensity to have long-lasting relationship with the main bank and the decision to retain redundant employees due to a shock in sales turnover. Therefore, in the spirit of Guiso

et al. (2004) and Herrera and Minetti (2007), we instrument the length of the bank-firm relation (measured at the firm level) with variation in local banking markets (at the provincial level), which is related to banking regulation waves which occurred in Italy in the late 1930s.

The IV strategy relies on identifying exogenous restrictions on the local financial system that affect the firms' opportunity and availability of borrowing from a main bank on a relational basis but do not directly affect firms' decisions about workforce dynamics. To this end we exploit the 1936 Banking Law which subjected the Italian banking system to strict regulation of entry and branch opening in provinces, freezing the size and bank-composition of the local credit market until the end of the 1980s. The rationale for using this regulatory event to instrument relationship length is the theoretical and empirical evidence showing that the likelihood of close bank-firm relationships depends on the concentration, size and organizational structure of local credit markets (Boot and Thakor, 2000; Elsas, 2005; Berger *et al.*, 2005; Hauswald and Marquez, 2006; Berger *et al.*, 2007; Presbitero and Zazzaro, 2011). Based on the prevailing opinion that an excess of banking competition lay at the root of recurrent crises that plagued the Italian banking industry in the 1920s, the objective of the banking regulation was to enhance bank stability through severe restrictions on bank competition. The 1936 Banking Law imposed strict limits on the ability of different types of banking institutions to open new branches. Specifically, each bank type was attributed a geographical area of competence based on its presence in 1936, and its ability to grow and lend was restricted to that area. In particular, national banks could open branches only in the main cities; cooperative and local commercial banks could open branches within the boundaries of the province; savings banks could expand within the boundaries of the region. Guiso *et al.* (2004) demonstrate that the geographical distribution of bank branches in 1936 was broadly uncorrelated with the geography of economic development, and that it deeply impacted local credit markets in the decades that followed. Entry into the local markets was liberalized only during the 1990s.[12]

In practice, as instruments we use two indicators that Guiso *et al.* (2004) employ to characterize the local structure of the banking system in 1936: (i) the number of bank branches in

[12]Between 1936 and 1985, in Italy the total number of bank branches grew by 87 percent versus 1228 percent in the United States. By contrast, after deregulation, between the end of the 1980s and the late 1990s, the total number of branches grew by about 80 percent, almost double that in the United States.

the province per 100,000 inhabitants ($Z_{p,1}$) in 1936, and (ii) the share of bank branches owned by local banks over total banks in the province in 1936 ($Z_{p,2}$). Since the instrumental variables are measured at the provincial level, our IV regression analysis cannot incorporate province fixed effects. However, to control for geographical time-invariant characteristics, we include a broader definition of geographical area in IV regressions.[13] We instrument the variables R_{it} and $R_{it} \times S_{it}$ with the identified instruments $Z_{p,1}$ and $Z_{p,2}$ and their interactions with the variable S_{it} used in the baseline estimates showed in equation (1).[14]

The two-stage-least-squares results are presented in Table 4A, columns (3) and (4). The two columns are from specifications that respectively do not and do include the vector of controls X_{it}. Estimates of $\beta_{1,IV}$ and $\beta_{2,IV}$ appear to be in line with the OLS results. In particular, the estimated $\beta_{2,IV}$ coefficient is always positive and statistically different from zero, confirming the robustness of our baseline estimates. Note that the magnitude of the estimated coefficients in Table 4A is not directly comparable to the OLS estimates; this is naturally due to the fact that IV strategy does not allow for the inclusion of province fixed effects and that the main variation, in the IV specifications, is mainly related to geographical-level variation. Estimated IV coefficients in columns (3) and (4) result from a specification that employs the *Shock on sales 5%* as measuring the occurrence of sales shocks. This variable was discussed as potentially endogenous above in section 4.3.1. For this reason, as a final step, we combine the IV strategy with the use of *Sectoral change in sales* as a shock variable. Empirical estimates from these last specifications, without and with the set of controls X_{it}, are presented in columns (5) and (6) of Table 4A. They are in line with the previous IV findings, and once again confirm the robustness of our OLS results.

4.4 Placebo test

As a final check for the reliability of our OLS baseline results, we estimate the regression in equation (1) by employing as dependent variable the lagged value of the growth rate of employment for each firm i: Δn_{it-1}. The rationale of this placebo test is to support the hypothesis that

[13] Area dummies that identify the Italian macro-regions: North, Center and South.

[14] First stage results are shown in Table 4B, columns (1) and (2); estimates show that the instruments are strong although the F-statistics are below the rule of thumb thresholds used in the literature. For this reason, in the appendix, Table A1, we verify the robustness of our IV estimates to the LIML methodology.

the shock in sales at time t, and its interaction with relationship lending, does not correlate with the pre-determined changes in firms' employment. Estimation results, in Table 5, confirm that the variable S_{it}, and its interaction with R_{it} does not correlate with the lagged value of growth rate of employment.

5 The effect on the cost of labor

Our findings on the growth of employment are consistent with the insurance role of long-lasting lending relationships. Negative shocks on sales generate liquidity shortage to the firms that, without the liquidity insurance mechanism generated by tight lending relations, translate into choices aimed at reducing firms' operating costs, among which the dismissal of employees is a natural candidate. On the contrary, our results seem to be at odds with the disciplinary role of relationship banking, according to which the main bank, as the principal debt-holder, calls for a restructuring of the corporate organization which will safeguard its competitiveness and profitability. This would involve resorting to larger layoffs of less productive employees, and possibly replacing them with a more highly qualified workforce.

To corroborate the predominance of the insurance effects, in this section, we consider the cost of labor as an outcome of our regression analysis. The idea is that if an insurance mechanism is actually at work, conditional on a negative shock, bank-related firms experience a lower decrease in total cost of labor. By contrast, if relationship banking generates disciplinary effects, distressed firms with long-lasting lending relationships should experience an increase in the average cost of labor, with a modest impact on the total cost of labor.

Therefore, we replicate the baseline analysis by using as outcomes of the regression analysis the growth rate of the total labor cost and the growth rate of the unit cost of labor. Our results are reported in Table 6. Columns (1) and (2) show that companies that are hit by a negative shock on sales feature a negative growth rate of total labor cost; however, consistent with the insurance hypothesis, this sensitivity is reverted if the companies have a durable lending relationship. The results in columns (3) and (4) use the growth rate of unit cost of labor (average labor cost) as dependent variable. The coefficient attached to the interaction term between shock on sales

and relationship lending is smaller and not statistically different from zero. This finding is not in line with a workforce decrease driven by a flight to productivity, as the disciplinary role of relationship banking would predict.

6 Sub-sample analysis

Our results so far indicate that relationship banking plays an insurance role for the firms' employees. The longer the lending relationships with the main bank, the smoother the impact of negative shocks on sales on the total number of employees and total labor cost, while the composition of the internal workforce and, therefore, the average labor costs remain statistically unaffected.

As we stated in the Introduction, there are three main mechanisms that can explain the insurance role of relationship banking. First, bank-related firms can have relatively unrestricted access to credit and, as a result, are able to sign implicit contracts with their employees, trading a commitment not to lay off or (drastically) reduce wages during bad times in exchange for the ability to pay lower wages in normal times. Second, bank-related firms can find it cheaper to fund labor costs and hoard employees who are temporarily in excess than to handle the firing and re-hiring processes. Third, relational banks could push borrowing firms that are temporarily in distress to retain their employees, thus preventing possible negative spillovers on workers' income and aggregate demand from damaging their funding and lending activities.

In this section, we aim to shed some light on the main economic mechanisms driving our baseline results. Although the available data do not allow us to unambiguously identify which of the three above-described mechanisms most contributes to generating the occupational insurance effects of close and durable lending relationships with a main bank, we provide some helpful clues to distinguish between them. To this end, we repeat the baseline analysis in Table 2 by splitting the initial sample into different subgroups according to pre-identified characteristics of firms, banks or the institutional environment. The choice of observable characteristics is based on theoretical arguments and empirical findings in the related literature. We identify subgroups of companies that should benefit more from relationship banking and for which one

of the three mechanisms is expected to be more relevant. Then we test whether the estimated insurance effects of relationship lending on workforce changes of firms hit by a negative sales shock are actually larger than for other distressed firms (i.e., whether for these firms the coefficient β_2 on the interaction term $R_{it} \times S_{it}$ is significantly larger).

