The financing of innovative activities by banking institutions: policy issues and regulatory options

Ughetto, Elisa

15 May 2006

The financing of innovative activities by banking institutions: policy issues and regulatory options.

Elisa Ughetto[1]*

Politecnico of Turin and University of Bergamo

Abstract

The paper investigates to what extent the convergence of banks over risk-adjusted capital standards set by the new Basel Capital Accord may affect the way in which they screen innovative firms. It also gives an overview of the existing forms of credit support to R&D activities. The study is built upon a survey conducted in January and February 2006 on 12 main Italian banking groups. The survey provides interesting insights on the use of non-financial parameters to assess the creditworthiness of potential borrowers and on the architecture of internal rating systems in the light of Basel II requirements. Results suggest that the majority of banks does not consider intangibles as meaningful determinants in credit risk assessment. This could imply that the sole implementation of the Accord might not lead to reduce informational asymmetries between lenders and borrowers as it could be expected. However, such an effect could be compensated by specific measures provided by single financial intermediaries.

---

[1] Corresponding author:

Politecnico di Torino-DSPEA, C.so Duca degli Abruzzi 24, 10129 Torino, Italy

Tel: + 39 0115647205   Fax: + 39 0115647299

E-mail address: elisa.ughetto@lep.polito.it

1. Introduction

It is a widely held view that firms characterized by high levels of R&D spending are very likely to undergo financial constraints. This line of reasoning has been originally addressed by two influential papers by Nelson (1959) and Arrow (1962), which pointed to the incomplete appropriability of the returns to R&D as the potential source of the limited private incentives to the allocation of financial resources to basic and applied research. The argument of the market failure for R&D investments was later investigated by many researchers in economics and finance (see Hall, 2002 for a review). A common theoretical framework to these studies is that they mostly explain credit rationing or the extension of credit only on unfavourable terms to innovative firms with the presence of information asymmetries between lenders and borrowers. Generally entrepreneurs are better informed than lenders as to the likelihood of success of their innovation projects and usually they have poor incentives to disclose information to investors since this might reveal useful for competitors (Carpenter and Petersen, 2002; Bhattacharya and Ritter, 1983). Thus investors have more difficulty in distinguishing good projects from bad ones, making credit rationing more probable (Jaffee and Russell, 1976; Stiglitz and Weiss; 1981). Also moral hazards problems can hamper the external financing of innovative investments since entrepreneurs could change ex-post their behaviour by replacing low risk-low return projects with high risk-high return ones (Hall, 2002; Carpenter and Petersen, 2002).

Alternative or additional explanations of credit rationing highlight that investments in innovation contain a large part of intangible assets (that are predominantly salary payments) which cannot be used as collateral to secure firms' borrowing (Lev, 2001; Bester, 1985). Physical investments designed to embody R&D results are likely to be firm specific and have little collateral value. Therefore expenditure on R&D can only be backed by the revenue it generates, which is in turn highly uncertain and skewed because R&D projects have a low probability of financial success.

There are in particular two lines of reasoning which have remained relatively unexplored compared to the debate on information asymmetries.

The first one is related to the unsuitability of the banking system to support R&D activities because of a general lack of interest in financing innovation and a shortage of adequate instruments to evaluate innovation projects and innovative firms. What drives a bank to issue a loan is by and large the ability of the obligor to repay the debt. It is a matter of limited interest whether the loan is used to sustain a research activity or the purchase of equipment and machinery. Moreover the inability of banks to understand and properly classify innovation projects into classes of risk is the result of a lack of specialized technical knowledge. It is also fair to say that, at least until a few years ago, most banks have relied virtually exclusively on subjective analysis to assess the credit risk on corporate loans. The judgment of a banker as to whether or not to grant credit has been mainly based upon considerations on the reputation, leverage, volatility of earnings of the borrower and presence of collateral (Altman and Saunders, 1998). Qualitative aspects such as investments in intangibles have received very little attention.

An additional cause of the credit rationing phenomenon is the poor availability of analytical instruments able to capture and correctly estimate the expected future revenues of innovative activities (Encaoua et al, 2000). Investments in intangibles are in most cases not reflected in the balance sheet due to the existence of very restrictive criteria for the recognition of assets and their valuation. As a consequence, financial statements are becoming less informative on the firm's current financial position and future prospects because they do not provide relevant estimates of the value of companies (Caňibano et al., 2000)

These issues, although not sufficiently investigated by scholars, are likely to become relevant in the near future, with the recent display of interest among banks on innovation financing, the adoption of the New Basel Capital Accord framework by banks, and the endorsement of the International Accounting Standards (IAS) by firms.

As far as the first issue is concerned, it is a matter of fact that banks are showing an increased interest in the support of innovation-related activities. This stems from the belief that investments in research and development, information technology and human resources become essential in order to maintain firms' competitive position in a knowledge-based, fast-changing and technology-intensive economy. Banks are moving away from a cautionary approach to innovation financing towards a greater involvement in the support of R&D activities. Indeed, beside government-backed loan schemes both at national and regional level, some specific loan programs have been recently launched by financial intermediaries.

The second aspect that needs to be underlined concerns the consequences of the implementation of the New Basel Capital Accord on the credit risk assessment of innovative firms. As previously noted, the very core of banking is the classification of loan applications into risk categories, a process which has traditionally been hidden by strict secrecy and complemented by informal practices of "relationship banking". Under Basel II banks are prompted to move towards more objectively based evaluation systems and to compete for the best classification procedures. Precisely, they are encouraged to systematically assess risk relative to capital within their organizations, according to an internal ratings-based approach (IRB)[2], subject to the meeting of specific criteria and to validation by the relevant national supervisory authority. This opens up the possibility for banks to use qualitative criteria together with quantitative information in appraising the creditworthiness of their borrowers. A qualitative assessment of a company might take into account the role played by intangible

---

2 The IRB approach gives the bank varying degrees of autonomy in the estimate of the parameters determining risk weightings and consequently, capital requirements: under the Foundation only the probability of default (PD) is internally estimated, while under the Advanced a bank can also produce its own estimates for the loss given default (LGD) and exposure at default (EAD).

assets[3] as well. Intangibles may encompass patents, trademarks, brands, franchises, research and development, advertising, organizational coherence and flexibility, customer satisfaction, intellectual capital and so forth, depending on the different classification perspectives taken by researchers (see Caňibano et al., 2000 for a review). In other words, the traditional assessment of a borrower's level of risk thought to fit firms whose activity is primarily of a manufacturing or a mercantile nature, could be broadened to reflect intangibles and other qualitative information. Given that intangible assets are likely to be progressively more considered in credit decision making, it follows that firms which would not ordinarily be eligible for bank funding because of limited financial track records and lack of collaterals, may have the chance to be granted credit if their qualitative rating is good. In this context innovative firms should have theoretically a lower likelihood of being credit constrained, although this conclusion cannot be taken for granted, at least until the implementation of internal rating models and procedures by major banking institutions is fully completed.

