

Liquidity Constraint on the Production of Firms in Southern Italy

Domenico Sarno

ABSTRACT. The paper shows how small and medium enterprises located in the less developed regions of Southern Italy face higher liquidity constraints compared to the firms in the Central-Northern Italian regions. The reasons for these constraints are the undersized nature of firms and higher risk of business activity. Consequently, credit rationing is more extensive. In order to analyse the effects on the potential growth of firms' production, a simple model is presented, followed by estimates for growth. The results confirm the existence of a bottleneck of financial resources devoted to current finance production that limits the accumulation of working capital even when faced with favourable market opportunities.

1. Introduction

The aim of the present paper is to show how – in a dualistic economy such as the Italian one – firms located in the less developed regions of the *Mezzogiorno* (Southern Italy)¹ face an atypical constraint that limits the accumulation of working capital and therefore the expansion of activity even when faced with profitable opportunities.

This constraint is exacerbated by the fact that these companies are undersized, which renders the lack of liquidity flows necessary to finance current activities more likely. The greater need for external resources increases the idiosyncratic risk of the company and this tends to worsen the borrowing conditions for the company. Naturally, it follows that the investment is jeopardised by

these constraints since it cannot be supported by internal financing.

This approach is partially different from that of rationing models. Instead it recalls the questions suggested by the theory of “financial accelerator”. The analysis of the transmission mechanism of monetary policies highlights that smallest firms are more sensitive to monetary stance and change in the business cycle. This is due both to the direct influence of monetary policy and to the indirect impact working through the imperfections in capital market. The indirect channel acts by means of a financial accelerator that tends to force the effects of the business cycle by amplifying relatively modest shocks. Therefore, in the presence of such a propagation mechanism, a contraction shock deteriorates credit conditions, contracts investment spending and prolongs the downturn (Bernanke and Gertler, 1990, 1995; Gertler, 1992; Gertler and Gilchrist, 1993, 1994).

On this question, the evidence consists largely of firm-level research showing that cash flow is an important indicator for investment. Although this evidence is often viewed with scepticism because cash flow is also a good indicator for investment opportunities, several empirical works have found that investment appears to be excessively sensitive to fluctuations in cash flow. This would indicate that access to capital markets is limited and that the firms face financial constraints (Hubbard, 1998).

Moreover, other approaches have shown that the severity of credit constraints is mitigated in presence of lending relationships. Studies on *Relationship Banking* have demonstrated why efficiency gains have arisen in this case. To the extent that these relationships partially compensate the failures caused by informational asymmetries, they

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Seconda Università Di Napoli
Facoltà Di Economia
Piazza Umberto I
81043, Capua
Italy
E-mail: domenico.sarno@unina2.it

tend to reduce the credit rationing to the firms (small firms, especially). A better evaluation of the financing risk and more careful monitoring would prevent adverse selection and moral hazard problems and prevent the debt (and the share of short term debt) from increasing too much. This would limit the financial stress, allow more efficient solutions to resolve difficulties and at the same time reduce bankruptcy costs.

Empirical works have found that *Relationship Banking* relaxes significantly the credit constraints to small firms. The benefit from the relationship is not in terms of cheaper capital for firms, but in terms of greater access to capital (Petersen and Rajan, 1994) and with lower collateralisation (Berger and Udell, 1995). There is also evidence that the competitiveness of financial markets is an important determinant for the lending relationship. It seems that more competitive the markets, the weaker the relationship (Petersen and Rajan, 1995).

This theoretical framework appears to be particularly appropriate for an analysis of the development of the Southern Italian economy in the last decade.

2. The evolution of the Mezzogiorno economy in the last decade

In the Nineties, the economy of South Italy was affected by considerable changes.

At the beginning of the decade, the special regime for intervention in favour of southern regions ceased, at the same time as the financial crises and the exit from European Monetary System. In the case of southern firms, there was a lack of traditional demand support nor could firms benefit from devaluation due to their poor propensity to export.

This forced firms to compete. The difficulties in dealing with increasing competition forced the firms towards downsizing; at the same time, the shadow sector increased dramatically.

This trend was halted in the middle of the decade when the southern firms' performance improved. The improvement did not arise from better productivity, but from greater cost competitiveness achieved through exploiting the shadow sector and increasing exports.

Although there are many evident weaknesses

and contradictory elements, there is no doubt that the competitive selection of the Nineties has resulted in a real southern sector of SMEs that seem more able than in the past to face competitive challenges. New regional policies are devoted to support these firms in order to promote the economic growth (Giannola and Sarno, 1998).

At the same time, the regional credit system is affected by a complex restructuring process. The difficulties of the firms is caused by the lack of a regional credit market. Simultaneously, this is worsened by the liberalisation of financial markets and consequently trade penetration in the southern regions by larger external banks is increasing.

This process will lead to a complete dislocation of the regional banking system towards a series of acquisitions and mergers of regional banks by external banks (Giannola and Sarno, 2001).

The contrasting development in the Southern Italy of the real and financial sectors lies at the heart of the current debate on the prospects of regional economic growth.

On the one hand, empirical works confirm the importance of credit in order to promote the growth. They verify the robustness of the relationship between regional growth and financial market growth (Lopes, 2002).