6.1 Credit rationing and ever-greening practices

The first issue relates to the nature of the insurance provided by relationship lending. On the one hand, we can expect the effect of relationship lending on firms' employment decisions to be mediated by the direct impact of durable bank relationships on credit availability that allows distressed firms to retain their employees. In this case, firms that borrow on a transactional basis would be forced to reduce their workforce in the wake of a shock on sales only if they were unable to fill the temporary liquidity shortfall with bank credit; otherwise, all else being equal, their behavior would be indistinguishable from that of bank-related firms. On the other hand, the insurance role of relationship lending can be at work even in the absence of the direct impact of long-lasting lending relationships on the amount of credit provided by the main bank. For example, relationship banking could help to keep loan contract terms smoother and (implicitly or explicitly) subsidizes the hoarding of labor, making it a cheaper option rather than firing redundant employees in the wake of shocks and then re-hiring workers after recovery.

Empirically, if the first prediction is true, we should find our baseline effect to be driven by companies that are credit-rationed. If, instead, after excluding credit rationed firms from the analysis, we still find a positive and statistically significant coefficient β_2, we can conclude that the insurance role of relationship lending goes beyond the effect on immediate liquidity needs by the companies. Using information contained in the UniCredit-Capitalia survey, we identify two groups of firms: a) firms that are not strongly rationed and, b) within this group, the subgroup of firms that are not weakly rationed. To create our rationing variables, we rely on the following three questions: (i) *In the last year, would the firm have liked to obtain more credit at the market interest rate?* (ii) *In the last year, did the firm demand more credit than it actually obtained?*; (iii) *In order to obtain more credit, would the firm be willing to pay a higher interest rate?* Following Guiso (1998) and Minetti and Zhu (2011), we define weakly

rationed the firms that gave a positive response to question (i), regardless of their answer to questions (ii) and (iii), and strongly rationed those that responded *yes* to all three questions.

We replicate the baseline results in Table 2 for these two subgroups of companies; results are shown in columns (1) and (2) of Table 7. The estimates of β_2 are similar to our baseline estimates both regarding their magnitude and their statistical significance. Therefore, the results suggest that the impact of relationship lending on firms' employment decisions in bad times is not strictly related to credit availability in the short run, and they are more in line with the labor hoarding hypothesis.

Having established the relevance of labor hoarding, a second issue is whether this is the result of ever-greening lending practices by banks eager to avoid negative spillovers on the asset and liability sides of their balance sheets. To deal with this issue, we use a question of the survey that asks the firms if their main bank is headquartered in the same province or elsewhere.[15] The intuition is simple. The negative externalities on labor income and aggregate demand produced by the layoffs of local firms potentially have a greater effect on local banks, which carry out most of their business in the geographical area where the dismissed employees reside, rather than large banks that operate throughout the country and/or abroad (Mian *et al.*, 2015). In addition, Italian banks are embedded in local politics and society (Carretta *et al.*, 2012), and with local firms, with which they are more likely to have interlocking directorates, supervisory boards and shareholders' meetings, and other conflicts of interest. Therefore, we can reasonably assume that local banks internalize to a larger extent the local employment impact of shocks in sales in their lending decisions than would any of the other main banks and that they find it more "advantageous" to support financially distressed local entrepreneurs.

The estimate results for the subgroups of firms are reported in columns (3) and (4) of Table 7. The insurance effect of relationship lending is statistically significant and similar for both subgroups, and if anything larger for firms with the main bank headquartered outside the province. We may thus conclude that our baseline results are not driven by the behavior of banks that are closer to their borrowing firms and are more likely to engage in ever-greening practices.

[15] This information is not available for the last survey wave (period 2004-2006).

6.2 The role of size and age

Typically, small and young firms are more vulnerable to external negative shocks, more informationally opaque and suffer from a general financial gap. In addition, for these firms the explicit and hidden costs of employee turnover are especially high and therefore, conditional on the support of banks, labor hoarding in bad times is a more advantageous option. Therefore, we expect the occupational insurance effect of long-lasting relationship to be stronger among small and young firms.

We test for this hypothesis by splitting our initial sample into two subsamples: 1) firms with total assets below or above the median value (4,8 million euros); 2) firms with age above or below the median value (about 21 years). We replicate the baseline analysis for these subgroups and report the results in Table 8. Empirical estimates validate the above theoretical hypothesis by showing that the effect of relationship lending interacted with the sales shock is largely driven by smaller and younger firms.

6.3 The role of high skilled workers and innovation

If labor hoarding is the driving mechanism of the insurance role of relationship banking, we should expect that mitigating impact of long-lasting lending relationships on the layoffs by financially distressed firms is stronger when the level of firm-specific human capital of employees is high and the internal workforce is imperfectly substitutable.

To verify this hypothesis, we exploit cross-sectional variation in workforce composition of firms in our sample according to two alternative dimensions. First, we split firms according to whether the share of employees that have degrees is above or below the median value (about 3.8%), under the assumption that highly educated employees are less substitutable than others.

Second, we split our initial sample into firms in high-tech or low-tech industrial sectors, once again based on the assumption that employees in these sectors are on average more specialized and less easily substitutable.[16]

[16]We adopt the classification of high-tech firms put forth by Parisi *et al.* (2006) and Benfratello *et al.* (2008) who, by using the same survey that we use, consider a firm high-tech if its main activity belongs to one of the following manufacturing sectors: chemicals (24); non-electric machinery (29); office equipment and computers (30); electric machinery (31); electronic material, measuring and communication tools, TV and radio (32); medical apparels and instruments (33); vehicles (34); other transportation (35), where the two-digit Ateco 1991 codes are

On the whole, the results reported in Table 9 are consistent with the hypothesis that relationship lending helps smoothe the negative impact of short-run shocks to sales in companies where the human capital of employees is relatively more valuable and can be replaced only at high costs. Columns (1) and (2) indicate that firms employing skilled labor more intensely, conditional on maintaining close relationships with the main bank, have a higher propensity to hoard excess employees in bad times. Similarly, for firms in high-tech sectors the coefficient on the interaction term $R_{it} \times S_{it}$ is twice as large as that of the subgroup of low-tech firms (columns (3) and (4)).

6.4 Implicit tests of the labor hoarding hypothesis

Finally, in this section, we provide empirical evidence consistent with the labor hoarding hypothesis by relying on two empirical tests. The first set of results is an heterogeneity analysis that hinges on the actual degree EPL in local labor markets that is induced by the enforcement of legislation in the province where the firm operates. The idea is that courts play an important role in determining the strictness of EPL legislation (Autor *et al.*, 2007; Ichino *et al.*, 2003) and that courts' delays in settling labor disputes significantly increase the expected firing costs (Gianfreda and Vallanti, 2017). Therefore, to the extent that the insurance role of relationship banking is driven by the opportunity for bank-related firms to avoid firing costs by hoarding excess labor in bad times, we should expect the estimated coefficient β_2 on the interaction term $R_{it} \times S_{it}$ to be larger in provinces where the efficiency of courts is lower.[17] Estimates in columns (1) to (4) of Table 10 are in line with this prediction. We find the effect of relationship lending to be mainly driven by the subgroup of companies located in those provinces where the average length of labor lawsuits and the share of pending trials in such matters are above the median.

The second empirical test for the labor hoarding versus the implicit contract hypotheses investigates the link between relationship lending and the *level* of average labor cost (i.e., per-employee-cost) in normal times. The idea is that if bank-related firms were able to sign an

reported in parentheses.

[17] Disaggregated data for Italy show that the length of trial and the share of pending trials is highly heterogeneous throughout the country. For example, in 2001 (roughly the middle year of our sample) the average length of labor proceedings was 404 days in Turin and 1,263 days in Naples.

implicit contract with their employees they would benefit from paying lower wages during normal times. In contrast to this prediction, columns (5) and (6) show that firms engaging in longer relationships with the main bank display, on average, larger average labor costs. This suggests that relationship lending does not imply an implicit employer-employees insurance contract. On the contrary, our evidence is consistent with the hypothesis that for companies with a long-lasting relationship with their main bank, labor is a valuable input that is hard to dismiss and hire again and that is, therefore, worth retaining during a shock.