While intangible investments may become an important concern for creditors, the same doesn't seem to hold for accounting standard setting bodies. The recently issued IAS regulation embraces a rather restrictive and conservative approach towards accounting for intangibles. IAS 38 considers R&D as a category of internally generated intangible items and as such it requires the full expensing of research, allowing only certain development costs to be carried forward as assets. If most intangible investments are not reflected in the balance sheet but immediately expensed in the income statement, financial statements fail to provide a true estimate of the value of companies. It follows that banks are prevented from getting reliable information on the innovation activity of firms, leading to an unfair or inaccurate credit risk evaluation.

---

3 IAS 38 defines intangible assets as non-physical and non-monetary sources of probable future economic profits accruing to the firm as a result of past event or transactions.

The aim of the paper is to investigate to what extent the convergence of banks over risk-adjusted capital standards may affect the way in which they screen innovative firms. More precisely, it is worth exploring to what extent banks actually rely and will rely once implementing the Basel II Accord on non-financial parameters to assess the creditworthiness of a potential borrower.

Results from a survey conducted in January and February 2006 on a sample of 12 Italian banking groups show that the majority of banks does not consider intangibles as meaningful determinants in credit risk assessment. This could imply that the sole implementation of the Accord might not lead to reduce informational asymmetries between lenders and borrowers as it could be expected. Hence, if innovative firms show a higher idiosyncratic risk, the bank in its portfolio optimization process might continue either to ask them higher interest rates or simply to deny credit to them. However, such an effect could be compensated by specific measures provided by single financial intermediaries. Current trends suggest that banks are paying an increasing attention to the issue of innovation financing, as it is witnessed by recently launched loan schemes, specifically devoted to sustain technology-based investments.

The remainder of this paper is organized as follows. Section 2 discusses the recent literature on banks' internal rating systems and on the role of non-financial factors in credit risk models. Section 3 describes the architecture and operating design of the internal rating systems at the surveyed banks. In particular I want to take a closer look at what types of information are being used to determine corporate ratings. Section 4 gives an overview of the products banks have in place to finance innovative activities. Section 5 offers concluding remarks and some policy indications.

2. Overview of the related literature

Since June 2004, when the Basel Committee on Banking Supervision issued a revised framework on International Convergence of Capital Measurement and Capital Standards (hereafter "Basel II"), the debate on internal ratings has gained increasing importance within banking institutions. Internal rating systems are expected to play a central role not only in credit granting decisions, but in the determination of regulatory capital adequacy as well (June 2004; par.6). Whereas academic literature has by far dealt with the various methodologies for the prediction of default and the use of financial ratios in credit risk models, a limited interest has been shown in the structure of internal rating systems, in their use of non-financial factors and in the envisaged procedures and internal controls. Earlier empirical analysis of corporate bankruptcy prediction based on financial ratios date back to Beaver's univariate model (1966). Since then a plethora of multivariate methods have been developed by researchers (see Altman and Saunders, 1998; Szegö and Varetto, 1999 for a review): discriminant analysis, linear probability models, logit and probit regression analysis, or, more recently, recursive partitioning algorithm, multicriteria decision aid methods, expert systems and neural networks. The large number of financial factors proposed in the literature can be gathered into three main groups: those concerning the capital structure, the profitability and the liquidity of a firm. Although accounting based credit-scoring models are widely accepted because of their relatively high discriminary power, they have been subject to at least three criticisms (see Altman and Saunders, 1998, Szegö and Varetto, 1999). Firstly, they are empirical models lacking an underlying theory of business failure, where explanatory variables are chosen according to their accuracy in predicting default for a specific sample of observations. Secondly, as financial factors are mostly backward-looking point in time measures, these models fail to capture fast-moving changes in borrowers' conditions. Thirdly, these models can hardly maintain their diagnostic potential through time because a variety of elements

intervene to jeopardize their temporal stability (e.g structural changes in the economic cycle, inflation rate variations, changes in banking decision-making procedures..)

Drawing on the last criticism, researchers have started to include variables other than financial in their models, in order to capture macro-economic, industry-specific and qualitative factors. Macro-economic variables for failure prediction have been proposed by Foster (1986), Rose et al. (1982), El Hennawy and Morris (1983). Mensah (1984) aggregates sample data into four sub-periods of US business cycle from January 1972 to June 1980 (steady growth, recession, steady growth, stagflation and recession) and notes that different economic environments lead to different models for the prediction of failure. Izan (1984) uses industry relative accounting ratios, rather than simple firm specific accounting ratios, to control for industry variation and he demonstrates stable classification results both ex post and ex ante. Platt and Platt (1990; 1991) add to their industry-relative model a measure of industry growth to test specific busyness cycle effects on corporate failure. The industry relative accounting ratio model outperforms the unadjusted model.

Other studies include qualitative data in the analysis of corporate failure. Zopounidis (1987) employs a set of "strategic criteria" to assess the risk of failure of French enterprises, such as quality of management, research and development level, diversification stage, market trend, market niche/position, cash out method and world market share. Tennyson et al. (1990) consider the information which is contained in annual reports (financial management decisions, influence of external environment on earnings and stockholders, production capacity, variations of exchange rates, new firm strategies..), while Laitinen (1993) extends the analysis of the information content of narrative disclosures to their layout, length, language. Keasey and Watson (1987), Daily and Dalton (1994), D'Aveni (1989) consider qualitative variables related to management characteristics, the composition of board of directors, corporate governance and company's reputation.

It is probably fair to say that most of these studies have contributed to shape the architecture of the most recent credit risk systems adopted by financial institutions. As noted earlier, the literature on banks' internal ratings is still scarce, and this is possibly due to the reluctance of banking institutions to disclose information on the structure and input factors of their internal rating systems.