On the other hand, the dislocation of the regional banks has led to different views regarding the possibility of increasing the role of credit supply to regional growth. A first approach, recalling the dependent path of southern banks' integration, is sceptical about the possibilities of increasing credit supply to firms (Giannola, 2002). An alternative view stresses the benefits of allocative efficiency due to the increasing competitive pressure in regional financial markets and consequently the benefits for firms in terms of access to the capital market (Ferri and Messori, 2001). There is an compromise position whereby the efficiency gains of the financial market integration are compatible with the benefits due to informative advantages by the local banks (Alessandrini, 2001).

Finally, there are earlier empirical reports indicating a lack of credit supply and the worsening of credit access for southern SMEs (Sapienza, 1998).

The remainder of this paper is organised as

follows. After having expounded the characteristics of the data-set in Section 3, Section 4 deals with the central question, concentrating on the nature of the relationship between the real and financial structure and the effects of financial constraints on the investment spending of the southern firms. Then, in order to highlight the sources of the financial-liquidity constraints, I present a simple model (Section 5) and the results of its estimate and a simple simulation exercise (Section 6). Finally, some conclusions are drawn (Section 7). The procedure and the technique of the model estimate are described in the Appendix.

3. Characteristic of the data-set

The database utilised in the present analysis is provided by Mediocredito Centrale. Every three years, the Mediocredito Centrale "Osservatorio sulle piccole e medie imprese" [Observatory of SMEs] carries out a structural analysis of manufacturing companies on behalf of the Italian Ministry of Industry.²

The sample of the inquiry is composed of companies with more than 10 employees. The base unit of measurement is the company. The sample is drawn up with a mixed methodology of companies with less than 500 employees. Moreover the sample embraces all the companies of the universe with more than five hundred employees. The random component is obtained through the method of stratified random selection. The sample plan requires the initial division of the universe into homogeneous groups of companies with less than five hundred employees; an index of labour productivity is utilised as the stratification factor; then, both the entire dimension and the composition by strata of the sample are defined applying the formula by Neyman. The latter enables us to define the size of the sample in such a way as to minimise the sample variance. The composition in the single strata is proportional to the regional articulation of the universe and the sample companies are taken at random from the regional universes.

The analysis concerns two different phases using two different instruments of observation. First, the sample companies are required to complete questionnaires;³ then the accounting

records of the interviewed companies are collected either directly or indirectly from other archives.⁴

In the context of the statistics on the national manufacturing industry, the archive of Mediocredito Centrale has an outstanding degree of completeness and continuity. Indeed, it enables the joint and continuous analysis of both the structural dynamics and the financial dynamics of a large sample of companies.⁵

The data utilised in this work has been obtained from the samples of the last two reports, which refer to the period 1992–1994 and 1995–1997, respectively. They all concern small and medium enterprises with less than 50 billion Italian Lire of total sales (approximately 26 million euro). In all, there are 6,550 observations, while the observations referring only to *Mezzogiorno* companies number 778. This analysis considers this sample of firms and also – within this context – the set of small companies with less than 10 billion Italian Lire of total sales (approximately 5 million euro).

The analysis will refer to two different three-year periods, 1992–1994 and 1995–1997, that respectively coincide with the descending phase and ascending phase of an economic cycle.⁶

4. Productive and financial performance, investment spending and financial constraints

The problems of Southern firms are clearly revealed from their relative performance (Table I).

Profitability ratios, such as ROE and ROI, are very low compared to central-northern firms. This has both a real and financial explanation. It can be noted that there is a very large difference in the productivity factors; at the same time, southern firms are burdened with financial costs and the financial structure of these firms requires difficult adjustments.

Southern companies have an added value growth rate that is markedly smaller than the growth rates of centre-northern companies. Even if the added value grows more slowly in the South – even when there is a ratio with respect to sales that converges with the ratio of the companies in the Centre-North – the share of labour cost is approximately similar. This is due to the fact that

TABLE I
Performance and financial ratios of SMEs (median values)

	1992	1993	1994	1995	1996	1997
<i>Mezzogiorno*</i>						
Return on equity (ROE)	4.2	3.2	4.2	4.4	4.9	4.8
Return on investment (ROI)	9.6	8.0	7.8	9.4	9.8	8.0
Burden of debt/financial debt	17.8	17.4	13.8	14.1	13.2	11.3
Burden of debt/gross margin	41.8	37.0	29.7	37.9	36.4	31.6
Burden of debt/value added	16.7	14.6	12.1	14.2	13.6	11.7
Value added/sales	32.6	33.2	32.8	25.9	26.5	27.1
Labour cost/value added	63.7	66.6	66.6	59.2	61.7	63.7
Value added/employees	57.0	53.6	52.9	67.7	64.8	65.8
Labour cost/employees	35.9	34.4	34.2	39.7	39.6	41.9
Financial debt/equity	79.4	57.5	57.0	65.3	63.0	61.6
Financial debt/sales	27.7	23.4	22.8	18.6	19.7	21.6
Bank debt/financial debt	100.0	100.0	100.0	100.0	100.0	100.0
Burden of debt/bank debt	20.3	20.6	17.5	15.4	15.4	14.0
Current assets/sales	70.5	68.8	70.1	66.1	65.7	67.5
<i>Centher-North</i>						
Return on equity (ROE)	5.7	7.0	13.0	17.4	13.8	12.2
Return on investment (ROI)	11.1	13.3	13.7	19.0	16.3	13.4
Burden of debt/financial debt	18.2	17.9	13.8	15.6	13.7	10.9
Burden of debt/gross margin	45.6	38.5	28.4	29.0	30.7	27.7
Burden of debt/value added	14.2	12.7	9.9	11.4	10.6	9.1
Value added/sales	33.3	34.9	33.6	27.8	28.4	28.4
Labour cost/value added	69.4	68.1	66.6	59.2	64.1	66.2
Value added/employees	67.1	67.9	72.9	86.6	79.0	81.0
Labour cost/employees	46.4	46.5	48.5	50.6	50.4	52.9
Financial debt/equity	112.9	92.6	91.7	87.7	68.4	74.1
Financial debt/sales	23.2	20.0	18.3	15.0	13.7	15.0
Bank debt/financial debt	100.0	100.0	100.0	100.0	100.0	100.0
Burden of debt/bank debt	21.4	21.2	16.0	17.3	15.6	12.6
Current assets/sales	61.2	60.8	60.1	55.9	54.7	57.3