7 Conclusions

In this paper we showed that relationship lending has a significant impact on firms' labor demand. In particular, it helps smoothe the negative effects of sales shocks on firms' employment growth rate. We used four waves of the UniCredit-Capitalia survey to identify a measure of relationship lending and combined this source of data with administrative information on firms' workforce and balance sheets. We investigated the impact of relationship lending on workforce variation when the company faces a negative shock in sales. Our empirical results validate the theories on the insurance role of relationship lending: firms with longer and established relations with their main bank exhibit relatively lower sensitivity of workforce variation to shocks on sales. This result is mostly driven by younger, smaller and companies that show a larger share of graduate workers, and for companies that are likely to face larger hiring and firing costs. Taken together, our results confirm that relationship lending has a greater impact during adverse sales fluctuations for firms whose internal workforce has skills that are more firm-specific and thus substitutable to a lesser extent.

REFERENCES

ACCONCIA, A., DEL MONTE, A. and PENNACCHIO, L. (2011). *Underpricing and firm's distance from financial centre: Evidence from three European countries*. Tech. Rep. Working Paper No. 295, CSEF.

ACHARYA, V. V., EISERT, T., EUFINGER, C. and HIRSCH, C. (2018). Real effects of the sovereign debt crisis in Europe: Evidence from syndicated loans. *Review of Financial Studies*, **31** (8), 2855–2896.

ADMATI, A. R. and PFLEIDERER, P. (1994). Robust financial contracting and the role of venture capitalists. *Journal of Finance*, **49** (2), 371–402.

ALESSANDRINI, P., PRESBITERO, A. F. and ZAZZARO, A. (2009). Banks, distances and firms' financing constraints. *Review of Finance*, **13** (2), 261–307.

—, — and — (2010). Bank size or distance: what hampers innovation adoption by smes? *Journal of Economic Geography*, **10** (6), 845–881.

ALLEN, F. and GALE, D. (1999). Innovations in financial services, relationships, and risk sharing. *Management Science*, **45** (9), 1239–1253.

AUTOR, D. H., KERR, W. R. and KUGLER, A. D. (2007). Does Employment Protection Reduce Productivity? Evidence from US States. *The Economic Journal*, **117** (521), F189–F217.

AZARIADIS, C. (1975). Implicit contracts and underemployment equilibria. *Journal of Political Economy*, **83** (6), 1183–1202.

BACH, L. and SERRANO-VELARDE, N. (2015). CEO identity and labor contracts: Evidence from CEO transitions. *Journal of Corporate Finance*, **33**, 227–242.

BAGLIONI, A., COLOMBO, L. and ROSSI, P. (2018). *Debt restructuring with multiple bank relationships*. Working Papers 1191, Banca d'Italia.

BAILY, M. N. (1974). Wages and employment under uncertain demand. *The Review of Economic Studies*, **41** (1), 37–50.

BALDUZZI, P., BRANCATI, E. and SCHIANTARELLI, F. (2018). Financial markets, banks' cost of funding, and firms' decisions: Lessons from two crises. *Journal of Financial Intermediation*, **36**, 1–15.

BANERJEE, R., GAMBACORTA, L. and SETTE, E. (2017). The real effects of relationship lending. *BIS Working Paper*, (662).

BARBOSA, L., BILAN, A. and CELERIER, C. (2019). Credit supply shocks and human capital: Evidence from a change in accounting norms. *ECB Working Paper Series*, (2271).

BARTELSMAN, E., SCARPETTA, S. and SCHIVARDI, F. (2005). Comparative analysis of firm demographics and survival: evidence from micro-level sources in oecd countries. *Industrial and corporate change*, **14** (3), 365–391.

BASSANINI, A., BREDA, T., CAROLI, E. and REBÉRIOUX, A. (2013). Working in family firms: Paid less but more secure? evidence from french matched employer-employee data. *ILR Review*, **66** (2), 433–466.

BECK, T., DEGRYSE, H., DE HAAS, R. and VAN HOREN, N. (2018a). When arm's length is too far: Relationship banking over the credit cycle. *Journal of Financial Economics*, **127** (1), 174–196.

—, IOANNIDOU, V. and SCHÄFER, L. (2018b). Foreigners vs. natives: Bank lending technologies and loan pricing. *Management Science*, **64** (8), 3792–3820.

BENFRATELLO, L., SCHIANTARELLI, F. and SEMBENELLI, A. (2008). Banks and innovation: Microeconometric evidence on Italian firms. *Journal of Financial Economics*, **90** (2), 197–217.

BENTOLILA, S., JANSEN, M. and JIMÉNEZ, G. (2018). When credit dries up: Job losses in the great recession. *Journal of the European Economic Association*, **16** (3), 650–695.

BENTOLILLA, S. and BERTOLA, G. (1990). Firing costs and labour demand: How bad is Eurosclerosis. *Review of Economic Studies*, **57** (3), 381–402.

BERGER, A., MILLER, N., PETERSEN, M., RAJAN, R. and STEIN, J. (2005). Does function follow organizational form? evidence from the lending practices of large and small banks. *Journal of Financial Economics*, **76** (2), 237–269.

—, ROSEN, R. and UDELL, G. (2007). Does market size structure affect competition? the case of small business lending. *Journal of Banking & Finance*, **31** (1), 11–33.

BERGER, A. N. and UDELL, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, pp. 351–381.

BERLIN, M. and MESTER, L. J. (1999). Deposits and relationship lending. *Review of Financial Studies*, **12** (3), 579–607.

BERTON, F., MOCETTI, S., PRESBITERO, A. F. and RICHIARDI, M. (2018). Banks, firms, and jobs. *Review of Financial Studies*, **31** (6), 2113–2156.

—, RICHIARDI, M. and S., S. (2012). *The political economy of work security and flexibility: Italy in comparative perspective*. Bristol: Policy Press.

BOLTON, P., FREIXAS, X., GAMBACORTA, L. and MISTRULLI, P. E. (2016). Relationship and transaction lending in a crisis. *The Review of Financial Studies*, **29** (10), 2643–2676.

BOOT, A. A. (2000). Relationship banking: What do we know? *Journal of Financial Intermediation*, **9** (1), 7–25.

BOOT, A. W. and THAKOR, A. V. (2000). Can relationship banking survive competition? *The Journal of Finance*, **55** (2), 679–713.

BOTTERO, M., LENZU, S. and MEZZANOTTI, F. (2015). *Sovereign debt exposure and the bank lending channel: Impact on credit supply and the real economy*. Tech. Rep. Working Papers No. 1032, Banca d'Italia.

CAGGESE, A., CUÑAT, V. and METZGER, D. (2019). Firing the wrong workers: Financing constraints and labor misallocation. *Journal of Financial Economics*, **133** (3), 589–607.

CALOMIRIS, C. W., ORPHANIDES, A. and SHARPE, S. A. (1994). *Leverage as a state variable for employment, inventory accumulation, and fixed investment*. Working Paper 4800, National Bureau of Economic Research.

CARRETTA, A., FARINA, V., GON, A. and PARISI, A. (2012). Politicians ?on board?: Do political connections affect banking activities in Italy? *European Management Review*, **9** (2), 75–83.

CHODOROW-REICH, G. (2014). The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *The Quarterly Journal of Economics*, **129** (1), 1–59.

CINGANO, F., MANARESI, F. and SETTE, E. (2016). Does credit crunch investment down? new evidence on the real effects of the bank-lending channel. *Review of Financial Studies*, **29** (10), 2737–2773.

CLARK, A., GEORGELLIS, Y. and SANFEY, P. (2001). Scarring: The psychological impact of past unemployment. *Economica*, **68** (270), 221–241.

DREXLER, A. and SCHOAR, A. (2014). Do relationships matter? evidence from loan officer turnover. *Management Science*, **60** (11), 2722–2736.

DUQI, A., TOMASELLI, A. and TORLUCCIO, G. (2018). Is relationship lending still a mixed blessing? a review of advantages and disadvantages for lenders and borrowers. *Journal of Economic Surveys*, **32** (5), 1446–1482.

ELLUL, A., PAGANO, M. and SCHIVARDI, F. (2017). Employment and wage insurance within firms: Worldwide evidence. *The Review of Financial Studies*, **31** (4), 1298–1340.

ELSAS, R. (2005). Empirical determinants of relationship lending. *Journal of Financial Intermediation*, **14** (1), 32–57.