Empirical analysis examine the architecture and the use of internal ratings. Udell (1989) looks at the internal rating systems of a sample of Midwestern US banks as part of a broader study of such banks' loan review system. Treacy and Carey (2000) shed light on the use and design of internal risk ratings at large US banks. English and Nelson (1999) describe the internal rating scales of a sample of US banks, reporting the distribution of loans across grades. They also show that ratings are reflected in loan pricing, while non-price terms generally do not rise or fall monotonically with the loan risk rating. An overview of international best practice rating standards in the banking industry is carried out by the Basel Committee Models Task Force (Basel Committee on Banking Supervision, 2000), while information on the operational design of rating systems at Italian banks is provided by Banca d'Italia (2000) and De Laurentis, Saita (2004). Santomero (1997) surveys internal rating systems as a part of a study on bank's credit risk management practices. Other studies use data on internal ratings to perform specific analysis. Machauer and Weber (1998) study loan pricing patterns using German banks' internal ratings. Drawing on bank-internal borrower rating data to evaluate borrower quality, Elsas and Krahnen (1998) provide a direct comparison between housebanks and normal banks as to their credit policy in Germany. Grunert et al. (2005) analyze SMEs' credit file data of four major German banks from 1992 to 1996. The authors find evidence that the combined use of financial and non-financial factors leads to a more accurate prediction of future default events than the single use of each of these factors. Brunner et al. (2000) show that "soft" (qualitative) factors have a significant and positive impact in determining the overall rating of a borrower. Carey (2001) analyses the extent of banks'

rating disagreements for given borrowers. Rating disagreements are less likely for large borrowers and for borrowers that have not drawn down much on their lines of credit, while a bit more likely for high-quality borrowers. Tabakis and Vinci (2002) assume that rating inconsistencies derive from a different evaluation of non-financial factors. They therefore compare credit assessments of different financial institutions (rating agencies, banks, other credit assessment institutions). A more normative approach to the issue is taken by Crouchy et al. (2001), who show how an internal rating system can be organized in order to rate creditors systematically. A framework for evaluating the quality of a standard rating systems is also suggested by Krahnen and Weber (2001), who advocate fourteen principles that ought to be met by good rating practices.

3. Results of the survey on internal ratings

In the following sections I present the results of a survey conducted during January and February 2006 on 12 main Italian banking groups, selected according to dimensional criteria (with total assets more than €30 billion)[4]. Information was collected through structured extensive interviews with bankers operating both in the risk management area and in other units dealing with incentives to R&D and long-term credit. Overall, a total of 24 interviews were conducted, precisely two interviews per banking group.

Although the institutions I surveyed are the first largest 12 banks in Italy, their business segmentation[5] is not the same, as it is shown in Table 1. In order to maintain the

---

[4] The banking groups are the following ones: Intesa, Unicredit, Sanpaolo IMI, Capitalia, Monte dei Paschi di Siena (MPS), Banca Nazionale del Lavoro (BNL), Banche Popolari Unite (BPU), Banco Popolare di Verona e Novara, Banca Antoniana Popolare Veneta, Banca Popolare dell'Emilia Romagna, Bipiemme, Banca Lombarda e Piemontese.

[5] I just consider the % of claims on corporate, SMEs, small business segments on the total claims on firms. Loans to sovereign entities, banks, retail are therefore excluded.

confidentiality of data, banks are numbered randomly, that is being ranked as bank number 1 does not mean to be the largest Italian bank. Four banks indicated that it was not advisable to release such information. Market segments are defined following Basel II classification (June 2004, par. 232 and 273): large corporate/corporate with total turnover above €50 million, middle market with total annual sales between €5-50 million and small business with turnover below €5 million and exposures to the bank below €1 million. As it is evident from the table, Italian banks are largely oriented towards the middle-market segment. This is not surprising considering that the percentage of SMEs (with less than 500 employees) out of the total number of firms in Italy is greater than 86%[6]. A few differences can be detected referring to the large corporate/corporate and small business segments. More than a half of the respondent banks seem to rely on small business borrowers more than large corporate /corporate customers, whereas the opposite trend is shown by only three banks.

[Insert Table 1 here]

Bankers working in the risk management area were addressed questions regarding the architecture and operating design of their bank's internal rating system (the degree of fineness, the statistical models used, the extent to which judgmental considerations are taken into account, the weight of non-financial factors, the link between ratings and loan price/non-price terms, the organization of the monitoring and rating review activity and so forth). Under Basel II it is highly recommended that banks adopt a two-tier rating system that is an independent evaluation of the default probability of the borrower (PD) and of loss given default (LGD), namely the fraction of the loan's value that is likely to be lost in the event of default. While the first dimension is associated with the borrower, regardless of the structure and type of product, the second one considers the specific features of the operation, such as its maturity, structure and guarantees.

---

[6] Istat, I gruppi di imprese in Italia, 2003

I decided to maintain the focus of the interviews on the first of these two dimensions, the obligor rating. This was done primarily because few banks have already in place a facility rating that assigns grades to facilities. The overwhelming majority declared that transaction characteristics are explicitly considered in the process of credit risk assessment, but they are still working at developing models of LGD sound enough to get through the validation of the Bank of Italy.

Results are presented in an aggregated form because some banks, by virtue of very strict policies of non-disclosure, explicitly asked me not to make the information released public.

3.1 Internal rating systems: architecture

Like a public credit rating produced by agencies such as Moody's or Standard & Poor's, a bank internal rating is meant to summarize the quality of an obligor and the risk of loss due to his failure to repay the debt. While external ratings by agencies are available since many years, internal ratings by commercial banks began to be introduced only in the last decade.

According to the New Basel Capital Accord "the term rating system comprises all the methods, processes, controls and data collection and IT systems that support the assessment of credit risk, the assignment of internal risk ratings and the quantification of default and loss estimates" (Basel Committee, 2004, pp. 82).

Of the 12 banks interviewed, all declared to have an internal rating system, though a few are currently in an introductory or experimental phase. In particular one bank has just set up the preliminary architecture of the rating system, while at least two banks are testing the soundness of the models and processes with the minimum standards and practice guidelines which have been established by the Basel Committee.

The survey highlighted that internal rating systems differ, at least slightly, across banks in their architecture, methodology and application. The structure of statistical models, the number of grades, the decisions about who assigns ratings or the way in which the review

process is conducted reflect alternative approaches. However a considerable number of common elements can be identified.

All the interviewed banks base their ratings primarily on a statistical default/credit scoring model. Such models may be all developed internally, as it is the case of four banks, in part purchased by suppliers and in part developed internally (five banks) or developed internally with the support of a consultancy firm (three banks). These models are by and large constructed using internal data.