* Mezzogiorno refers to the southern regions of Italy.

Source: Processed data from Mediocredito Centrale.

labour cost per worker is much lower in the South than in the Centre-North, and this gap reflects the productivity gap. The incidence of financial costs over the operational margins remains systematically higher, despite the presence of a relatively smaller share of depreciation.

Southern companies are therefore characterised by more expensive industrial management. Indeed, the level of debt per unit sales is relatively higher. The larger incidence of short term debt on sales has such a magnitude that the cost of debt tends to be roughly the same as that in the Centre-North, despite the advantages that the southern companies have in the cost of medium and long term debt. The causes of such higher financial costs are explained by the need to fund current production

from external sources, given the generally lower level of profitability of the productive processes.

Therefore, the performance of southern firms is limited by these two factors: on the one hand, the inadequate dynamics of productivity and, on the other hand, the excessive requirements of external resources to finance current production. Moreover, there is a "scale effect" related to undersized activity that ends up amplifying the consequences caused from the linking of these two factors.

In this way, the constraints of correspondence between the productive structure of the company and its financial dimension becomes more rigid. In turn, it determines a great limit on the margins available for the financial management. This phenomenon amplifies the possible bottleneck

effects in the liquidity flows that the small scale of activity renders more likely and widespread. As a consequence, southern companies need to make choices to control their financial equilibrium in an effort to recuperate degrees of liquidity and reduce their own dependence on the credit system (Giannola and Sarno, 1996).

The performance in the 1995–1997 period confirms this key to interpretation from another perspective. In this period the southern firms' sales rose. The share of added value as well as the labour costs increased. At the same time as the rise of sales, there was an increase in debt. On the contrary, in central-northern firms the debt/sales ratio was constant.

In southern firms the burden of debt, although decreasing, balances the labour cost advantages. This causes the fall of the profitability ratios and this is explained from the increase of debt as well as from the inadequate size of activity (Giannola and Sarno, 1998).

It is likely that the need to protect the financial equilibrium of the firm has put in jeopardy the physical capital accumulation, too (Sarno, 2000).

Indeed, although there are large public subsidies for investment projects, firms' decisions have to be adequately supported by own resources.⁷ Financial fragility can make it more difficult to implement them.

The trend of fixed investment per unit sales for southern SMEs compared to central-northern firms is illustrated in Table II.

As can be seen, in the first period (1992–94) accumulation was concentrated particularly in medium-sized firms; instead, smaller firms were cut off since the financial-liquidity constraints

were more severe. In the following years (1995–97) there was a recovery of the fixed capital formation in the small firms, while the relatively positive trend in medium-sized firms remained stable.

In order to highlight the significant role that the financial-liquidity constraints play in respect to the accumulation of southern firms, a thorough examination of the relationship between investment spending and internal finance conditions is proposed.

It is well known that the core of finance theory lies in the relationship between the financial structure and the investment decisions of firms. Conventional analysis is represented by the Modigliani-Miller framework.⁸ The empirical studies on this subject test the correlation of the capital spending with some measure of internal finance, the cash flow generally. From a significant, positive correlation between investment and cash flow the existence of capital market imperfections are proven thereby causing financial constraints on firms.⁹

Bearing in mind these empirical studies, the investment function of Italy SMEs is then estimated from the data-set derived from a closed sample.¹⁰

The investment equation is specified in the version proposed by the accelerator model with adjustment costs augmented by the cash flow variable. In order to include the regional impact of cash flow on investment spending, the variable obtained through the combination of the dummy variable (that assumes unit value for southern firms and zero value for centre-northern firms) and the cash flow variable is added.

TABLE II
Fixed investment/sales (%)

	1992	1993	1994	1995	1996	1997
<i>Mezzogiorno</i>						
Small firms	3.3	2.8	2.9	9.0	5.9	9.4
Medium-sized firms	5.6	6.5	6.2	4.6	5.1	6.9
<i>Centre-North</i>						
Small firms	4.0	12.2	4.9	10.8	11.2	11.1
Medium-sized firms	3.5	4.3	2.7	4.8	4.6	4.6

Source: Processed data from Mediocredito.

The empirical model is

$$(I/K)_{t,i} = \alpha_1 (I/K)_{t-1,i} + \alpha_2 (\Delta S/K)_{t,i} + \alpha_3 (CF/K)_{t,i} + \alpha_4 M(CF/K)_{t,i} + \mu_{t,i}$$

where investment (I) is expressed as function of sales variation (ΔS) and cash flow (CF). $M(\cdot)$ is the variable devoted to measure the regional impact of cash flow, while the retarded variable represents the adjustment costs. All the variables are related to initial fixed assets (K).