ERSAHIN, N. and IRANI, R. M. (2020). Collateral shocks and corporate employment. *Review of Finance*, **20** (1), 163–187.

ESCB (2007). *Corporate Finance in the Euro Area*. ECB Occasional Paper Series 63, Task Force of the Monetary Policy Committee of the European System of Central Banks.

ESCB (2013). *Corporate Finance and Economic Activity in the Euro Area*. Tech. Rep. ECB Occasional Paper Series No. 151, Task Force of the Monetary Policy Committee of the European System of Central Banks.

EUROPEAN COMMISSION (2019). *Annual Report on European SMEs 2018/2019*. Tech. rep., European Commission.

FERRI, G., MINETTI, R. and MURRO, P. (2019a). Credit relationships in the great trade collapse. micro evidence from europe. *Journal of Financial Intermediation*, **40**, 100809.

— and MURRO, P. (2015). Do bank-firm "odd-couples" exacerbate credit rationing? *Journal of Financial Intermediation*, **24** (2), 231–251.

—, —, PERUZZI, V. and ROTONDI, Z. (2019b). Bank lending technologies and credit availability in europe: What can we learn from the crisis? *Journal of International Money and Finance*, **95**, 128 – 148.

GAMBINI, A. and ZAZZARO, A. (2013). Long-lasting bank relationships and growth of firms. *Small Business Economics*, **40** (4), 977–1007.

GARMAISE, M. J. (2008). Production in entrepreneurial firms: The effects of financial constraints on labor and capital. *Review of Financial Studies*, **21** (2), 543–577.

GIANFREDA, G. and VALLANTI, G. (2017). Institutions' and firms' adjustments: Measuring the impact of courts' delays on job flows and productivity. *The Journal of Law and Economics*, **60** (1), 135–172.

GIANNETTI, M. and SAIDI, F. (2019). Shock propagation and banking structure. *Review of Financial Studies*, **32** (7), 2499–2540.

GIOVANNINI, A., MAYER, C., MICOSSI, S., DI NOIA, C., ONADO, M., PAGANO, M. and POLO, A. (2015). Restarting european long-term investment finance. *A Green Paper Discussion Document, London*.

GIROUD, X. and MUELLER, H. M. (2017). Firm leverage, consumer demand, and employment losses during the great recession. *Quarterly Journal of Economics*, **132** (1), 271–316.

GOLDSMITH, A., VEUM, J. and DARRITY JR, W. (1996). The impact of labor force history on self- esteem and its component parts, anxiety, alienation and depression. *Journal of Economic Psychology*, **17** (2), 183–220.

GUISO, L. (1998). High-tech firms and credit rationing. *Journal of Economic Behavior and Organization*, **35** (1), 39 – 59.

— and PISTAFERRI, L. (2020). The insurance role of the firm. *The Geneva Risk and Insurance Review*.

—, SAPIENZA, P. and ZINGALES, L. (2004). Does local financial development matter? *Quarterly Journal of Economics*, **119** (3), 929–969.

HAUSWALD, R. and MARQUEZ, R. (2006). Competition and strategic information acquisition in credit markets. *Review of Financial Studies*, **19** (3), 967–1000.

HERRERA, A. M. and MINETTI, R. (2007). Informed finance and technological change: Evidence from credit relationships. *Journal of Financial Economics*, **83** (1), 223–269.

HOSHI, T., KASHYAP, A. and SCHARFSTEIN, D. (1990). The role of banks in reducing the costs of financial distress in Japan. *Journal of Financial Economics*, **27** (1), 67–88.

ICHINO, A., POLO, M. and RETTORE, E. (2003). Are judges biased by labor market conditions? *European Economic Review*, **47** (5), 913 – 944.

JACOBSON, L. S., LALONDE, R. J. and SULLIVAN, D. G. (1993). Earnings losses of displaced workers. *American Economic Review*, pp. 685–709.

JIN, Y., FUKAHORI, R. and MORGAVI, H. (2016). Labour market transitions in italy: Job separation, re-employment and policy implications. *OECD Economic Department Working Papers*, (1291), 0_1.

KANG, J.-K. and SHIVDASANI, A. (1997). Corporate restructuring during performance declines in Japan. *Journal of Financial Economics*, **46** (1), 29–65.

KYSUCKY, V. and NORDEN, L. (2016). The benefits of relationship lending in a cross-country context: A meta-analysis. *Management Science*, **62** (1), 90–110.

LOW, H., MEGHIR, C. and PISTAFERRI, L. (2010). Wage risk and employment risk over the life cycle. *American Economic Review*, **100** (4), 1432–67.

MIAN, A., SUFI, A. and TREBBI, F. (2015). Foreclosures, house prices, and the real economy. *The Journal of Finance*, **70** (6), 2587–2634.

MINETTI, R. and ZHU, S. C. (2011). Credit constraints and firm export: Microeconomic evidence from italy. *Journal of International Economics*, **83** (2), 109–125.

MORTENSEN, D. T. and PISSARIDES, C. A. (1994). Job creation and job destruction in the theory of unemployment. *Review of Economic Studies*, **61** (3), 397–415.

— and — (1999). Unemployment responses to ?skill biased? shocks: The role of labor market policy. *Economic Journal*, **109** (455), 242–265.

MUELLER, H. M. and PHILIPPON, T. (2011). Family firms, paternalism, and labor relations. *American Economic Journal: Macroeconomics*, **3** (2), 218–245.

MURRO, P. and PERUZZI, V. (2019). Family firms and access to credit. is family ownership beneficial? *Journal of Banking & Finance*, **101**, 173–187.

OFEK, E. (1993). Capital structure and firm response to poor performance: An empirical analysis. *Journal of Financial Economics*, **34** (1), 3–30.

OGURA, Y., OKUI, R. and SAITO, Y. U. (2019). *Network-motivated lending decisions; A rationale for forbearance*. Working Paper Series 127, Institute of Economic Research, Seoul National University.

PAGANO, M. (2019). *Risk Sharing within the Firm: A Primer*. CSEF Working Papers 553, Centre for Studies in Economics and Finance (CSEF), University of Naples, Italy.

PARISI, M. L., SCHIANTARELLI, F. and SEMBENELLI, A. (2006). Productivity, innovation and R&D: Micro evidence for Italy. *European Economic Review*, **50** (8), 2037–2061.

PAVITT, K. (1984). Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy*, **13** (6), 343–373.

PETERSEN, M. A. and RAJAN, R. G. (1994). The benefits of lending relationships: Evidence from small business data. *The Journal of Finance*, **49** (1), 3–37.

PETRALIA, K., PHILIPPON, T., RICE, T., VÉRON, N., ING, M. C., AUGAR, P., BECK, T., ING, T. B. and ECONOMICS, F. (2019). *Banking disrupted? Financial intermediation in an era of transformational technology*. Tech. rep., Technical Report 22, Geneva Reports on the World Economy, ICMB and CEPR.

POPOV, A. and ROCHOLL, J. (2018). Do credit shocks affect labor demand? evidence for employment and wages during the financial crisis. *Journal of Financial Intermediation*, **36** (1), 16–27.

PRESBITERO, A. F. and ZAZZARO, A. (2011). Competition and relationship lending: Friends or foes? *Journal of Financial Intermediation*, **20** (3), 387–413.