As it is defined by Brunner et al. (2000), a scoring methodology specifies a number of criteria a_i, one or a number of value functions v_i and an aggregation rule, usually linear, which assigns weights k to single criteria to form an overall score ($v(a)$).

The score, which is indicative of a probability of default, is then converted into a rating grade.

$$v(a) = \sum_i k_i \, v_i \, (a_i) \tag{1}$$

Although this general framework applies to every bank, differences in terms of selected criteria, aggregation rules, weights, rating scales, influence of judgmental factors characterize the several approaches.

Banks reported to have several rating models according to customers' segments (e.g large corporate, corporate, SMEs, small business, banks…). The number of models goes from an average of two-three to about fifteen. To a considerable extent, such differences may depend on the core business of a bank and on its use of internal ratings for different purposes. Banks in few lines of business are more likely to design their rating system with a limited number of models. As noted earlier two banks are currently working to improve their rating system and to extend it to more customer segments. It is important to stress, though, that bankers described the models employed in different ways. The low number of models is not always indicative of the degree of accuracy and sophistication of rating systems because macro-models are sometimes divided into several sub-models. On average, in each model a further

partition can be found, either by sector (e.g real estate, services, industry, commerce..), legal form or balance sheet structure (e.g holding, leasing company, manufacturing firm..).

Rating models are generally built upon three parts based respectively on financial statement data (cash flow, profitability, short-term and long term debt, debt-equity ratio and so forth), behavioral and loss data (both internal and external from Centrale dei Rischi, the national central credit register) and qualitative information. Quantitative criteria are typically backward-looking, while qualitative criteria reflect actual or forward-looking information.

Two-thirds of the surveyed banks used two-stage scoring models which imply that the scores produced respectively by quantitative, qualitative and behavioral models are aggregated by means of a second rule to form the overall score. One bank added to this architecture an additional layer: a market model. Two banks followed the above scheme for corporate and small business segments, while for large corporate borrowers a constrained expert judgment-based process was implemented beside the financial analysis. Only one bank declared to have simply a quantitative model and to be about to realize the qualitative part.

The relative importance of the each of the above mentioned modules and the weighting schemes adopted vary widely across banks. Since the dataset is not usually homogeneous (it can be that balance sheet information date back up to 5-10 years before, while the qualitative questionnaire has been introduced only one year ahead), banks can use different weighting schemes for quantitative and qualitative data. One bank reported to weight quantitative factors more than qualitative ones mainly for that reason. A vast majority of the interviewed banks outlined that qualitative and behavioral data seem to play a greater role for small business borrowers, where the shortage of financial statement information needs to be somehow counterbalanced. Yet qualitative modules appear to be implemented mainly for small businesses with turnover above € 1.5 million.

While in almost every bank qualitative factors enter the statistical model, sometimes they are rather standardized inputs (payment history, industry sector, geographic location..). In that

case qualitative considerations drive the process of upgrading/downgrading by the rater, who adjusts up or down the rating to a specific limited degree based on his judgment.

There appears to be a relatively limited set of techniques employed in the statistical models. For the vast majority of banks (9) the calculation engine is based upon logit regressions. To put it briefly, logit analysis uses a set of accounting variables to predict the probability of borrower default which takes a logistic functional form and is constrained to fall between 0 and 1. Discriminant analysis ranks second, being used by three banks, sometimes together with linear or logistic regressions. Discriminant analysis seeks to find a linear function of accounting variables that best distinguishes between two groups of firms, defaulted and non-defaulted, by maximizing the between group variance while minimizing the within group variance. It is quite surprising that discriminant analysis, which is the most frequently used method in the academic literature dealing with bankruptcy prediction, is so poorly widespread among commercial banks.

It is my impression that, although banks rely on statistical models as important elements of the rating process, expert judgment still plays a fundamental role in assigning a final grade to a counterparty. Especially for large exposures the current limitations of statistical models[7] are such that processes based on constrained or unconstrained expert judgment are commonly used to deliver a more accurate estimate of risk.

Most of the rating systems were numerical (8), with the lowest risk borrowers rated 1 and higher ratings implying higher risk. Just one numeric system was in reverse order (1 was the rating for the worst loan rather than the best). Two banks declared to have alpha numeric grades (a mixture of letters and numbers), while two others reported to follow a master scale

---

[7] It is indeed very difficult to distinguish between defaulted and non-defaulted firms for large corporate customers which are usually characterized by low default rates and consequently to construct a statistical model. Therefore judgmental factors tend to have a more prominent role in corporate and large corporate lending rather than in middle-market or small business lending.

based on letters similar to the Standard and Poor's one but with a higher granularity in the medium grades. The number of grades conceived by the different banks may vary according to the business segment. The largest part of the banks (8) surveyed have a standardized number of grades for both corporate and non-corporate borrowers (small and medium enterprises and small business). Retail counterparties are normally rated under a smaller number of classes of risk. Among the banks I interviewed, three have a higher grades-scale for corporate and large corporate borrowers. This is because for those banking groups which do a significant share of their commercial business in the large corporate and corporate loan market, making fine distinctions among low risk borrowers is more important in that market than in the middle market. However, it is somehow difficult to make an accurate taxonomy of the forms of categorization employed by banking institutions because different sorting criteria (e.g based on firms' turnover) are used to classify borrowers into business segments. In fact the precise boundary between corporate and middle-market borrowers or between middle-market and small business obligors varies by bank. Larger banks are more likely to have rating systems with a larger and more detailed number of pass categories, though the gap with smaller banks is not so big. Banks with large business loans portfolios (with total assets more than €70 billion) averaged 14 ratings, while those with smaller portfolios (with total assets from €30 to 70 billion) averaged 10.8 for corporate borrowers. All banks comply with the Basel II requirement (June 2004, par. 404) of having a minimum of seven borrower grades for non-defaulted borrowers and one for those that had defaulted. On average banks' master scale goes from 9 to 22 non-defaulted categories, with a number of defaulted categories varying from 1 to 4. Only three banks reported to conceive modifiers ("+" or "-") to alpha (two banks) or numeric grades (one bank). Ten banks declared to be satisfied with the actual number of pass grades, while two would like to modify their master scale either by splitting the existing pass categories into a larger number or by adding ± modifiers to the scale in order to reflect a better distribution of exposures across grades. The two banks that expressed the desire to

increase the number of grades on their scales have an actual scale of nine classes of risk. Several of the banks officials I spoke with indicated that, although internal rating systems with larger number of grades are more costly because of the extra work needed to distinguish finer degrees of risk, they are especially valuable to pricing and capital allocation models. Typically, banks with the highest degree of differentiation appeared to be those using ratings in pricing decisions.