The GMM equations are presented in the next table (Table III).

The results are consistent with the implications of the accelerator approach. Importantly, they show marked differences of cash flow impact on regional investment. For southern firms there is a significant impact of cash flow on current investment spending; the coefficients are positive with values in the range from 0.36 to 0.55. However, this relationship is not seen for the overall sample, where the cash flow coefficients are negative and close to zero.

5. The financial-liquidity constraints: a simple model

In order to shed some light on the nature of the financial constraint which is particularly relevant

TABLE III
Investment equation estimates

Dependent variable (I/K) _{<i>t</i>}	(1)	(2)	(3)
(I/K) _{<i>t-1</i>}	0.441** (0.17)	0.363** (0.14)	0.021** (0.14)
($\Delta S/K$) _{<i>t</i>}	0.247** (0.09)	0.273** (0.07)	0.049 (0.06)
(CF/K) _{<i>t</i>}	-0.092** (0.04)	-0.080** (0.05)	0.019 (0.26)
$M(CF/K)$ _{<i>t</i>}	0.357** (0.16)	0.412** (0.13)	0.547 (1.68)

GMM estimates.

N° obs: 2095 (140 for Mezzogiorno firms).

** = Significant values at 1%.

Standard deviation in brackets.

(1) Instruments (I/K)_{*t-1*} and (I/K)_{*t-2*}.

(2) Instruments (I/K)_{*t-1*} and (I/K)_{*t-2*}; dependent variable obtained from fixed effect panel.

(3) First differences; instrument $\Delta(I/K)$ _{*t-1*}.

to represent the idiosyncratic position of southern firms, the following sample model is presented.

Suppose that a firm resorts to debt, d , to finance its activity, y , according to a fixed proportion, α ($= d/y$).

Let δ be the expected or planned rate of growth of production,

$$y^e = (1 + \delta)y_{t-1}$$

The demand for debt per unit of time will be

$$d^e = (1 + \delta)d_{t-1}$$

Naturally, the planned growth of production is affected by the availability of external resources needed to fund production. The company faces two different constraints in resorting to external sources: the first is due to the “environment” risk, of a systemic nature; the second is due to the degree of risk specific to the company.

In order to represent the first of these constraints, assume that the supply of debt follows the rule

$$d_t = d^e - \phi f_t$$

where ϕ is the rationing share and f the specific risk level of the firm; ϕ represents both the cycle and the general conditions of risk (of the environment, of the sector, etc.).

Consider that the latter can be also written in the form:

$$d_t = (1 + \delta)d_{t-1} - \phi f_t \quad (1)$$

that corresponds to

$$y_t = (1 + \delta)y_{t-1} - (\phi/\alpha)f_t \quad (2)$$

For the sake of simplicity, we can write the equation representative of the firm’s risk as:

$$f_t = -\mu + \gamma d_t$$

where we suppose f_t to be an increasing function of the debt exceeding a given parameter μ . We can define μ as a *bonus*. Naturally, the firm risk depends critically from debt as well as from equity and both define the variable f .¹¹

This expression defines a critical level of d as a function of μ and γ , $d^* = \mu/\gamma$, for which $f = 0$. When $d \leq \mu/\gamma$, then $f \leq 0$ and the supply of loans is equal or greater than the demand. In this case, the firm does not face a financial constraint; the planned growth of production is compatible with

the available financial resources. In the opposite case (when $d > d^*$), the availability of external resources falls progressively. In this case the available resources are less than the amount needed to finance the planned growth.

Substituting and rearranging we have

$$d_t = \left[\frac{1 + \delta}{1 + \phi\gamma} \right] d_{t-1} + \frac{\mu\phi}{1 + \phi\gamma} \quad (4)$$

and

$$y_t = \left[\frac{1 + \delta}{1 + \phi\gamma} \right] y_{t-1} + \frac{\mu\phi}{\alpha(1 + \phi\gamma)} \quad (5)$$

For given initial conditions and with $\phi\gamma \neq \delta$, the solution of the two first order difference equations will be

$$d_t = A \left[\frac{1 + \delta}{1 + \phi\gamma} \right]^t + \frac{\mu\phi}{\phi\gamma - \delta}$$

$$y_t = A' \left[\frac{1 + \delta}{1 + \phi\gamma} \right]^t + \frac{\mu\phi}{\alpha(\phi\gamma - \delta)}$$

where A and A' are constants.

The debt grows over time in proportion to $[(1 + \delta)/(1 + \phi\gamma)] = h$. When $\phi\gamma = 0$, there is no constraint in financing the planned growth of production ($h = \delta$). When $0 < \phi\gamma < \delta$, $h > 1$, that is d shows a trend that diverges from the equilibrium level. This is the case when partial rationing exists. Instead, when $\delta < \phi\gamma$, $h < 1$, credit rationing prevails and d converges to the equilibrium value $\mu\phi/(\phi\gamma - \delta)$ that is positively related to μ and grows as the difference between δ and $\phi\gamma$ becomes smaller. The greater the difference between δ and $\phi\gamma$, the faster the convergence.

Obviously, since we assume a constant relationship between d and y , the growth profile of y coincides with that of d . When $\delta < \phi\gamma$, y converges to the equilibrium value $\mu\phi/\alpha(\phi\gamma - \delta)$. The latter is inversely related to α which, in turn, represents the measure of the dependence of firm production on external finance.

In what follows, a test of the geographical characteristics and different relevance of the financial constraints is proposed.