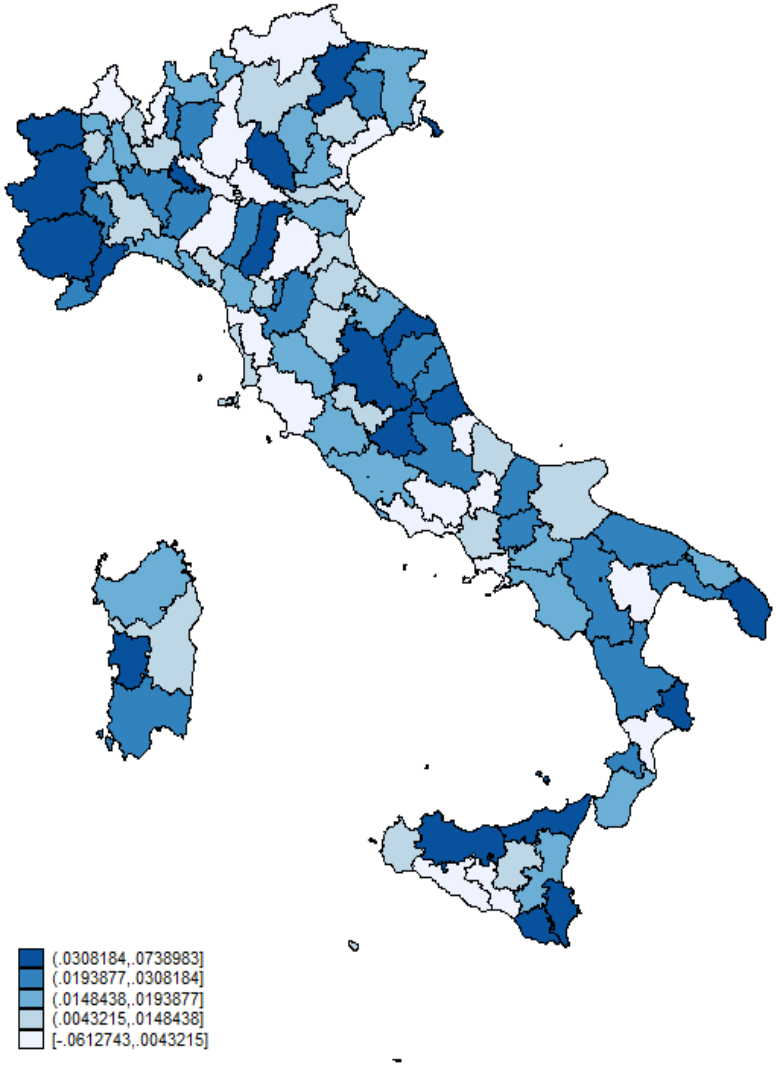
ROSENFELD, C. M. (2014). The effect of banking relationships on the future of financially distressed firms. *Journal of Corporate Finance*, **25**, 403–418.

SETTE, E. and GOBBI, G. (2015). Relationship lending during a financial crisis. *Journal of the European Economic Association*, **13** (3), 453–481.

SHARPE, S. A. (1994). Financial market imperfections, firm leverage, and the cyclicality of employment. *American Economic Review*, **84** (4), 1060–1074.

SRAER, D. and THESMAR, D. (2007). Performance and behavior of family firms: Evidence from the french stock market. *Journal of the European Economic Association*, **5** (4), 709–751.

Figure 1. Employment growth rate across Italian provinces



Note: This figure plots the average employment growth rate in the provinces over the years 1995-2006.

Table 1. Summary statistics

	Full sample			Shock on sales (5%)			Rel length over 10 years		
	Obs	**Mean**	**St. Dev.**	**Yes**	**No**	***t-test***	**Yes**	**No**	***t-test***
Main dependent variable									
Growth rate (employment)	15,181	0.020	0.130	-0.015	0.031	*19.276*	0.017	0.025	*3.663*
Growth rate (total labor cost)	11,597	0.058	0.154	-0.015	0.083	*31.127*	0.051	0.071	*6.314*
Growth rate (average labor cost)	11,569	0.041	0.144	0.006	0.052	*14.535*	0.038	0.046	*2.771*
Relationship lending variables									
Relationship length	16,597	16.782	12.253	17.009	16.948	*-0.263*			
Relationship length (ln)	16,423	2.564	0.788	2.579	2.577	*-0.162*			
Rel length over10	16,597	0.590	0.492	0.596	0.595	*-0.006*			
Measures of shock									
Shock on sales 5% (0/1)	17,040	0.235	0.424				0.236	0.236	*-0.006*
Sectoral change in sales (neg)	17,039	-0.053	0.102	-0.028	-0.061	*-17.160*	-0.053	-0.058	*-2.683*
Change in sales (neg)	17,049	-0.075	0.226	0.171	-0.151	*-128.610*	-0.065	-0.089	*-6.356*
Lagged shock on sales 5% (0/1)	17,135	0.285	0.451	0.321	0.272	*-5.790*	0.297	0.272	*-3.382*
Shock on sales 10% (0/1)	17,040	0.154	0.361	0.655	0.000	*-87.155*	0.149	0.161	*2.043*
Control variables									
Total assets	17,522	20,305	52,232	17,227	19,863	*3.01*	17,378	19,116	*2.31*
Total assets (log)	17,514	8.739	1.351	8.614	8.744	*5.494*	8.717	8.710	*-0.336*
Age	18,179	25.751	20.566	25.626	25.926	*0.814*	29.458	19.645	*-32.441*
Leverage	17,508	39.084	68.312	38.185	39.211	*0.835*	36.755	42.665	*5.208*
Family	18,603	0.749	0.434	0.763	0.743	*-2.542*	0.785	0.728	*-8.445*
Corporation	18,603	0.928	0.258	0.928	0.937	*1.778*	0.925	0.931	*1.426*
ROE	17,514	0.044	0.067	0.031	0.048	*13.341*	0.045	0.040	*-4.759*
Business group	18,550	0.239	0.426	0.229	0.235	*0.721*	0.205	0.275	*10.345*
Weak rationing	17,380	0.135	0.341	0.161	0.119	*-6.375*	0.129	0.152	*4.186*
Strong rationing	17,243	0.017	0.131	0.022	0.015	*-2.700*	0.015	0.022	*3.409*
Main bank in the same province	12,892	0.616	0.486	0.622	0.617	*-0.462*	0.664	0.553	*-12.465*
% of graduate workers	11,882	0.093	0.178	0.085	0.096	*2.940*	0.081	0.097	*4.628*
Export	18,499	0.658	0.475	0.658	0.660	*0.247*	0.667	0.659	*-1.026*
High-tech sectors	18,603	0.312	0.463	0.324	0.304	*-2.429*	0.299	0.325	*3.543*
Judicial efficiency: trial length	18,541	632.049	240.945	627.284	629.829	*0.579*	630.004	634.498	*1.183*
Judicial efficiency: pending trials	18,541	2.196	3.126	2.117	2.265	*2.581*	2.264	2.372	*2.112*
Survey 1995-1997	18,603	0.242	0.428	0.284	0.255	*-3.586*	0.256	0.260	*0.589*
Survey 1998-2000	18,603	0.252	0.434	0.164	0.258	*13.430*	0.271	0.271	*0.105*
Survey 2001-2003	18,603	0.231	0.421	0.316	0.182	*-16.573*	0.243	0.230	*-2.006*
Survey 2004-2006	18,603	0.276	0.447	0.236	0.305	*8.819*	0.230	0.238	*1.288*
North	18,603	0.684	0.465	0.649	0.702	*6.166*	0.699	0.649	*-6.701*
Center	18,603	0.179	0.384	0.194	0.175	*-2.613*	0.183	0.181	*-0.291*
South	18,603	0.138	0.344	0.158	0.123	*-5.448*	0.119	0.171	*9.303*
Instrumental variables									
Local branches in 1936	18,474	20.865	10.639	20.510	20.912	*2.075*	20.874	20.712	*-0.964*
Total branches in 1936	18,474	0.760	0.177	0.753	0.762	*2.665*	0.757	0.763	*1.993*

Note: See the Data Appendix for exact definition of the variables.

Table 2. Baseline estimates

	(1)	(2)	(3)	(4)
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.008***	-0.008***	-0.007***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
Rel length * Shock on sales 5% (0/1)	0.013***	0.012***	0.013***	0.013***
	(0.003)	(0.003)	(0.003)	(0.003)
Shock on sales 5% (0/1)	-0.075***	-0.074***	-0.075***	-0.074***
	(0.009)	(0.009)	(0.009)	(0.009)
Total assets (log)				0.000
				(0.001)
Age				-0.000***
				(0.000)
Leverage				0.000***
				(0.000)
Family				-0.002
				(0.003)
Corporation				-0.007
				(0.005)
ROE				0.175***
				(0.020)
Business group				-0.001
				(0.003)
Survey dummies	Y	Y	Y	Y
Sector dummies	N	Y	Y	Y
Provincial dummies	N	N	Y	Y
Observations	13,496	13,492	13,481	13,029

Note: The table shows estimates of the equation (1). The dependent variable is measured by the yearly percentage change of the number of employees in the last year of each survey wave. The main explanatory variables are Shock on sales 5%, a dummy variable that takes the value equal to 1 if the yearly percentage change of sales in the last year of the survey is less than 5% and 0 otherwise, and Relationship length (ln), the natural logarithm of the years of relationship between the firm and its main bank. Other explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3. Robustness checks

