Credit and labour markets in Italian regions.[1]

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[1]We would like to thank, without implicating, Claudio Lupi for useful suggestions and discussions and Francesco Trivieri for his help in providing data sets.

Abstract

The paper analyzes the links between credit and labour markets in Italy hilighting the influence of credit market on the evolution of regional employment rates. We estimate panel data for 8 Italian industries and 20 regions for the period 1995-2000. The results appear to indicate that employment is mainly negatively correlated to the level of industry leverage. At the same time, we find that leverage changes have a positive impact on employment. This effect may reflect the fact that hiring policies may be curbed by credit constraints. The comparison between geographical areas shows that these effects are often amplified in the less developed southern Italian regions.We argue that the impact of the monetary policy may be bigger in less developed areas.

Theme: 18. Regional labour markets

Jel classification: J43, J23

Key Words: Financial Structure, Employment, Regional Panel Data

1 Introduction

There is an increasing interest in the economic literature on the interrelationships among institutions, macroeconomic shocks and employment (unemployment) differentials. This topic has been investigated considering differences within countries and geographical areas (see for example Blanchard and Wolfers, 2000, and Nickell and van Ours 2000)

The characteristics and the structure of internal financial markets, and their link with the labour market performance, are without any doubt relevant institutional aspects to investigate. Nevertheless,they have not been extensively considered in recent studies. An important exception is the work of Acemoglu (2001), who analyzes the impact of credit market imperfections on persistent unemployment, focusing on job creation in response to technological shocks. Wasmer and Weil (2000), discuss the issue in a search model where both firms and financier face imperfect information and tight credit and labour markets. In general, there are many studies relating growth and financial development (Levine, 1997). These studies consider the issue of causality between these variables exploring whether financial factors determine growth or vice versa. The results do not point to a unique direction and it remains an open question.

In this paper we analyze specifically the links between the labour and financial markets in Italy attempting to highlight if there exists any possible impact of credit market on the evolution of employment rates at national and regional levels. We believe the issue is relevant to asses the impact of monetary policy and its role in determining regional economic development. Moreover, the research may be of some help in refining the economic policy instruments targeted to convergence.

In the next section we present some characteristics of the Italian credit and labour market. Section 3 discusses the theoretical links between labour and credit markets. Section 4 presents our index of credit dependence of the Italian industrial sectors. Section 5 illustrates the result of a panel estimation of employment growth considering financial variables. Section 6 concludes.

2 Labour and credit market in Italy

Regional labour market disparities are a well-documented feature of the Italian economy[1].Local unemployment differentials are huge and increasing throughout the last 25 years. Many explanations have been posited to ex-

[1]See, among other Baici and Samek Lodovici (2001), Brunello et al. (2001), Sestito (2002).

plain these differentials. Brunello *et al.* (2001) report how the employment performance in the South has worsened in the presence of sustained labour force growth. According to the authors, the fall in labour mobility from the South to the Northern areas has undoubtedly contributed to determine this result. The decline in earning differentials and the increase of social transfer per head arising after the labour market policies of the eighties are probably at the root of the observed phenomenon. The study documents how during the last twenty years the labour share in the South declined sensibly. A possible explanation is that after some policies that deregulate the labour market by means of the elimination of institutional rules allowing for the existence of regional wage differentials in union contracts, relative labour costs increased rapidly and the profit share fell. As unemployment started to increase the profit share partially recovered and the labour share decreased .Obviously, the observed differences in the performance of employment in the Italian regions can be explained either by the fact that regional shocks are more important than common aggregate shocks or by the fact that regional employment responds asymmetrical to common shocks. Empirical investigation seems to indicate that regional employment changes are only partially accounted for by national employment changes, especially in the South. This evidence suggests that the Northern and the southern areas responded in an asymmetric way to common aggregate shocks. Disparities in the labour market performances are only occasionally related to the functioning of the credit market. A recent paper of Guiso *et al.* (2003) studies the effect of differences in local financial development within an integrated financial market. They estimate an indicator of financial development and show that local financial development is an important determinant of the economic success of an area enhancing the probability an individual starts his own business, favoring entry, increasing competition, and promoting growth of firms. Their index of local financial development for Italian regions confirms the existence of a segmented credit market being the Northern regions at the top of the ranking.