About two-thirds of the interviewed banks declared that the largest part of their corporate loans is concentrated in the upper investment grade categories, revealing a loan distribution skewed towards lower-risk classes. One-third reported a distribution of corporate exposures which approximates a Gaussian distribution, in which loans are centered mostly in the middle classes of risk, while low percentages get into bottom and upper risk grades. A few banks did not answer to that question.

The survey asked banks whether there was a direct link between loan terms (such as spreads, size, collateralization) and ratings. More than a half of the banks surveyed highlighted that loan pricing can vary depending on the risk rating of the obligor. However, just for three of them pricing always reflects borrower's risk, while for the other ones ratings are relevant components of pricing decisions although they are not binding. This means that commercial and relationship reasons still play an important role either in the approval process and in the assessment of loan terms. Risk-adjusted pricing is becoming a common practice within large banking groups, while smaller ones are still far away from using ratings to set loan pricing. According to four banks taken from the sub-sample of the last seven by size, ratings currently influence loan origination and monitoring. The target is to begin to use ratings in pricing, capital allocation models and in setting reserves in the near future.

3.2 Internal rating systems: operating design

Bankers I spoke with indicated that their bank maintains some sort of Watch list, in which credits that need special monitoring fall. The Watch list is not administered by including a Watch grade on the internal rating scale but it is generally the output of a monitoring model, which differs in the architecture and variables used from statistical models employed to assign ratings. Generally such analysis takes into account both the rating and the loss history of the obligor. A few banks are testing "early warning" systems, by which whenever a borrower enters a lower grade, a monitoring process is set up. Only two banks declared to be about to build a monitoring system for high-risk positions, such as formal quarterly reviews of status that help bank management monitor and react to important developments in the portfolio.

An interesting issue in this context is related to the organizational division of responsibility for grading and to the nature and frequency of the review process.

As noted earlier, the rating of an obligor is the output of a mathematical model which is either developed by the risk management or purchased and which includes quantitative and qualitative inputs, in part loaded by the line staff. At some banks (5) ratings can be overridden, depending on the amount of the loan, either by "relationships managers" (lending officers responsible for the marketing of banking services) or credit staff, although such a practice is always followed by a formal approval by a superior authority. Incentives to deviate from the bank's interest could in fact arise since loan officers are commonly evaluated on the basis of the profitability of their commercial relationships. Moreover it doesn't usually hold for large corporate borrowers. Three banks highlighted that for large exposures only a specialized internal unit (similar to a rating agency) has the discretion to significantly deviate from statistical model indications in assigning a grade. The ultimate authority over grade assignments is in this case the Credit Board of Directors, which is consulted above all whenever judgment calls for an upgrade to the rating rather than a downgrade.

Ratings are typically assigned (or reaffirmed) at the time of underwriting and credit approval decision. Reviews of ratings are run automatically once a year by the majority of banks (more than two-thirds), in parallel with loans revisions. Additionally, more than a half of the interviewed banks conceive monthly revisions for the behavioral sections and occasional reviews whenever new information on the obligor or the market are acquired. Ratings reviews fall into the responsibility of different people (line, credit or loan review staff), depending on the credit culture of each bank. Those banks that lend mainly in the middle and small business market usually give the relationship manager the responsibility to periodically monitor the assigned ratings because he is in the best position for changing grades promptly as the conditions of borrowers change. Even in this cases a supervision by the credit staff is always undertaken in order to control incentive conflicts. Among the surveyed banks, five reported to have an internal independent review unit which has the final authority to set grades. Typically such unit has a direct contact with the line staff and whenever it detects grading errors it works with loan officers to find the reasons for that. Two banks indicated to have an internal review unit only for large corporate exposures. Other two banks are currently working to create a separate review unit. There is only one bank that could not answer to that question because it is still defining the key aspects of its internal rating system's operating design.

3.3 Internal rating systems: the role of qualitative factors

The survey provides interesting insights on the use of qualitative criteria in credit risk assessment. The results are in line with the requirement of the Basel Committee that banks not only have to consider quantitative but also qualitative factors such as the availability of audited financial statements, the conformity of accounting standards, the depth and skills of management to effectively respond to changing conditions and deploy resources, the firm's position within the industry and its future prospects (June 2004, par. 411, Second Consultative Document January 2001, par. 265). In all the banks but one (which declared to be about to

realize the qualitative part), qualitative inputs, taken from a questionnaire filled in by the line staff, enter the qualitative module of the rating model. All banks reported that the combined use of financial and non-financial factors leads to a more accurate prediction of default events than their single use.

Questionnaires are more or less detailed and extended depending on the bank, but they usually average 20 questions and they are differentiated by sector and borrower. Most of them have been framed internally, while other banks have adopted the CEBI questionnaire, elaborated by Centrale dei Bilanci.

The qualitative analysis is usually concerned with the quality of management, the firm's competitiveness within its industry, as well as the vulnerability of the firm to technological, regulatory and macro-economic changes. In Table 2 I provide a taxonomy of the main "soft information" that were cited by bankers as being examined in credit risk assessment.

Since I wanted to explore the extent to which innovation-related parameters are considered in credit ratings, I asked risk managers whether or not they were included in the questionnaire. Nearly two-thirds of the surveyed banks reported to have only a few direct questions on patent activity, R&D intensity and innovation capability. However innovation activity can be inferred from other questions, such as the technological level of facilities or processes, the quality and technological content of goods, the brand, image and reputation of the firm's products. Moreover the technological capability of a borrower can be further investigated by the relationship manager whenever he is supposed to integrate his own judgmental evaluation to the grade assigned by statistical models.

The reasons why innovation-related parameters do not normally enter statistical models (or have a significantly low weight once entered) mainly relate to two sets of explanations. The first one is that it is very difficult for a bank to identify an innovative company, simply because the only reliable information it can get comes from balance sheet data when intangibles are capitalized. However, the decision to capitalize intangible assets like R&D

expenses is in most cases driven much more by fiscal reasons than by disclosure policies. As I earlier noted, the implementation of IAS is not going to change anything in this respect.