6. The results of the estimate and a simple simulation exercise

The model has been estimated according to the procedure fully expounded in the appendix. The variables utilised in the estimated are as follows:

- the sales is a proxy of the planned production;
- the debt is defined as the total financial debt of the firms;
- the firm risk level is represented by the leverage, that is the ratio of debt to invested capital (debt plus equity).

The data refers to the two three-year periods, 1992–1994 and 1995–1997, expressed as logarithms.¹²

The estimated equations are in the tables of the Appendix. They are satisfactory. The R^2 values lie in the range between 0.6 to 0.8 in the GLS equations, while they show 0.3 values on average in the f equations. The t -Student values are high and all the coefficients are significant at the defined probability level with two exceptions only. Moreover, the Wald statistics' values are in the tables to test the linear restrictions in the GLS equations.

Table IV shows the estimates of the most significant parameters of the model based on the coefficient estimates; they have been drawn up considering the size of the company and the period of observation.

Examining the estimates referring to the largest companies, a large difference in the parameter representing the conditions of systemic risk and its relevance with respect to debt dynamics appears evident.

Moreover, it is worth pointing out that for southern firms the value of this parameter is greatly affected by the economic cycle. The value observed in the period 1992–94 is more than twice that observed in the period 1995–97. Considering the same value expressed in terms of sales, this proportion is even higher. These trends are much milder for the centre-north firms. The results of the estimates of the risk function of a firm (the function f of the model) find a less immediate explanation. For southern companies, they show a smaller value of the elasticity of the risk index with reference to current debt and a larger value of the constant with respect to the values observed

TABLE IV
Parameter estimates

(a) Larger firms (with less 50 billion lire of sales)

	1992–1994		1995–1997	
	Mess.	C-North	Mess.	C-North
φ	0.267	0.091	0.123	0.076
φ/α	0.180	0.038	0.051	0.013
δ	-0.048	-0.001	-0.006	0.000
$\log \mu$	-4.416	-4.537	-4.438	-4.768
γ	0.033	0.354	0.364	0.411
h	0.874	0.967	0.951	0.970

(b) Smaller firms (with less 10 billion lire of sales)

	1992–1994		1995–1997	
	Mess.	C-North	Mess.	C-North
φ	0.306	0.121	0.172	0.116
φ/α	0.199	0.064	0.072	0.030
δ	-0.060	-0.007	-0.008	-0.002
$\log \mu$	-4.703	-4.205	-4.642	-5.034
γ	0.401	0.354	0.419	0.484
h	0.838	0.952	0.925	0.945

Source: Processed data from Mediocredits Centrale.

for northern companies.¹³ The estimates referring to the smallest companies (with sales smaller than 10 billion Italian lire) punctually confirm these trends. Naturally, the share of rationing that can be considered due to the risk factors of a systemic nature in small companies is relatively high both in the South and in the Centre-North; likewise, the elasticity of the risk index with respect to the debt contained in equation f is relatively great.

The solutions of the two equations offer an effective representation of these regional differences in credit availability. In fact, the difference existing in the value of the elasticity of debt and sales (the value h) between the companies in the two different regions can be noted. In more detail, it can be seen that in the period 1992–94 the value of such elasticity was equal to 0.874 and to 0.967 for large companies in the *Mezzogiorno* and in the Centre-North respectively.

This means that the percentage of rationed debt (or correspondingly the percentage of sales) was equal to 12% circa for southern companies and slightly more than 3% for central-northern com-

panies. In the same period, the same percentage was equal to 16% circa for small southern companies, while it was only close to 5% in small companies in the regions of the Centre-North.

In the most favourable period (1995–97) the rationing constraints became less binding in the southern regions, while the situation remained substantially unchanged in the centre-north regions. As a matter of fact, the rationed share declined to 5% for the largest southern companies and to 7.5% for the small ones; for northern companies it was equal to 3% circa for large companies and to 5.5% for the small ones.

A simulation exercise is presented to show the incidence of rationing on the growth rate of sales. An indication in this sense can be obtained by measuring the share of crowded sales caused by rationing. In the logic of the model, this can be measured by the difference between the growth rate of sales as obtained by the estimates of the parameter model and an hypothetical planned rate, that is

$$[(1 + h)^t - (1 + \delta)^t]$$

The hypotheses which are at the base of this simulation exercise are very simple. Consider two perfectly identical companies, each operating in one of the two regions. The planned growth rate of sales (δ) of the two companies is the same and, for the sake of simplicity, can be supposed equal to 5%. Projecting the exercise over a period of 5 years, we can measure the cumulated loss of sales due to the presence of rationing in the financing of production.

In order to take into account the effects of the cycle, this cumulative crowding of sales is evaluated in two different contexts that can be briefly described as follows:

Scenario 1: coincides with the period that precedes the bottom of the cycle and is characterised by a recessive phase (1992–94);

Scenario 2: coincides with the trait following the bottom of the cycle and with the beginning of the recovery (1995–97).

The results are shown by the graphs in Figure 1.

The share of crowded sales is, in all cases, relevant for the southern companies and noticeably larger than the share of the northern companies.