3 Theoretical links between credit and labour markets

Most of the economists believe that financial development crucially affects the speed and pattern of economic growth. The crucial role of the credit market consists in reducing the effects of information and transaction costs on micro and macroeconomic equilibria. These costs include the cost of ac-

quiring information, enforcing contracts and transaction costs. Hence, the credit market has an impact on saving rates, investment decisions and technological innovations. Capital accumulation and technological innovations are affected by the existing financial structure and functions (Romer, 1986; Lucas, 1988; Rebelo, 1991). Some studies highlight the impact on steady state growth of the functioning of the financial markets and this effect arises through the influence on the rate of capital formation (Romer, 1990; Aghion and Howitt, 1992). The functional approach revised in Levine (1997) considers the effects of various financial functions on development. This functions enable greater liquidity, risk diversification, monitoring managers and exerting corporate controls, mobilizing savings and promoting specialization. The saving rate is undoubtedly influenced by the existing financial structure since it influences returns and lowers uncertainty. Nevertheless, some ambiguous effects through income and substitution effects have been investigated (Yappelli and Pagano, 1994). Financial systems that ease risk diversification can also acellerate the technological change. Moreover, high information costs may reduce the incentive to invest in high return/risk projects. In support of these theoretical considerations there exists some evidence that firms that rely heavily on external financing grow disproportionately faster in countries with well developed financial systems. Rajan and Zingales (1998), identify an industry's technological demand for external financing and examine whether industries that are more dependent on external financing grow relatively faster in countries that, a priori, are more financially developed, finding significant positive results. They consider that there exist technical reasons why firms depend heavily on external financing. Indeed, project scale, gestation periods, cash harvest periods and the need for continuous investment may determine the need for external financing. As a result, the growth of the number of the establishment in industries dependent on external finance should be particularly sensitive to financial development. Another question is if imperfections in credit markets spill over in the labour market influencing employment/unemployment rates and growth, labour force participation and wages. Liquidity and borrowing constraints may affect the households saving decisions and this may in turn determine the choice of hours of work and occupation. [2] Credit constraints may also influence schooling decisions and consequently both the skill level of the labour force and the private net returns of general and specific investment in human capital (Acemoglu and Piske, 1999; Carneiro and Heckman , 2002). Acemoglu (2001) considers how imperfections in the credit market may have played some role in limiting Eu-

[2]Del Boca e Lusardi (2003) investigates the issue for Italy. In particular they analyzes the relationship between female labour supply and mortgage debt commitments.

ropean employment growth. The idea is that job creation may be constrained by credit market imperfections inducing unemployment growth and persistence. Economies with better credit markets should respond to the arrival of new technologies without showing unemployment rise since availability of funds may help new firms to develop. The relevance of imperfect information, and the occurrence of moral hazard and adverse selection problems, for the links between labour and credit markets has been hilighlighted by Wasmer and Weil (2000). The main innovation of their model is the building of a search model leading to the definition of two equilibria loci representing firms and financial equilibria as a function of labour and credit market tightness. Defining $\theta = \frac{V}{U}$, with V and U indicating vacancies and unemployment respectively, as an indicator of the labour market tightness and $\phi = \frac{F}{B}$, with B and F indicating the number of bankers and entrepreneurs respectively, as an indicator of credit market tightness, in Fig.1 we represent the relationships between these two indicators. For the financiers, the equilibrium is represented by the locus BB which shows the condition that the expected cost of entering the market equals the expected benefit he will derive from interacting with an entrepreneur.

An higher cost induced by an higher ϕ must be compensated by an higher benefit represented by θ. For the entrepreneur the equilibrium is represented by the locus FF since a large cost of finding workers, represented by an higher θ, must be compensated by a lower cost of credit finding. The loci may shift due to search costs changes, both on entrepreneurs and financier sides, or by change in the profit functions. In this sense, monetary policy is a powerful instrument to move the locus BB. In this theoretical framework if wage bargaining is introduced, debt becomes a strategic instrument that financiers and entrepreneurs can use to affect the wage that workers will eventually negotiate with their employer. The authors show that the larger the firm's output net of repayment to the financier, the larger the wage. Moreover the workers' bargaining power affects the effective bargaining power of firms and banks. Interesting results of the model are that debt has a disincentive effect on the recruitment effort of the entrepreneur and that increasing repayment to financiers is a way to decrease the share of workers. In support of this hypothesis they find negative correlation between lagged venture capital investment variable and unemployment.