	Alternative measures of shock				*Alternative measure of Rel lending*	
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.000	-0.006***	-0.005***	-0.008***		
	(0.002)	(0.002)	(0.002)	(0.003)		
Rel length * Change in sales (neg)	0.025**					
	(0.011)					
Change in sales (neg)	-0.189***					
	(0.029)					
Rel length * Lagged shock on sales 5% (0/1)		0.010***				
		(0.003)				
Lagged shock on sales 5% (0/1)		-0.049***				
		(0.008)				
Rel length * Shock on sales 10% (0/1)			0.013***			
			(0.004)			
Shock on sales 10% (0/1)			-0.075***			
			(0.011)			
Rel length * Shock on sales 5% (0/1)				0.017***		
				(0.005)		
Shock on sales 5% (0/1)				-0.088***	-0.051***	-0.061***
				(0.013)	(0.004)	(0.008)
Relationship length over 10 years (0/1)					-0.009***	
					(0.003)	
Rel length (over 10 y.) * Shock on sales 5% (0/1)					0.020***	
					(0.005)	
Rel. length (ln) & % main bank						-0.000
						(0.001)
Rel. length (ln) & % main bank * Shock on sales 5% (0/1)						0.008***
						(0.003)
Total assets (log)	-0.000	0.001	0.000	0.001	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Age	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Family	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Corporation	-0.006	-0.006	-0.007	-0.008	-0.008	-0.006
	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
ROE	0.182***	0.177***	0.180***	0.131***	0.179***	0.173***
	(0.019)	(0.020)	(0.020)	(0.028)	(0.020)	(0.020)
Business group	-0.002	-0.002	-0.001	0.000	-0.000	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Survey & Sector & Provincial dummies	Y	Y	Y	Y	Y	Y
Observations	13,031	12,994	13,031	7,595	13,168	13,031

Note: The table shows estimates of the equation (1) for alternative measures of the explanatory variables. The dependent variable is measured by the yearly percentage change of the number of employees in the last year of each survey wave. The main explanatory variables in column (1) are the Relationship length (ln) and Change in sales (neg), the negative value of the yearly percentage change of firms' sales in the last year of each survey. The main explanatory variables in column (2) are the Relationship length (ln) and the Shock on sales 5% measured in the second year of each survey. The main explanatory variables in column (3) are the Relationship length (ln) and the Shock on sales 10%, a dummy variable that takes the value equal to 1 if the yearly percentage change of sales in the last year of the survey is less than 10% and 0 otherwise. The main explanatory variables in column (4) are the Relationship length (ln) and the Shock on sales 5%, as in the baseline estimations. However, in running this regression we exclude all the firms that experienced a negative change of sales in the second year of the survey. The main explanatory variables in column (5) are the Rel. length (over 10y.), a dummy variable that takes the value equal to 1 if the years of relationship between the firm and its main bank is equal to or greater than 10 years and 0 otherwise, and the Shock on sales 5%. The main explanatory variables in column (6) are the Rel. length (ln) interacted with % of the main bank, a continuous variable that measures the share of credit from the main bank when the share is above 30% and 0 otherwise, and the Shock on sales 5%. Other explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4A. Endogeneity concerns

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.003**	-0.002	-0.092	-0.061	-0.040	-0.034
	(0.001)	(0.001)	(0.063)	(0.064)	(0.045)	(0.055)
Rel length * Shock on sales 5% (0/1)			0.169**	0.138*		
			(0.086)	(0.084)		
Shock on sales 5% (0/1)			-0.478**	-0.398*		
			(0.222)	(0.216)		
Rel length * Sectoral change in sales (neg)	0.028***	0.031***			0.407*	0.434*
	(0.010)	(0.010)			(0.214)	(0.224)
Sectoral change in sales (neg)	-0.112***	-0.123***			-1.072*	-1.147**
	(0.032)	(0.033)			(0.549)	(0.575)
Total assets (log)		0.001		0.001		0.002
		(0.001)		(0.001)		(0.001)
Age		-0.000***		0.000		0.000
		(0.000)		(0.001)		(0.001)
Leverage		0.000***		0.000**		0.000
		(0.000)		(0.000)		(0.000)
Family		-0.002		-0.001		0.001
		(0.003)		(0.004)		(0.004)
Corporation		-0.007		-0.006		-0.007
		(0.005)		(0.007)		(0.007)
ROE		0.200***		0.193***		0.239***
		(0.020)		(0.040)		(0.043)
Business group		-0.002		-0.005		-0.011
		(0.003)		(0.008)		(0.009)
Survey & Sector & Provincial dummies	Y	Y	N	N	N	N
Survey & Sector & Area dummies	N	N	Y	Y	Y	Y
Observations	13,479	13,026	13,483	13,031	13,481	13,028
Overident. Test			0.832	1.330	0.560	1.910
Overident (P-value)			0.660	0.514	0.756	0.385

Note: Columns (1) and (2) show estimates of the equation (1) where the dependent variable is the yearly percentage change in the number of employees in the last year of each survey wave and the main explanatory variables are Relationship length (ln) and Sectoral change in sales (neg), the negative value of the yearly percentage change of total sales in the firm's sector, excluding the firm itself, measured in the last year of the survey. Columns (1) to (4) show second stage estimates from the IV strategy where the dependent variable is the yearly percentage change of the number of employees in the last year of each survey wave. In columns (3) and (4), the explanatory variables are Shock on sales 5% and Relationship length (ln); in columns (5) and (6), the explanatory variables are Relationship length (ln) and Sectoral change in sales (neg). Other explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4B. IV regressions: First stage

First Stage 1 : Dependent variable	(1) Relationship length (ln)	(2) Relationship length (ln)	(3) Relationship length (ln)	(4) Relationship length (ln)
Local branches 1936	-0.147**	-0.109**	-0.186***	-0.142***
	(0.059)	(0.055)	(0.059)	(0.054)
Total branches 1936	0.002**	0.002**	0.002*	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Local branches 1936 * Shock on sales 5% (0/1)	-0.143	-0.122		
	(0.110)	(0.103)		
Total branches 1936 * Shock on sales 5% (0/1)	-0.001	-0.000		
	(0.002)	(0.001)		
Local branches 1936 * Sectoral change in sales (neg)			-0.002	-0.043
			(0.007)	(0.402)
Total branches 1936 * Sectoral change in sales (neg)			-0.048	-0.003
			(0.426)	(0.006)
First Stage 2 : Dependent variable	Rel length * Shock on sales 5% (0/1)	Rel length * Shock on sales 5% (0/1)	Rel length * Sectoral change in sales (neg)	Rel length * Sectoral change in sales (neg)
Local branches 1936	-0.000	0.009	-0.008	-0.010
	(0.005)	(0.008)	(0.006)	(0.007)
Total branches 1936	-0.000*	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Local branches 1936 * Shock on sales 5% (0/1)	-0.295***	-0.279***		
	(0.098)	(0.096)		
Total branches 1936 * Shock on sales 5% (0/1)	0.002	0.002		
	(0.002)	(0.001)		
Local branches 1936 * Sectoral change in sales (neg)			-0.307***	-0.297***
			(0.086)	(0.086)
Total branches 1936 * Sectoral change in sales (neg)			-0.002	0.002
			(0.001)	(0.001)
Survey & Sector & Area dummies	Y	Y	Y	Y
Additional controls	N	Y	N	Y
Observations	13,482	13,030	13,480	13,480
F-test of excluded instruments	4.06	3.20	3.10	2.50
Overident (P-value)	0.685	0.522	0.750	0.383

Note: The table shows first stage estimates from the IV results introduced in columns (3) to (6) of Table 4A. We use as main instrumental variables: Local branches 1936 (the number of branches of local banks in 1936 in the province where the firm operates per 100,000 inhabitants) and Total branches 1936 (the number of bank branches in 1936 in the province where the firm operates per 100,000 inhabitants). Moreover, we use as instrumental variables the interactions among Local branches 1936 and Total branches 1936 with Shock on sales 5% in columns (1) and (2), and with Sectoral change in sales (neg) in columns (3) and (4). Other explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Placebo test