The second explanation is of a purely statistical nature. Firstly, since the percentage of innovative firms in Italy is very limited, a bank cannot set a default prediction model on the basis of innovative firms' characteristics because a statistical model needs to be as general as possible. Secondly, there are some qualitative components (such as management quality, ownership structure and competitive position) which make the difference, by upgrading or downgrading an obligor rating. Conversely, innovation-related factors are likely to contribute to the final rating not more than a notch. Therefore collecting too many data may not always reveal helpful.

[Insert Table 2 here]

4. Results of the survey on financial support measures to R&D

This section of the paper gives a brief overview of existing banks' loan schemes devoted to sustain firms' technology-based activities in Italy (see the Appendix for a detailed description of the programs). As previously anticipated, information was collected from interviews with senior bankers working in the medium-long term credit divisions.

These consultations indicated that only four banking groups have conceived specific programs to support R&D investments, with different degrees of specification: Banca Intesa, Sanpaolo IMI, Unicredit and BPU. All the remaining banks declared to participate to government-backed funding programs, both at national or regional level.[8]

---

[8]Capitalia, through MCC (Mediocredito Centrale), is responsible for the management of numerous national subsidy programs devoted to the support of R&D activities (F.A.R, F.I.T, Fondo agevolazione regionale, Fondo Capitale di Rischio, Fondo Garanzia). Surveyed banks reported to be involved in subsidy lending for different of these government-backed loan schemes.

As it emerges from Table 3, all programs are devoted to support product and process innovation and other more specific forms of innovation. Technological assessment of the projects is provided mostly by external teams of engineers, except for two banks which have their own internal teams. The loan schemes applied show common features across different banking groups: they are all medium-long term grants and usually advantageous conditions are applied both in terms of interest rates or collateral requirements. Two banks also provide some consultancy support both prior to the presentation of the project and during its actual implementation.

[insert Table 3 here]

5. Conclusions and policy orientations

It is widely perceived that Italy suffers from an "equity gap", since the venture capital industry, that should solve the problem of financing innovation for new and young firms, is rather absent. Banks, it is argued, may ration credit to new enterprises, strangling dynamic and innovative future giants at birth. This is because of a lack of track records and collateral and because information about these firms may be limited and asymmetrical, stacked on the side of the borrower at the lender's hazard. Moreover banks have difficulty in understanding innovative projects since past experience or observed past realizations can offer little guidance in assessing the prospects of truly new projects.

There is recent evidence that this scenario is somehow progressively changing.

Banks are encouraged, under Basel II, to incorporate qualitative information in their internal rating models. This is clearly an important issue that cannot be underestimated. Ratings take more and more the form of objectively-based "screening devices" that can alleviate asymmetric information problems between borrowers and lenders, and in doing so they account for information other than simply financial to appraise the creditworthiness of

obligors. In that way innovative firms should theoretically have the chance of being less credit constrained.

However, the evidence suggests that innovation-related parameters are not yet taken into account by Italian banks in a systematic way. In fact the majority of banks does not consider intangibles as meaningful determinants in credit risk assessment. This is primarily the result of a regulatory caveat which prevents banking institutions from inferring appropriate information on firms' innovation activity from financial statements, rather than banks' reluctance in considering such factors to a greater extent.

Even though a wider recognition of qualitative elements in credit risk assessment is on the way, the sole implementation of the Accord might not lead to reduce informational asymmetries between lenders and borrowers, at least in the short run. This seems to be acknowledged by the fact that banks have started to conceive some forms of credit support for R&D activities which wouldn't be necessary if the implementation of the Basel II Accord could really lead banks to screen innovative firms in a better way.

Given these current trends, I positively advocate a regained role of the banking system in supporting science and technology-based activities. It is my opinion that the expansion of banks' activities in terms of innovation financing is likely to have a positive and strong impact on the whole Italian industrial system, largely constituted by small and medium enterprises. Banks are territorially distributed and may respond efficiently to SMEs, strongly locally featured and mostly incapable of building lasting relationships with the international capital. Therefore the banking system could bring about the innovation-based development process of the Italian industrial system, helping it to reach that dimensional threshold to get to other forms of financing.

Indeed, working on the criticalities which have traditionally characterized borrower-lenders relationships is a necessary requirement if banks intend to start offering to their customers not only products, but also solutions. In this respect universities and research centers may

contribute to alleviate information asymmetries, by giving a technology assessment of innovation projects and collecting all the relevant information to orientate credit granting decisions.

In conclusion, the future challenge for economic development is to plan the emergence of virtual spaces of overlapping institutional spheres for science and technology-based activities. A new organizational environment should emerge in which industry, financial institutions, universities/research centres and government tend to integrate their own interests and goals when carrying out, financing and regulating investments in research and development.

6. Appendix

I give a brief overview of the products developed by the interviewed banks to sustain R&D intensive activities.

INTESA GROUP

Intesa Group has launched two specific programs related to R&D support: IntesaNova and Eurodesk.

IntesaNova

- IntesaNova is a funding scheme purposely thought for companies involved in substantial research activities. Firms can submit their research project to the bank and getting financing at advantageous conditions and without collateral requirements. Innovation projects above €200.000 up to €1 million are normally assessed by an internal team of engineers. For higher levels of complexity or cost amounts above €1 million, the bank gets the support of a network of outstanding Italian universities (Politecnico di Torino, Politecnico di Milano, Università degli Studi di Trento Politecnico di Bari). The evaluation of the project implies an assessment of its costs,

degree of innovation, realization time, as well as considerations on the competitive position of the firm and its implementation capacity. On the basis of a technological/financial evaluation of the project and the creditworthiness of the firm (which can be eligible only if it has a rating ranging between 1 and 6), the bank issues a medium-term loan (3-5 years), with a variable Euribor interest rate plus a 1%-2% range depending on the rating. Universities also provide technological support when the project reaches the implementation phase (auditing of the product/process development, prototype realization, laboratory experimentation, consultancy for patenting, marketing of technologies). The program currently applies to two product families: product and process innovation and innovation connected with the diffusion of information and communication technologies. In only one year of effectiveness of the program, about 800 projects have been examined and 600 financed.

Eurodesk

- In the light of the 7th Framework Program of the European Commission, Banca Intesa intends to support the participation of Italian companies through a cooperation with research centers and universities. This means offering consultancy for the entire life of approved projects and acting as a trait d'union with the academic world. In this perspective IntesaNova can be extended, thanks to EU funding opportunities, to a wider spectrum of R&D activities and universities involved.