The impact of the financial structure on the labour adjustment costs has also been investigated. Nickell and Nicolitsas (1999) analyse the impact of liquidity constraint on employment by using a standard quadratic cost adjustment model for employment n:

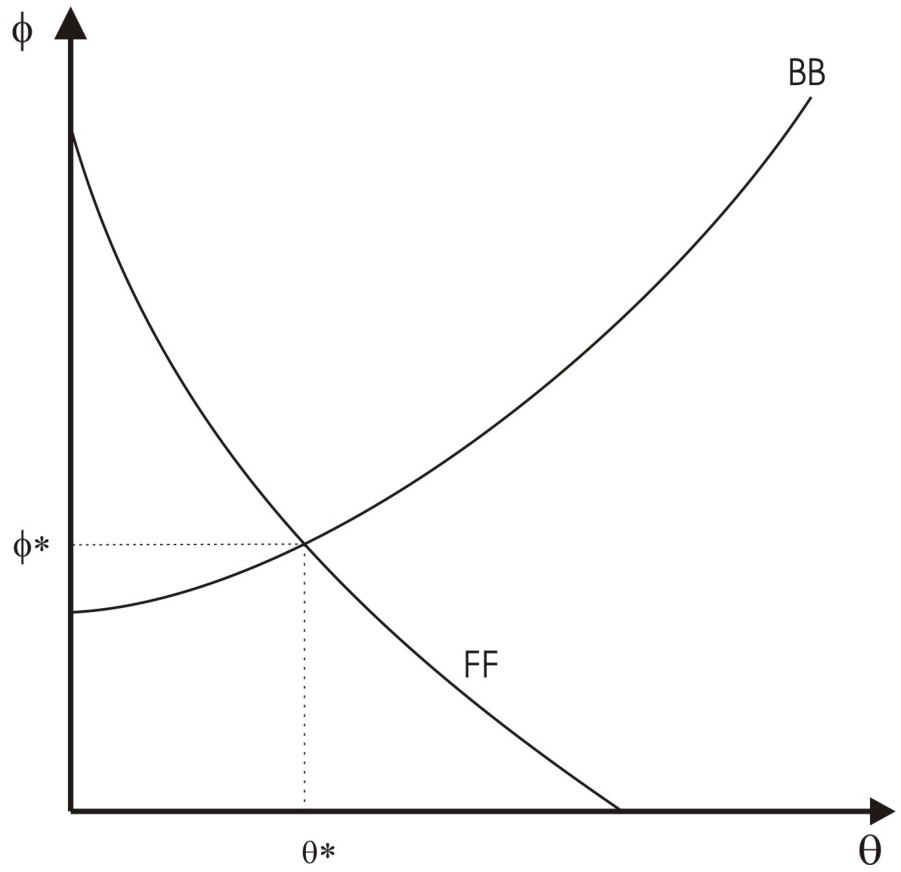

Figure 1: Equilibria loci for for firms and financiers.

$$n_{it} = \lambda n_{it-1} + (1-\lambda)(1-\omega\lambda)\sum_{j=0}^{\infty}(\omega\lambda)^j E_t n_{it+j}^{(*)} \quad (1)$$

where λ is a stable root of the Euler equation and ω is the firm's discount factor. In order to generate an observable model, it is necessary to specify the stochastic process generating all the variables which determine n_{it}^*. Then the reduced form employment equation has the form:

$$n_{it} = \alpha_i + \alpha_t + \lambda n_{it-1} + \alpha_1 k_i - \alpha_2 (w_{it} - p_{it}) + \alpha_3 d_{it} + \alpha_4 f_{it} + \varepsilon_{it} \quad (2)$$

where α_i is a firm effect, α_t is a time effect, k , w , p are the log of capital, wages and prices, respectively, and d is a demand/competition effect. They consider that the debt position of the firm would influence its investment behaviour and the hiring of new employees and add financial factors f to the reduced form employment equation. They find a significant negative effect of financial factors on employment estimating a dynamic panel data model for UK. For Italy, Cristini *et al.* confirm the importance of financial variables on employment adjustment costs.

4 The data and some descriptive statistics

In this paper we explore the issue of the relevance of credit market constraints on regional labour market using different sets of data. We use data from the Mediobanca Survey fot the period 1995-2000 which contain industry data based on a sample of about 47,000 industrial firms with more that 20 employees. We collect information to build an index of leverage to measure external financial dependence. The index is calculated as:

$$f = \frac{\text{Long and Short Term Financial Liabilities}}{\text{Total Assets}} \quad (3)$$

We illustrate the index relative to 8 industries for the period 1995-2000 in Table 1 . The ranking of industries according to their external financial dependence is not identical to that presented in Rajan and Zingales (1998), but there are some similarities.