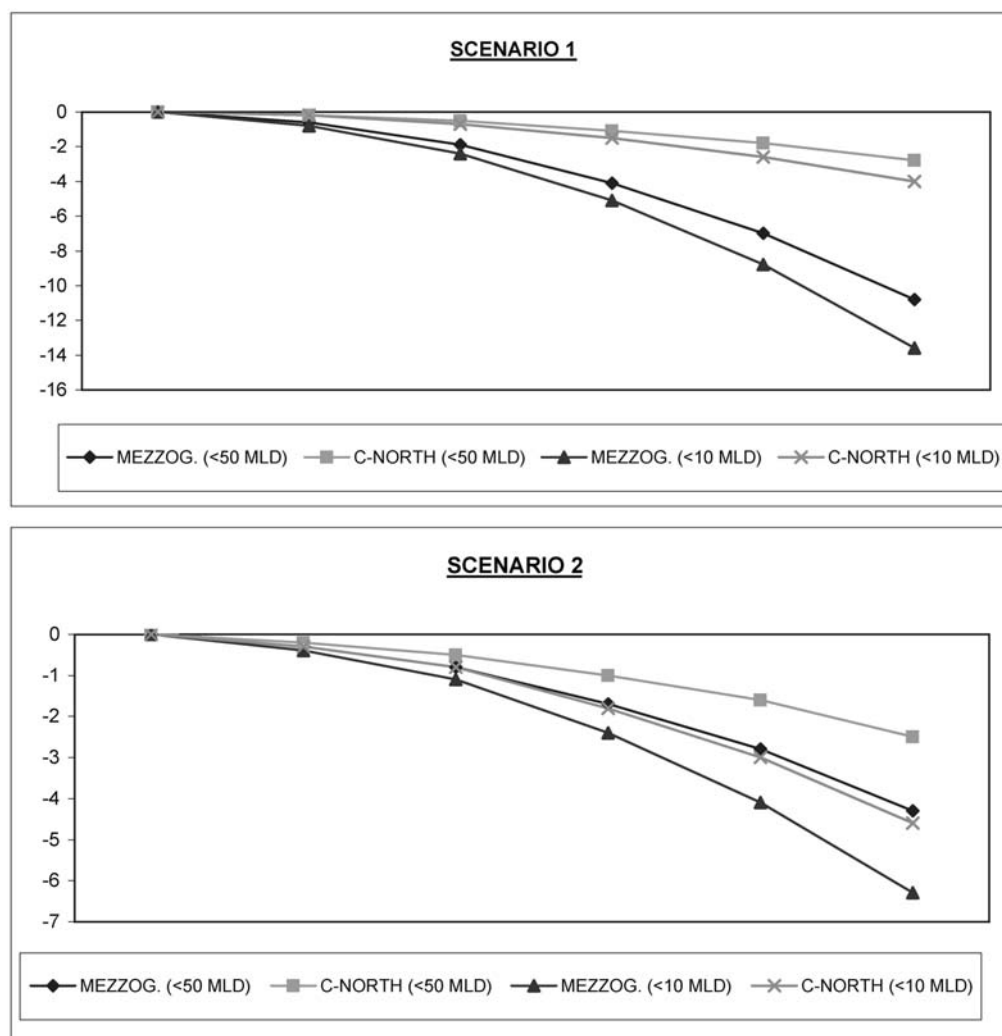


Figure 1. Cumulative crowded sales share (simulations).

In the context of Scenario 1 (the least favourable one), the share of crowded sales for the southern companies reached four percent of sales in the third year and slightly less than 11% in the fifth year. For the large companies of centre-north, in the same years, shares close to 1% and to 3% of sales were recorded. In the fifth year the “loss” for the southern companies of small dimension was as high as 13.6% compared with 4% for the small companies in the Centre-North.

For southern firms the crowded share is significantly reduced in the context of Scenario 2 (for larger firms 4.3%; for smaller 6.5%), while it is almost unchanged for northern firms (2.5% for large and 4.6% for small firms).

7. Conclusions

This paper tackles a theme that is generally not considered in the analysis put forward by the existing models of credit rationing. I have here expounded and estimated a model that focuses on the rationing of the financial resources utilised to fund the current production of companies. The results can be improved upon; the hypothesis of the model (particularly the assumption of invariance of the debt/output ratio), the variables utilised here and the estimation technique can be further improved. Nonetheless the results so far are encouraging. They confirm the analytical structure of the model, in as much as they indicate the

difficulties in acquiring bank credit as one of the most critical problems for firms in the *Mezzogiorno*. Indeed, for a company that systematically operates below its optimal scale, the provision of liquidity flows to finance current production and investment projects is a problem arising ever more frequently and harshly. In the negative phases of the cycle, this problem becomes a source of great imbalance between the real and the financial structure of the company. The existence of binding financial constraints increases uncertainty thereby causing a further worsening of the productive weaknesses of the firm. As a result, the growth opportunities of the company are compromised and, at best, these opportunities are strictly conditional to the availability of internal sources or, more often, to the flow of public resources available to the company in the form of capital subsidies. In this respect, it can be said that these public resources, besides acting as intended to support investment projects, play the role of collateral for the banking system, easing the heavy risk conditions of southern firms.

Furthermore, these results are consistent with those put forward by the analysis of the “financial accelerator”. The analysis shows that the rationing does not operate homogeneously. In the *Mezzogiorno*, it becomes more intensive during the negative phases and tends to be lighter in the positive ones. In the central-northern regions, the rationing is only mildly affected by the alternative phases of the cycle.

Finally, the conclusions of this study converge with the ideas put forward studies on *Relationship Banking*. This indicates a virtuous model of the bank-firm relationship as a crucial factor in the promotion of growth for small-medium sized enterprises.