	(1)	(2)	(3)	(4)
Dependent variable	Growth rate t-1 (employment)	Growth rate t-1 (employment)	Growth rate t-1 (employment)	Growth rate t-1 (employment)
Relationship length (ln)	-0.013***	-0.013***	-0.011***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Rel length * Shock on sales 5% (0/1)	0.001	0.001	0.002	0.002
	(0.004)	(0.004)	(0.004)	(0.004)
Shock on sales 5% (0/1)	-0.011	-0.011	-0.014	-0.013
	(0.011)	(0.011)	(0.011)	(0.011)
Total assets (log)				-0.002*
				(0.001)
Age				-0.000***
				(0.000)
Leverage				0.000
				(0.000)
Family				0.006**
				(0.003)
Corporation				0.006
				(0.006)
ROE				0.169***
				(0.021)
Business group				0.001
				(0.004)
Survey dummies	Y	Y	Y	Y
Sector dummies	N	Y	Y	Y
Provincial dummies	N	N	Y	Y
Observations	12,987	12,985	12,975	12,539

Note: The table replicates baseline results in Table 2 but using as dependent variable the yearly percentage change of the number of employees in the second year of each survey wave. Other explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. The effects on cost of labor

Dependent variable	(1) Growth rate (total labor cost)	(2) Growth rate (total labor cost)	(3) Growth rate (average labor cost)	(4) Growth rate (average labor cost)
Relationship length (ln)	-0.016***	-0.014***	-0.007***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
Rel length * Shock on sales 5% (0/1)	0.014***	0.014***	0.005	0.005
	(0.004)	(0.004)	(0.005)	(0.005)
Shock on sales 5% (0/1)	-0.132***	-0.129***	-0.063***	-0.063***
	(0.012)	(0.012)	(0.013)	(0.013)
Total assets (log)		0.005***		0.003**
		(0.001)		(0.001)
Age		-0.000***		-0.000
		(0.000)		(0.000)
Leverage		0.000***		0.000***
		(0.000)		(0.000)
Family		0.006		0.006
		(0.004)		(0.004)
Corporation		-0.015**		-0.013**
		(0.006)		(0.006)
ROE		0.226***		0.013
		(0.023)		(0.023)
Business group		0.004		0.007*
		(0.004)		(0.004)
Survey & Sector & Provincial dummies	Y	Y	Y	Y
Observations	11,286	11,160	11,251	11,129

Note: The table replicates baseline results in Table 2 but using as dependent variables, in columns (1) and (2), the Growth rate (total labor cost), the yearly percentage change of the total labor costs of employees in the last year of each survey, while in columns (3) and (4), the Growth rate (average labor cost), the yearly percentage change of the total labor costs divided by the number of employees, measured in the last year of each survey. Explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Heterogeneous effects: the role of rationing and bank-firm relations

	(1)	(2)	(3)	(4)
	No weak rationing	No strong rationing	Main bank in the same province	Main bank in another province
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.006***	-0.006***	-0.006**	-0.007**
	(0.002)	(0.002)	(0.003)	(0.003)
Rel length * Shock on sales 5% (0/1)	0.012***	0.013***	0.011***	0.018***
	(0.004)	(0.003)	(0.004)	(0.005)
Shock on sales 5% (0/1)	-0.068***	-0.071***	-0.068***	-0.084***
	(0.010)	(0.009)	(0.012)	(0.014)
Survey & Sector & Provincial dummies	Y	Y	Y	Y
Control variables	Y	Y	Y	Y
Observations	11,066	12,524	6,677	4,084

Note: The table replicates baseline results in Table 2 on different subsamples. Estimates in column (1) display baseline results considering the initial sample after excluding companies that are not weakly credit-rationed; estimates in column (2) display baseline results considering the initial sample after excluding companies that are strongly credit-rationed. Estimates in column (3) display baseline results considering the subsample of companies whose main bank is located in the same province where the firm operates; estimates in column (3) display baseline results considering the subsample of companies whose main bank is located in a different province with respect to the one where the firm operates. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Heterogeneous effects II: the role of size and age

	(1)	(2)	(3)	(4)
	Below median (Total assets)	Above median (Total assets)	Below median (Age)	Above median (Age)
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.007**	-0.005**	-0.005	-0.001
	(0.003)	(0.002)	(0.004)	(0.002)
Rel. length * Shock on sales 5% (0/1)	0.018***	0.009**	0.017***	0.007
	(0.005)	(0.004)	(0.006)	(0.004)
Shock on sales 5% (0/1)	-0.091***	-0.059***	-0.088***	-0.051***
	(0.014)	(0.012)	(0.015)	(0.013)
Survey & Sector & Provincial dummies	Y	Y	Y	Y
Control variables	Y	Y	Y	Y
Observations	6,067	6,961	6,063	6,968

Note: The table replicates baseline results in Table 2 on different subsamples. Estimates in column (1) display baseline results considering the subsample of companies whose total assets, measured in the last year of the survey, are below the sample median; estimates in column (2) display baseline results considering the subsample of companies whose total assets, measured in the last year of the survey, are above the sample median. Estimates in column (3) display baseline results considering the subsample of companies whose age, number of years from the firm's inception measured in the last year of the survey, is below the sample median; estimates in column (4) display baseline results considering the subsample of companies whose age, is above the sample median. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9. Heterogeneous effects III: the role of high skilled workers, export and innovatio

	(1)	(2)	(3)	(4)
	Below median (% graduate)	Above median (% graduate)	High tech Sectors	No High tech
Dependent variable	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.007**	-0.006**	-0.011***	-0.004**
	(0.003)	(0.003)	(0.003)	(0.002)
Rel. length * Shock on sales 5% (0/1)	0.010**	0.015***	0.021***	0.010***
	(0.005)	(0.005)	(0.006)	(0.004)
Shock on sales 5% (0/1)	-0.060***	-0.072***	-0.087***	-0.070***
	(0.013)	(0.015)	(0.017)	(0.011)
Survey & Sector & Provincial dummies	Y	Y	Y	Y
Control variables	Y	Y	Y	Y
Observations	4,636	4,565	4,025	9,004

Note: The table replicates baseline results in Table 2 on different subsamples. Estimates in column (1) display baseline results considering the subsample of companies whose share of graduate employees, measured in the last year of the survey, is below the sample median; estimates in column (2) display baseline results considering the subsample of companies whose share of graduate employees, measured in the last year of the survey, is above the sample median. Estimates in column (3) display baseline results considering the subsample of companies operating in the high tech sector, while estimates in column (4) display baseline results considering the subsample of companies not operating in the high tech sector. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10. Implicit tests of the labor hoarding hypothesis

	(1)	(2)	(3)	(4)	(5)	(6)
	Judicial efficiency				Cost of labor	
Dependent variable	Below median (trial length) Growth rate (employment)	Above median (trial length) Growth rate (employment)	Below median (pending trials) Growth rate (employment)	Above median (pending trials) Growth rate (employment)	Average cost of labor	Average cost of labor
Relationship length (ln)	-0.004*	-0.008***	0.000	-0.010***	0.464***	0.279*
	(0.003)	(0.002)	(0.002)	(0.003)	(0.156)	(0.146)
Rel. length * Shock on sales 5% (0/1)	0.012**	0.015***	0.004	0.017***		
	(0.005)	(0.004)	(0.004)	(0.005)		
Shock on sales 5% (0/1)	-0.071***	-0.078***	-0.035***	-0.098***		
	(0.013)	(0.013)	(0.011)	(0.013)		
Survey & Sector & Provincial dummies	Y	Y	Y	Y	Y	Y
Control variables	Y	Y	Y	Y	N	Y
Observations	6,370	6,660	6,033	6,997	11,565	11,441

Note: The table replicates baseline results in Table 2 on different subsamples (columns 1 to 4). Estimates in column (1) display baseline results considering the subsample of companies operating in provinces where the average length of judicial labor-related trials are below the national median, while estimates in column (2) display baseline results considering the subsample of companies operating in provinces where the average length of judicial labor-related trials are above the national median. Estimates in column (3) display baseline results considering the subsample of companies operating in provinces where the normalized number of pending labor-related trials is below the national median, while estimates in column (4) display baseline results considering the subsample of companies operating in provinces where the normalized number of pending labor-related trials is above the national median. Estimates in columns (5) and (6) refers to a regression analysis where the dependent variable is the average cost of labor, while the main explanatory variable is Relationship length (ln). Explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Data Appendix: Data sources and variable definitions

This table describes the definitions of the variables used in the paper. Three main data sources are used in the empirical analysis: (*i*) four waves of the Capitalia Survey of Italian Manufacturing Firms (SIMF), which cover three-year periods ending respectively in 1997, 2000, 2003 and 2006; (*ii*) the BvD-AIDA database (AIDA); and (*iii*) the book "Struttura funzionale e territoriale del sistema bancario italiano 1936-1974" (SFT) by the Bank of Italy. We also use some data from the Italian National Statistics Office (ISTAT).