We also use regional data from the ISTAT regional account for years 1995-2000. This data set contains relevant informations on employment, labor cost and value added by industry.

Table 1: Leverage in Italian manufacturing Industries (1995-2000).

	1995	1996	1997	1998	1999	2000	Average
1.Food	0.35	0.34	0.37	0.38	0.39	0.32	0.34
2. Textile	0.30	0.29	0.27	0.29	0.29	0.30	0.29
3.Paper	0.27	0.25	0.23	0.20	0.26	0.28	0.27
4. Coke and Refinery	0.40	0.32	0.30	0.27	0.25	0.27	0.33
5. Minerals	0.28	0.28	0.28	0.29	0.28	0.26	0.27
6. Metals	0.53	0.53	0.30	0.30	0.30	0.30	0.40
7. Machinery	0.20	0.20	0.20	0.19	0.26	0.23	0.21
8.Wood and Rubber	0.21	0.21	0.21	0.20	0.21	0.13	0.19
Source: Mediobanca							

5 Empirical Results

In order to detect the impact of financial factors on employment we estimate a version of equation (2) using panel data for 8 Italian industries and 20 Italian regions. Using an approach similar to that of Nickell and Nicolitsas (1999) we estimate the following employment equation:

$$n_{ict} = \alpha_{ic} + \beta_1 n_{ict-1} + \beta_2 \pi_{ict} + \beta_3 w_{ict} + \beta_4 f_{ict} + \epsilon_{ict} \tag{4}$$

where n, π, w,f represent log of employment, value added per worker, wages and leverage respectively. Value added and wages are in real terms. The subscript i indicates regions, c indicates industrial sectors.

A main general point in estimating employment equations refers to the endogeneity of some expalnatory variables. As is often argued, industry specific variables should be treated as potentially endogenous and potentially instrumented. The stochastic error term may contain current demand and technology shocks which may influence employment. Moreover, there are employment shocks which arise from omitted variables and all current dated firm specific variables may be correlated with these shocks. Estimation is, therefore, carried out by means of a GMM procedure (Arellano and Bond, 1991). The method consists in first differencing the equations in order to eliminate the fixed effect and dealing with endogeneity by making use of the moments restrictions implied by the assumed absence of serial correlation in the error term. The validity of the GMM procedure crucially depends on the absence of serial correlation in the error term, i.e. $E(\Delta\epsilon_{it}, \Delta\epsilon_{is}) = 0$ for $t \neq s$. In particular, since $\Delta\epsilon_{it}$ are first difference of serially incorrelated errors, $E(\Delta\epsilon_{it}, \Delta\epsilon_{it-1})$ need not to be zero but the consistency of the GMM estimator is based on the assumption that $E(\Delta\epsilon_{it}, \Delta\epsilon_{it-2}) = 0$. In order to

overcome endogeneity problems we use as instruments lags on employment, value added per worker, and wages.

Estimation results are given in Tables 2- 5. Before turning to the discussion of the estimated parameters it is first pointed out that the equation diagnostics, in the 8 equations, do not provide any indication of the presence of second order serial correlation in the residuals but in the case of the machinery industry, and the Sargan test of instrument validity performs reasonably well.

Some points are worth noting. Firstly, in 5 of 8 sectors employment is significantly negatively correlated to industry's leverage. This result is consistent with the theoretical adjustment cost framework hilighlighted in the previous Section and with the empirical results reported in Nickell and Nicolitsas(1999). The important exception to this pattern is the textile industry where a positive relationship emerges. We suspect that this result may be due to the characteristics of this sector in Italy where the firm's average dimension is low and there exists more competition in product and labour market. Change in leverage are also correlated to employment. Mainly, we find that an increase in leverage determine an increase in industry employment. This effect may reflect the fact that hiring policies may be curbed by credit constraints. The comparison between the two geographical areas shows that most of the time the impact of leverage is higher in the Southern regions. Hence, we observe that the impact of the internal financial structure of the industry on employment is higher where the local financial market is less developed and employment/unemployment rates are low/high. In this sense a change in the financial pressure or a change in the cost of borrowing have an amplified effect in less developed regions. As a consequence, monetary policy appears to be extremely relevant in promoting regional development and convergence.