Appendix: The technique and procedure of the estimates

The estimates are cross sections; the variables are expressed in logarithms. The equations are constrained in such a way as to keep the invariance of the debt/sales ratio.

The model is estimated through applying the SURE technique. The estimates are obtained with the GLS method. The procedure of the GLS estimate provides an estimate obtained in two phases: in the first phase, the OLS estimates are obtained; in the second, after the correction of the variance-covariance matrix on the basis of the OLS estimates, the GLS estimates are obtained. This happens when all equations have the same set of independent variables and there are imposed linear constraints. If there are no constraints, then the estimate obtained with the SURE technique is the same as the OLS equation.

The procedure is the following:

- The equations (1) and (2) of the model are estimated by means the following specification:

$$\ln D_{i,t} = a_1 \ln D_{i,t-1} + a_2 \ln L_{i,t-1} + e_{i,t} \quad (a)$$

$$\ln F_{i,t} = a_1 \ln F_{i,t-1} + a_3 \ln L_{i,t-1} + e_{i,t} \quad (b)$$

where $D_{i,t}$, $e D_{i,t-1}$ and $F_{i,t}$, $e F_{i,t-1}$ are the total debt and the sales at time t and $t-1$ respectively; $L_{i,t-1}$ is the leverage of the firm (the variable representing the degree of risk) and, finally, $e_{i,t}$ is the error term.

Naturally, $a_1 = (1 + \delta)$ is common to both equations, while $a_2 = \varphi$ e $a_3 = \alpha\varphi$.

- The equation (3) of the model is specified as

$$\ln L_{i,t} = b_1 + b_2 \ln D_{i,t} + e_{i,t} \quad (c)$$

where $b_1 = \mu$ and $b_2 = \gamma$.

- The equations (4) and (5) of the model are specified as follows:

$$\ln D_{i,t} = c_1 + c_3 \ln D_{i,t-1} + e_{i,t} \quad (d)$$

$$\ln F_{i,t} = c_2 + c_3 \ln F_{i,t-1} + e_{i,t} \quad (e)$$

where $c_1 = \frac{u\varphi}{1 - \varphi\gamma}$, $c_2 = \frac{u\varphi}{\alpha(1 + \varphi\gamma)}$, $c_3 = h$; the c_3 parameter is the same as in the equation and it is determined by $c_3 = a_1/(1 + a_2b_2)$.

The estimates are reported in the Table A1 for the largest firms (with less 50 billion lire of sales) and in Table A2 for the smaller firms (with less 10 billion lire of sales), respectively.

TABLE A1
Model estimate, larger firms (with less 50 billion lire of sales)

Equations	1992–1994						1995–1997					
	a_1	a_2	a_3	R^2	WALD	LOGLIK.	a_1	a_2	a_3	R^2	WALD	LOGLIK.
(a) $\ln D_{i,t} = a_1 \ln D_{i,t-1} + a_2 \ln L_{i,t-1} + e_{i,t}$												
(b) $\ln Y_{i,t} = a_1 \ln Y_{i,t-1} + a_3 \ln L_{i,t-1} + e_{i,t}$												
Mezzogiorno	0.952* (180.9)	-0.267* (-9.1)		0.776	20.3*	-1195.6	0.994* (341.4)	-0.123* (-6.4)		0.706	24.1*	-909.9
	0.952* (180.9)		-0.180* (-6.5)	0.601			0.994* (341.4)		-0.051* (-3.2)	0.838		
Centre-North	0.998* (862.3)	-0.091* (-13.9)		0.706	450.2*	-6941.0	1.000* (895.2)	-0.076* (-9.5)		0.689	70.5*	-4369.0
	0.998* (862.3)		-0.038* (-7.2)	0.890			1.000* (895.2)		-0.013 (-2.1)	0.812		
Equation ^a												
(c) $\ln L_{i,t} = b_1 + b_2 \ln D_{i,t-1} + e_{i,t}$	b_1	b_2		R^2			b_1	b_2		R^2		
Mezzogiorno	-4.416* (-23.1)	0.333* (13.9)		0.251			-4.438* (-23.5)	0.364* (15.6)		0.272		
Centre-North	-4.537* (-73.1)	0.354** (45.9)		0.273			-4.768* (-62.1)	0.411* (42.8)		0.339		
Equation												
(d) $\ln D_{i,t} = c_1 + c_3 \ln D_{i,t-1} + e_{i,t}$												
(e) $\ln Y_{i,t} = c_2 + c_3 \ln Y_{i,t-1} + e_{i,t}$												
Mezzogiorno	1.052* (34.4)		0.874* (16.9)	0.752	11.5*	-1216.2	0.474* (16.9)		0.951*	0.697	16.3*	-819.9
		1.103* (30.7)	0.874* (35.4)	0.614				0.492* (35.4)	0.951*	0.838		
Centre-North	0.304* (37.2)		0.967* (26.2)	0.701	226.0*	-6949.2	0.307* (26.2)		0.970*	0.685	62.1*	-471.4
		0.372* (113.7)	0.967* (57.4)	0.891				0.313* (57.4)	0.970*	0.814		

GLS Estimates; * Significant at 1%; t Student in brackets.

^a GLS estimates coincide with OLS estimates.