SANPAOLO IMI GROUP

Sanpaolo IMI Group has recently launched two programs specifically devoted to support R&D and technologically-driven investments: Applied Research and Innovation-Buy. These schemes are thought to respond to company's requirements about demand and supply of

innovation. Firms willing either to develop a technologically advanced product, service or process, or to buy innovation from external sources, can submit their project to the bank which, upon acceptance, will finance it at favorable terms. A technological evaluation of the project is carried out by an inside team of engineers, specialized in different technological sectors. Marketing and profitability analysis complement the technological validation of the project.

Applied Research

- Applied Research is aimed at financing R&D projects directed either to the realization/completion of new technologically advanced products, processes, services or to the technological improvement of existing products, processes or services. It is a long term loan scheme with a loan period between 3-5 years, including a pre-amortization that ends up 6 months after the end of the project. The loan covers up to 100% of the cost of the project, which does not have to be below €250.000 or above €4.000.000. The project can last 1 or 2 years. A variable interest rate Euribor 3m applies for the entire loan period. An interesting point that needs to be underlined in this respect is that the bank anticipates 50% of the loan when the contract is drawn up and another 50% when half of the cost of the project is overcome. Moreover for completed and successful projects a kind of reward is applied: a 20% spread reduction if the project is brought to an end and a two-year increase of amortization if it has a positive outcome. One year after the launch of the program at the end of 2004, 550 projects have been financed with a total cost of €550 million. Around 30 projects were not admitted. The large majority of the funded projects are devoted to product innovation (65%). A smaller percentage applies to process innovation (21%) and product/process innovation (14%). Request of funds is markedly affected by geographical location: firms from the North of Italy (Lombardy and Piedmont above

all) have been granted more funds, although a notably reverse trend is shown by the region of Campania. Innovation projects mainly concern mechanical and ICT sectors.

Innovation-Buy

- Innovation-Buy is aimed at financing the purchase of innovation in its different forms (technologies, tangible and intangible goods, training). It is a medium-long term loan scheme with a loan period between 5-7 years, including a pre-amortization of 2 years. The loan covers up to 100% of the cost of the purchase, which does not have to be below €250.000 or above €4.000.000. The investment can last up to 18 months. A variable interest rate Euribor 3m applies for the entire loan period. Even in this case the bank anticipates 50% of the loan when the contract is drawn up and another 50% when half of the cost of the investment is overcome. For completed projects a kind of reward is applied: a 15% spread reduction for 5-year transactions and 10% spread reduction for transactions beyond 5 years. The program was born in November 2005. A pilot experiment has taken place in December 2005 in the Brescia area and within 4 weeks 34 demands have been presented for a total financing of €30 million.

UNICREDIT GROUP

Technological Innovation

- Unicredit provides a plafond of medium-long term loans (up to 5 years) to sustain firms in their product and process innovation and industrial research. Interest is calculated on Euribor3m and it is correlated with rating classes. A technological evaluation of the project is carried out by national or local associations. Covenants but not collaterals are required.

BPU

Support to R&D

- BPU has recently created a credit line to sustain R&D activities. A technology check-up of companies' research projects is carried out by local industrial associations. Upon such evaluation, BPU issues a medium-term loan (up to 5 years), including a pre-amortization of 12 months. The loan covers up to 100% of the cost of the project. Projects can be devoted to the realization of new products or processes, to technological and organizational innovation, to the protection of the environment and energy conservation. The plafond, which is about to be extended, is around €70 million.

7. References

ABI, Albo dei gruppi bancari: struttura, movimentazione e dati di bilancio, June 30th 2005

Altman, E. I., Saunders, A., 1998. Credit risk measurement: developments over the last 20 years. Journal of Banking and Finance 21, 1721-1742

Arrow, K., 1962. Economic welfare and the allocation of resources for invention, in: Nelson, R., The rate and direction of incentive activity: economic and social factors, Princeton University Press.

Banca d'Italia, 2000. Modelli per la gestione del rischio di credito. I "ratings" interni. Tematiche istituzionali, April 2000

Basel Committee on Banking Supervision, 2000. Range of practice in banks' internal rating systems. Discussion paper, January

Basel Committee on Banking Supervision, 2004. International Convergence of Capital Measurement and Capital Standards. Bank of International Settlements.

Beaver, W., 1966. Financial ratios as predictors of failure. Journal of Accounting Research 4, 71-102

Bester, H., 1985. Screening vs. rationing in credit markets with imperfect information, American Economic Review 75, 850-855.

Bhattacharya, S., Ritter, J.R, 1983. Innovation and communication: signaling with partial disclosure. The Review of Economic Studies 50, 331-346

Brunner, A., Krahnen, J.P., Weber, M., 2000. Information Production in credit relationships: on the role of internal ratings in commercial banking. Working paper n. 2000/10, Center for Financial studies, Frankfurt am Main

Caňibano, L., García-Ayuso, M., Sanchez, P., 2000. Accounting for intangibles: a literature review. Journal of Accounting Literature 19, 102-130

Carey, M., 2001. Some evidence on the consistency of banks' internal credit ratings. Working paper, Federal Reserve Board

Carpenter, R., Petersen B., 2002. Capital market imperfections, high-tech investment and new equity financing. Economic Journal 112, 54-72.

Crouhy, M., Galai, D., Mark, R., 2001. Prototype risk rating system. Journal of banking and Finance 25, 47-95

Daily, C., Dalton, D., 1994. Corporate Governance and the bankruptcy firm. Strategic Management Journal 37 (6), 1603-1617

D'Aveni, R., 1989. Dependability and organizational bankruptcy: an application of agency and prospect theory. Management Science 35 (9), 1120-1138

De Laurentis, G., Saita, F., 2004. Rating interni e controllo del rischio di credito: Esperienze, problemi, soluzioni. Bancaria Editrice, Rome

El Hennawy, R., Morris, R., 1983. The significance of base year in developing failure prediction models. Journal of Business Finance and Accounting 10, 209-223

Elsas, R., Krahnen, J.P., 1998. Is relationship lending special? Evidence from credit-file data in Germany, Journal of Banking and Finance 22, 1283–1316

Encaoua, D., Laisney, F., Hall, B.H., Mairesse, J., 2000. Economics and econometrics of innovation. Kluwer, Amsterdam

English, W.B., Nelson, W.R., 1999. Bank risk rating of business loans, in: Proceedings of the 35th Annual Conference on Bank Structure and Competition, May 1999.