6 Conclusions

In this paper we investigate the impact of financial factors on industry employment. Our goal is also to highlight if financial variables have a different impact in different geographical areas. We estimate panel data models for 8 Italian industries and 20 regions for the period 1995-2000. The results appear to indicate that employment is most of the time negatively correlated to industry's leverage. This is consistent with a theoretical adjustment cost framework and in line with the empirical results reported in Nickell and Nicolitsas(1999). At the same time, we find that leverage changes have often a positive impact on employment. This result may arise from the fact that

Table 2: Dynamic panel data estimate of employment equations for manufacturing industries (1995-2000)

	1.Food		2.Textile	
Indep.Vars	North	South	North	South
n_{ict-1}	0.205 (0.217)	0.562 (0.000)	0.228 (0.403)	0.548 (0.045)
n_{ict-2}	-	-	-	-
f_{ict}	−1.255 (0.000)	−1.52 (0.000)	3.112 (0.000)	6.032 (0.000)
Δf_{ict}	0.760 (0.000)	0.924 (0.000)	−1.547 (0.008)	−4.195 (0.000)
Δf_{ict-1}	0.675 (0.007)	0.928 (0.003)	−1.361 (0.001)	−2.965 (0.000)
w_{ict}	−0.591 (0.023)	−0.281 (0.390)	−0.866 (0.000)	−1.244 (0.006)
π_{ict}	−0.186 (−0.186)	−0.128 (0.087)	−1.142 (0.173)	−0.250 (0.146)
Constant	−1.267 (0.000)	−1.542 (0.000)	3.930 (0.000)	7.64 (0.000)
2^{nd} order S.C. test	0.754	0.987	0.129	0.608
Sargan Test	$13.90(\chi^2_{17})$	$30.80(\chi^2_{17})$	$43.15(\chi^2_{17})$	$12.05(\chi^2_{17})$
Wald Test	$90.62(\chi^2_6)$	$39.77(\chi^2_6)$	$39.85(\chi^2_6)$	$53.10(\chi^2_6)$
N	48	32	48	32
T	6	6	6	6

Notes: i) n_i= employment, f_i=leverage, w_i=wage per worker, π_i=value-added per worker. All variables are in logs. The subscript i refers to regions, the subscrit c refers to industrial sectors. t is a time index.ii) For estimation, the equations are first differenced to eliminate the fixed effect. All explanatory variables are treated as potentially endogeneous. Instruments used are those implied by a GMM procedure and include all lags of endogeneous variables from $t-2$ backward. iii) Probability value under the null in parenthesis.

Table 3: Dynamic panel data estimate of employment equations for manufacturing industries (1995-2000)

	3.Paper		4.Coke and Refinery	
Indep.Vars	North	South	North	South
n_{ict-1}	0.837 (0.000)	0.424 (0.008)	0.548 (0.001)	0.782 (0.0.308)
n_{ict-2}	-	-	-	-
f_{ict}	-0.194 (0.036)	-1.04 (0.043)	0.259 (0.186)	0.812 (0.205)
Δf_{ict}	0.04 (0.62)	0.517 (0.103)	-0.167 (0.219)	-0.743 (0.162)
Δf_{ict-1}	$-$	0.649 (0.026)	-1.003 (0.13	-1.84 (0.096)
w_{ict}	-0.975 (0.000)	-0.008 (0.981)	-0.255 (0.846)	-0.043 (0.969)
π_{ict}	-0.138 (0.178)	-0.517 (0.000)	-0.059 (0.032)	-0.004 (0.987)
Constant	-0.258 (0.056)	-1.466 (0.048)	0.262 (0.186)	0.887 (0.198)
2^{nd} order S.C. test	0.900	0.865	0.967	0.439
Sargan Test	$10.55(\chi^2_{24})$	$15.12(\chi^2_{17})$	$6.06(\chi^2_{17})$	$3.24(\chi^2_{17})$
Wald Test	$104.72(\chi^2_5)$	$62.54(\chi^2_6)$	$26.03(\chi_6)$	$474.17(\chi^2_6)$
N	48	32	48	32
T	6	6	6	6

Notes: i) n_i= employment, f_i=leverage, w_i=wage per worker, π_i=value-added per worker. All variables are in logs. The subscript i refers to regions, the subscrit c refers to industrial sectors. t is a time index.ii) For estimation, the equations are first differenced to eliminate the fixed effect. All explanatory variables are treated as potentially endogeneous. Instruments used are those implied by a GMM procedure and include all lags of endogeneous variables from $t-2$ backward. iii) Probability value under the null in parenthesis.