TABLE A2
Model estimate, smaller firms (with less 10 billion lire of sales)

Equations	1992–1994						1995–1997					
	a_1	a_2	a_3	R^2	WALD	LOGLIK.	a_1	a_2	a_3	R^2	WALD	LOGLIK.
(a) $\ln D_{i,t} = a_1 \ln D_{i,t-1} + a_2 \ln L_{i,t-1} + e_{i,t}$												
(b) $\ln Y_{i,t} = a_1 \ln Y_{i,t-1} + a_3 \ln L_{i,t-1} + e_{i,t}$												
Mezzogiorno	0.940* (109.5)	-0.306* (-9.9)		0.664	8.6*	-675.1	0.992* (241.2)	-0.172* (-6.5)		0.694	22.2*	-339.1
	0.940* (109.5)		-0.199* (-5.1)	0.324			0.992* (241.2)		-0.072* (-3.3)	0.696		
Centre-North	0.993* (473.1)	-0.121* (-10.7)		0.590	226.2*	-2758.0	0.998* (370.1)	-0.116* (-2.2)		0.633	45.1*	-1702.0*
	0.993* (473.1)		-0.064* (-6.9)	0.781			0.998* (370.1)		-0.030 (-2.2)	0.303		
Equation ^a	b_1	b_2		R^2			b_1	b_2		R^2		
(c) $\ln L_{i,t} = b_1 + b_2 \ln D_{i,t-1} + e_{i,t}$												
Mezzogiorno	-4.703* (-15.9)	0.401* (9.7)		0.245			-4.642* (-17.4)	0.419* (11.9)		0.346		
Centre-North	-4.205* (-44.7)	0.354** (26.6)		0.277			-5.034* (-37.3)	0.484* (26.1)		0.361		
Equation	c_1	c_2	c_3	R^2	WALD	LOGLIK.	c_1	c_2	c_3	R^2	WALD	LOGLIK.
(d) $\ln D_{i,t} = c_1 + c_3 \ln D_{i,t-1} + e_{i,t}$												
(e) $\ln Y_{i,t} = c_2 + c_3 \ln Y_{i,t-1} + e_{i,t}$												
Mezzogiorno	1.246* (34.4)		0.838* (23.7)	0.620	14.8*	-677.2	0.675* (17.3)		0.925*	0.674	17.5*	-350.3
		1.311* (23.7)	0.838* (23.7)	0.378				0.707* (35.1)	0.925*	0.694		
Centre-North	0.382* (20.2)		0.952* (56.9)	0.577	136.5*	-2614.2	0.505* (24.7)		0.945*	0.623	60.1*	-1692.5
		0.475* (56.9)	0.952* (56.9)	0.782				0.537* (42.4)	0.945*	0.321		

GLS Estimates; * Significant at 1%; t Student in brackets.

^a GLS estimates coincide with OLS estimates.

Notes

¹ Mezzogiorno refers to the southern regions of Italy: Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia and Sardegna.

² Mediocredito Centrale used to be a publicly owned bank, recently acquired by Banco di Roma. In the past, it carried out, on the behalf of the Italian Government, an intense activity of inquires and the provision of incentives in favour of small and medium enterprises. Besides such a structural inquiry, Mediocredito carries out a cyclical analysis of small and medium enterprises on a quarterly basis.

³ The questionnaire in the last inquiry is divided into six sections: general information, labour force, investments and R&D, internationalisation, finance and organisation of the company.

⁴ Naturally, for different reasons, the number of interviewed companies is larger than the number of companies for which balance sheet are available. In the inquiry, the ratios are proportional to the universe through the use of a proper system of weights.

⁵ Other archives exist concerning the Italian manufacturing industry. For example, the archive utilised in the Mediobanca inquiry contains balance sheet data of 2,000 companies circa and structural data for about circa 1,000 companies. The archive of the Centrale dei Bilanci contains balance sheet data but not structural data; it is composed of circa 35,000 companies.

⁶ In the following analysis of investment financing I have utilised a different sample of Mediocredito source, too (see note 9).

⁷ The new regime is regulated by law 488/1992. This law provides capital grants in order to carry out investment projects through auction mechanism that is defined by project share covered by equity, too. After 1994, investment projects carried out in several northern areas were also eligible for capital grants.

⁸ Conventionally, the reference to the Modigliani-Miller theorem indicates the wide range of literature about the financial structure of the firms. This theory has developed following three main approaches: (1) the fiscal approach; (2) the agency cost approach; (3) the informational asymmetries approach.

⁹ Economic research on this subject is very large. The empirical evidence is generally made up of the estimates of investment equation in which the cash flow is among the independent variables. On the whole, these studies adopt two main approaches: the first is defined by the *Q*-Tobin model (for example, Fazzari et al., 1988; or Gilchrist and Himmelberg, 1995) and the second by the Euler equation model (for example, Bond and Meghir, 1994). Hubbard (1998), provides a review; the last work for the Italian case is Bagella et al. (2001).

¹⁰ The closed sample of source Mediocredito refers to the 1989–1997 period and it includes 419 small and medium sized firms; the southern firms are 28. This model and the empirical results are discussed extensively in Sarno, 2002.

¹¹ This means that between two firms belonging in the same risk class, the bonus μ is greater for firm with higher equity.

¹² Therefore, the estimates define the value of the elasticity

when referring to independent variables and shares when referring to constants, respectively.

¹³ These apparently counter-intuitive results are explained by the fact that normally southern firms show that the value of equity (that appears to be the denominator of the leverage) is notably larger than the corresponding companies in the centre-north and that, nonetheless, the leverage on average is larger because of a larger total debt.

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