Foster, G., 1986. Financial Statements Analysis. Prentice-Hall, London

Grunert, J., Norden, L., Weber, M., 2005. The role of non-financial factors in internal credit ratings. Journal of Banking and Finance 29, 509-531

Hall, B., 2002. The financing of research and development. Oxford Review of Economic Policy 18 (1), 35-51.

Izan, H.Y, 1984. Corporate distress in Australia. Journal of Banking and Finance 8, 303-320

Jaffee, D., Russel T., 1976. Imperfect information, uncertainty and credit rationing. The Quarterly Journal of Economics 90, 651-666

Keasey, K., Watson, R., 1987. Non financial symptoms and the prediction of small company failure. Journal of Business Finance and Accounting 14, 353-355

Krahnen, J.P., Weber, M., 2001. Generally accepted rating principles: a primer. Journal of Banking & Finance 25, 3-23

Laitinen, E., 1993. The use of information contained in annual reports and prediction of small business failure. International Review of Financial Analysis 3

Lev, B., 2001. Intangibles: Management, Measurement and Reporting. Brookings Institution Papers, Washington D.C.

Machauer, A., Weber, M., 1998. Bank behavior based on internal credit ratings of borrowers. Journal of Banking and Finance 22, 1355-1383

Mensah, Y., 1984. An examination of the stationarity of multivariate bankruptcy prediction models: a methodological study. Journal of Accounting Research 22/1, 380-395

Nelson, R., 1959. The simple economics of basic scientific research. Journal of Political Economy 49, 297-306.

Platt, H.D., Platt, M.B, 1990. Development of a class of stable predictive variables: the case of bankruptcy prediction. Journal of Business Finance and Accounting 17 (1), 31-51

Platt, H.D., Platt M.B, 1991. A note on the use of industry-relative ratios in bankruptcy prediction. Journal of Banking and Finance 15, 1183-1194

Rose, P.S., Andrews, W.T., Giroux, G.A., 1982. Predicting business failure: a macroeconomic perspective. Journal of Accounting and Finance 6/1, 20-31

Santomero, A.M., 1997. Commercial bank risk management: an analysis of the process. Journal of Financial Services Research 12, 83-115

Stiglitz, J., Weiss, A., 1981. Credit rationing in markets with imperfect information. American Economic Review 71, 393-410.

Szegö, G., Varetto, F., 1999. Il rischio creditizio. Misura e controllo., Utet, Torino

Tabakis, E., Vinci, A., 2002. Analysing and combining multiple credit assessments of financial institutions. Working paper n. 123, European Central Bank

Tennyson, B.N, Ingram, R.W, Dugan, M.T., 1990. Assessing the information content of narrative disclosures in explaining bankruptcy. Journal of Business Finance and Accounting 17/3, 391-410

Treacy, W.F, Carey M., 2000. Credit risk rating systems at large US banks. Journal of Banking and Finance 24, 167-201

Udell, G.F, 1989. Loan quality, commercial loan review, and loan officer contracting. Journal of Banking and Finance 13, 367-382

Zopounidis, C., 1987. A multicriteria decision making methodology for the evaluation of the risk of failure and an application. Foundations of Control Engineering 12/1,45-67

8. Tables

	large corporate/ corporate	middle market	small business
1	29%	40%	31%
2	26%	58%	16%
3	32%	30%	38%
4	28%	49%	23%
5	nd	nd	nd
6	20%	40%	40%
7	45%	45%	10%
8	nd	nd	nd
9	15%	45%	40%
10	20%	40%	40%
11	nd	nd	nd
12	nd	nd	nd

**Table 1-Market segmentation and relative weight
of business areas by the largest 12 Italian banks**

	QUALITATIVE FACTORS
BUSINESS PROFILE	Core business and related business activities
	Evolutionary stage of activity (start-up, maturity, decline)
QUALITY OF MANAGEMENT	Managerial and entrepreneurial capability (flexibility of addressing problems promptly, of introducing or updating methods and technologies when warranted..)
	Risk tolerance and risk propensity
	Morality (also financial)
	Professional experience and human resources policies
	Presence of management succession plans
OWNERSHIP STRUCTURE	Group belonging
BEHAVIOUR	Presence of writs, lawsuits or judgments
	Correct behavior towards employees
QUALITY OF FINANCIAL REPORTING	Clarity, completeness and punctuality in financial data presentation
	Transparency and prudentiality of accounting information
IINDUSTRY OUTLOOK	Features of the industry and relative position of the firm within its industry
	Competitive arena and competitive position of the firm
BUSINESS RISK	Vulnerability to macro-economic environment (economic downturns, movements in interest rates and exchange rates..)
	Vulnerability to long-term trends that affect demand (lifestyle changes and consumer attitudes)
	Vulnerability to technological change
	Impact of environmental and antitrust regulations, fiscal policy, direct and indirect taxation

Table 2-Overview of qualitative criteria for credit risk assessment

	INTESA	SANPAOLO IMI	UNICREDIT	BPU
LOAN SCHEMES	**1) IntesaNova**	**1) Innovation-Buy** **2) Applied Research**	**1) Technological Innovation**	**1) Support to R&D**
ELIGIBLE PROJECTS	• product and process innovation • innovation connected with the diffusion of ICT	• product and process innovation • purchased innovation	• product and process innovation • industrial research	• product and processes innovation • organizational innovation • protection of the environment and energy conservation
TECHNOLOGICAL ASSESSMENT	• internal (teams of engineers) • external (network of universities)	• Internal (teams of engineers)	• External (national/local associations)	• External (local industrial associations)
GRANT DECISION	• financial/technological evaluation of the project • assessment of the creditworthiness of the borrower (rating between 1-6)	• financial/technological evaluation of the project	• financial/technological evaluation of the project	• financial/technological evaluation of the project
LOAN TERMS	• medium-term financing (3-5 years) • no collateral requirement • variable Euribor interest rate + 1-2% range depending on the rating	• medium-long term financing (3-7 years) • variable Euribor 3m interest rate • two subsequent anticipations of 50% of the loan • rewards for successful and completed projects	• medium-long term financing (until 5 years) • variable Euribor 3m interest rate, correlated on rating classes • no collateral but covenants	• medium term financing (up to 5 years) • advantageous conditions
CONSULTANCY SUPPORT	• prior to the presentation of the project • during the implementation of the project	• prior to the presentation of the project • during the implementation of the project		–

Table 3- Banking programs to sustain innovation activities