Variable	Definition and source (in parentheses)
Main dependent variable	
Growth rate (employment)	Yearly percentage change of the number of employees in the last year of each survey. (AIDA)
Growth rate (total labor cost)	Yearly percentage change of the total cost of labor in the last year of each survey. (AIDA)
Growth rate (average labor cost)	Yearly percentage change of the total cost of labor divided by the number of employees in the last year of each survey. (AIDA)
Relationship lending variables	
Relationship length (ln)	Logarithm of the length in years of the relationship between the firm and its main bank. (SIMF)
Rel length over 10 (0/1)	Dummy that takes the value of one if the length in years of the relationship between the firm and its main bank is over 10, zero otherwise. (SIMF)
Rel. length (ln) & % main bank	Logarithm of the length in years of the relationship between the firm and its main bank multiplied by the share of credit from the main bank when the share is above 30% (SIMF)
Measures of sales shock	
Shock on sales 5% (0/1)	Dummy that takes the value of one if the variation in the firm's sales in the last year of each survey is equal to or less than -5%, zero otherwise. (AIDA)
Sectoral change in sales (neg)	The negative value of the yearly percentage change of total sales in the firm's sector in the last year of each survey. The sector is taken at 2-digit ATECO level. (AIDA)
Change in sales (neg)	The negative value of the yearly percentage change of firm's sales in the last year of each survey. (AIDA)
Lagged shock on sales 5% (0/1)	Dummy that takes the value of one if the variation of the firm's sales in the second year of each survey is equal to or less than -5%, zero otherwise. (AIDA)
Shock on sales 10% (0/1)	Dummy that takes the value of one if the variation of the firm's sales in the last year of each survey is equal to or less than -10%, zero otherwise. (AIDA)
Control variables	
Total assets (log)	This variable is balance sheet data, available for each year covered by the survey. We use the average over the three years of each survey. (AIDA)
Age of the firm	Number of years since inception. (SIMF)
Leverage	For each firm and year of the survey, we calculate the ratio of total liabilities to equity; then we compute the average over the three years for each survey. (AIDA)
Family	The survey asks each firm to report the characteristics of the main shareholder of the firm. Family is a dummy that takes the value of one if the main shareholder is a family or an individual. (SIMF)
Corporation (business type)	The survey asks each firm whether it is publicly listed. In the survey, the information on whether the firm is a private limited company (LTD) or a public limited company (PLCs) is available only for the 2003 and 2006 surveys. For the other years, the information, which is publicly available on firms' websites, has been imputed by hand using the VAT identification number. Corporation is a dummy that takes the value of one if the firm is a LTD or PLC. (SIMF)
ROE	For each firm and year of the survey, we calculate the ratio of gross profit to equity; then we compute the average over the three years for each survey. (AIDA)
Business group	Dummy that takes the value of 1 if the firm reports that it belonged to a business group in the three years of the survey, zero otherwise. (SIMF)
Weak rationing	Dummy that takes the value of one if the firm was weakly rationed in the last year of the survey, and zero otherwise. (SIMF)
Strong rationing	Dummy that takes the value of one if the firm was strongly rationed in the last year of the survey, and zero otherwise. (SIMF)
Main bank in the same province	Dummy that takes the value of one if the firm's main bank is located in the same province, and zero otherwise. This information is not available in the 2004-2006 survey. (SIMF)
% of graduate workers	Share of graduate workers in the last year of the survey. (SIMF)
Export	Dummy that takes the value 1 if the firm exports in the last year of the survey, 0 otherwise. (SIMF)
High-tech sectors	We use the classification proposed in Benfratello et al. (2008). The High-tech dummy takes the value of one for these industries and zero otherwise.
Judicial efficiency: trial length	Mean numbers of days it takes to complete a first-degree trial in each of the 27 district courts of Italy. We imputed this variable to the firms according to the districts where they are headquartered. (ISTAT)
Judicial efficiency: Pending trials	We considered the number of civil suits pending in each of the 27 district courts of Italy, scaled by the population of the district. We imputed this variable to the firms according to the districts where they are headquartered. (ISTAT)
North	Dummy that takes the value of one if the firm is located in a northern province; zero otherwise. (SIMF)
Center	Dummy that takes the value of one if the firm is located in a central province; zero otherwise. (SIMF)
South	Dummy that takes the value of one if the firm is located in a southern province; zero otherwise. (SIMF)
Sector of activity	The survey reports the sector of activity of firms (ATECO code). Based on this information we construct sectoral dummies at 2-digit ATECO level. (SIMF)
Instrumental variables	
Local branches in 1936	Number of branches of local banks in the year 1936 in the province, per 100,000 inhabitants. (SFT)
Total branches in 1936	Number of bank branches in the year 1936 in the province, per 100,000 inhabitants. (SFT)

Table A1. IV Regressions (LIML)

	(1)	(2)
	2SLS	2SLS
Dependent variable	Growth rate (employment)	Growth rate (employment)
Relationship length (ln)	-0.099	-0.069
	(0.070)	(0.075)
Rel length * Shock on sales 5% (0/1)	0.177*	0.148*
	(0.092)	(0.092)
Shock on sales 5% (0/1)	-0.500**	-0.423*
	(0.237)	(0.237)
Total assets (log)		0.001
		(0.001)
Age		0.000
		(0.001)
Leverage		0.000*
		(0.000)
Family		-0.000
		(0.005)
Corporation		-0.006
		(0.007)
ROE		0.197***
		(0.045)
Business group		-0.006
		(0.009)
Time & Sector & Area dummies	Y	Y
Observations	13,483	13,031

Note: The table reports second stage estimates contained in columns (3) and (4) of Table 4A using limited information maximum likelihood strategy (LIML) to account for weak instruments. Explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2 The effects on cost of labor (endogeneity concerns)

	(1) OLS	(2) IV	(5) OLS	(6) IV
Dependent variable	Growth rate (total labor cost)	Growth rate (total labor cost)	Growth rate (average labor cost)	Growth rate (average labor cost)
Relationship length (ln)	-0.010***	-0.037	-0.004*	0.068
	(0.002)	(0.079)	(0.002)	(0.081)
Rel length * Sectoral change in sales (neg)	0.035**		0.022	
	(0.017)		(0.016)	
Sectoral change in sales (neg)	-0.120**		-0.054	
	(0.050)		(0.048)	
Rel length * Shock on sales 5% (0/1)		0.139		0.062
		(0.093)		(0.100)
Shock on sales 5% (0/1)		-0.453*		-0.210
		(0.239)		(0.259)
Total assets (log)	0.009***	0.006***	0.004***	0.003**
	(0.001)	(0.001)	(0.001)	(0.002)
Age	-0.000***	-0.001	-0.000	-0.001
	(0.000)	(0.001)	(0.000)	(0.001)
Leverage	0.000***	0.000***	0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Family	0.006	0.006	0.006	0.002
	(0.004)	(0.005)	(0.004)	(0.006)
Corporation	-0.014**	-0.013	-0.012*	-0.004
	(0.007)	(0.009)	(0.006)	(0.009)
ROE	0.283***	0.225***	0.044*	-0.042
	(0.024)	(0.049)	(0.023)	(0.052)
Business group	0.003	0.006	0.007*	0.021*
	(0.004)	(0.011)	(0.004)	(0.012)
Survey & Sector & Provincial dummies	Y	N	Y	N
Survey & Sector & Area dummies	N	Y	N	Y
Observations	11,153	11,160	11,122	11,129
Overident. Test		2.963		0.907
Overident (P-value)		0.227		0.635

Note: The table replicates OLS results reported in column (2) of Table 4A and IV second stage results reported in column (4) of Table 4A using alternative dependent variables. In columns (1) and (2) the dependent variable is the Growth rate (total labor cost), while in columns (3) and (4), the dependent variable is the Growth rate (average labor cost). Explanatory variables are defined in the data appendix. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.