Table 4: Dynamic panel data estimate of employment equations for manufacturing industries (1995-2000)

	5.Minerals		6.Metals	
Indep.Vars	North	South	North	South
n_{ict-1}	-0.779 (0.295)	0.392 (0.425)	0.316 (0.061)	0.258 (0.229)
n_{ict-2}	-0.518 (0.346)	-0.941 (0.835)	-	-
f_{ict}	-0.219 (0.014)	-0.231 (0.108)	-3.878 (0.003)	-3.037 (0.041)
Δf_{ict}	-0.499 (0.358)	-0.360 (0.411)	-0.042 (0.169)	0.054 (0.184)
Δf_{ict-1}	-0.279 (0.618)	0.569 (0.443)	-0.045 (0.033)	-0.018 (0.682)
w_{ict}	-0.167 (0.538)	$-0,376$ (0.284)	-1.082 (0.002)	-0.637 (0.048)
π_{ict}	-0.339 (0.128)	-0.023 (0.955)	-0.228 (0.013)	-0.097 (0.486)
Constant	–	–	-4.609 (0.003)	-3.607 (0.042)
2^{nd} order S.C. test	0.366	0.460	0.109	0.445
Sargan Test	$3.64(\chi^2_7)$	$4.21(\chi^2_7)$	$23.82(\chi^2_{17})$	$20.36(\chi^2_{17})$
Wald Test	$35.40(\chi^2_7)$	$74.35(\chi^2_7)$	$50.24(\chi^2_6)$	$26.33(\chi^2_6)$
N	48	32	48	32
T	6	6	6	6

Notes: i) n_i= employment, f_i=leverage, w_i=wage per worker, π_i=value-added per worker. All variables are in logs. The subscript i refers to regions, the subscrit c refers to industrial sectors. t is a time index.ii) For estimation, the equations are first differenced to eliminate the fixed effect. All explanatory variables are treated as potentially endogeneous. Instruments used are those implied by a GMM procedure and include all lags of endogeneous variables from $t-2$ backward. iii) Probability value under the null in parenthesis.

Table 5: Dynamic panel data estimate of employment equations for manufacturing industries (1995-2000)

	7.Machinery		8.Wood and Rubber	
Indep.Vars	North	South	North	South
n_{ict-1}	1.289 (0.000)	−0.013 (0.965)	−0.074 (0.475)	0.307 (0.024)
n_{ict-2}	-	-	-	-
f_{ict}	−8.32 (0.000)	−4.83 (0.079)	0.922 (0.164)	−0.669 (0.556)
Δf_{ict}	8.42 (0.000)	4.978 (0.073)	−0.984 (0.160)	0.872 (0.473)
Δf_{ict-1}	6.87 (0.000)	4.038 (0.067)	−0.829 (0.093)	0.914 (0.315)
w_{ict}	−0.734 (0.000)	0.073 (0.605)	−0.707 (0.000)	−1.095 (0.000)
π_{ict}	0.158 (0.000)	−0.003 (0.941)	−0.481 (0.000)	−0.098 (0.596)
Constant	−13.25 (0.000)	−7.684 (0.079)	1.491 (0.150)	−0.968 (0.586)
2^{nd} order S.C. test	0.007	0.041	0.350	0.763
Sargan Test	-	-	$11.79(\chi^2_{10})$	$16.19(\chi^2_{17})$
Wald Test	-	-	$185.30(\chi^2_6)$	$78.90(\chi^2_6)$
N	48	32	48	32
T	6	6	6	6

Notes: i) n_i= employment, f_i=leverage, w_i=wage per worker, π_i=value-added per worker. All variables are in logs. The subscript i refers to regions, the subscrit c refers to industrial sectors. t is a time index.ii) For estimation, the equations are first differenced to eliminate the fixed effect. All explanatory variables are treated as potentially endogeneous. Instruments used are those implied by a GMM procedure and include all lags of endogeneous variables from $t-2$ backward. iii) Probability value under the null in parenthesis.

hiring policies may be curbed by credit constraints. The comparison between the two geographical areas shows that often these effects are amplified in the less developed Southern Italian regions. We argue that the impact of the monetary policy may be bigger in less developed areas. If this is the case, monetary policy might be extremely relevant in promoting regional development and convergence.

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