
Ceris-Cnr, W.P. N°14/2000

ITALIAN CORPORATE GOVERNANCE, INVESTMENT, AND FINANCE

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October 3rd, 2000

Abstract

Italian industrial structure and financial markets have several distinct features. Italian firms are relatively small, few trade publicly and no corporate bond market exists. The limited types of external funds available to Italian firms makes them prone to financing constraints. We examine a panel containing over 1100 Italian firms. We find that firm size does not appear correlated with the severity of financing constraints. We also find that small firms are frequently mature. Our results suggest that young firms face financing constraints, while mature firms may develop relationships with lenders that lower the costs of external funds. Small, young firms appear to face the tightest financing constraints. Many firms are affiliated with pyramidal business groups. We find that affiliation with pyramidal business groups appears to reduce the effect of financing constraints. Our results have important implications for government policy to promote small firm growth in Italy.

Key words: business groups, cash flow, corporate investment, capital structure, panel data

JEL: L20, L11, G32

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** We would like to thank Bruce Petersen, Luigi Buzzacchi, Dennis Coates, Giovanni Fraquelli, Dennis Mueller, Alessandro Sembenelli, and participants at the IX International Conference on Panel Data and the XXVII EARIE Conference for their useful comments on an earlier version of the paper. We are also grateful to Luigi Benfratello, Diego Margon, Silvana Zelli and Maria Zittino for their help on the dataset. We owe a special debt to Tom Remington. Carpenter thanks the Claus M. Halle Institute for Global Learning for support.*

WORKING PAPER CERIS-CNR
Anno 2, N° 14 – 2000
Autorizzazione del tribunale di Torino
N. 2681 del 28 marzo 1977

Direttore Responsabile
Secondo Rolfo

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Segreteria di redazione
Maria Zittino

Distribuzione
Spedizione gratuita

Fotocomposizione e impaginazione
In proprio

Stampa
In proprio

Finito di stampare nel mese di novembre 2000

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Private edition

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1. Introduction

The system of corporate governance in Italy, as well as Italian industrial structure, is a subject of intense interest not only to a broad range of economists, but throughout the social sciences¹. A factor driving research into the Italian economy is that it has distinct features that taken in combination set it apart from other large economies. The industrial structure of Italy includes a relatively large number of small and medium sized firms. The proliferation of small scale enterprises has often been pointed to as one of the reasons for Italy's economic success (Piore and Sabel, 1984; Beccattini, Sengenberger, Pyke, 1990; Bagnasco, 1977). Capital markets in Italy are also relatively undeveloped compared not only to the US, but to some extent, other large European countries as well.

This paper focuses on whether underdeveloped capital markets, combined with a large incidence of small and medium sized firms, leads to financing constraints that limit firms' investment and, ultimately, their growth. Two other features of the Italian economy enrich our analysis. First, the Italian model of corporate governance is quite different from the familiar model proposed by Berle and Means, where owners are fragmented and ownership and control are widely separated. In Italy, ownership and control are not typically at the same arms-length relationship found in Anglo-Saxon economies. Nor is ownership widely dispersed. Instead, the ownership of most Italian firms, even large firms, is tightly held, frequently by a single extended family. Family members frequently take an active interest in the day-to-day operations of the typical firm. The tight concentration of ownership may serve as an additional constraint on firm growth. To grow may require significant levels of outside finance that results in reduced family control and additional monitoring by outsiders. As a result, some small Italian firms may be quite mature and have well-established track records and relationships with lenders. They may not face financing constraints associated with firms at an early stage in their life cycle. Our empirical analysis accounts for both the size of the firm and its maturity as proxied by its age. To our knowledge, our research is the first to examine how the maturity of firms in Italy may affect their investment, growth, and access to finance.

Second, many Italian companies are members of a hierarchical relationship with interlocking ownership and concentrated control called a "pyramidal business group." These groups are typically headed by a parent company that holds controlling stakes directly or indirectly in

¹ See, for example, Robert Putnam (1993) and Richard Locke (1995) for especially well known work in political science.

member firms. Each company within the group, however, remains legally independent. Several explanations have been proposed for the existence of groups.² The group structure allows the parent company to control a large amount of assets with minimal investment. Thus, groups allow for leverage and diversification. An additional reason for the formation of groups is that they may help to establish internal capital markets (Impenna and Pagnini, 1993; Buzzacchi and Pagnini, 1994). In an economy with few available external sources of finance, group membership could become valuable for firms with investment projects that are difficult to evaluate (e.g., high-tech firms).

We conduct our analysis with a large panel comprised of more than 1100 Italian manufacturing firms. We find that, in contrast to the evidence from the US, small firms as a group do not appear to face an especially large premium for external funds. However, we examine the age of the firms in the sample and we find that many small Italian firms are also mature. Mature firms have had time to develop both a track record and a relationship with lenders. When we split the sample by age, we find that young firms' investment appears to be more sensitive to fluctuations in internal finance than mature firms, consistent with the young firms facing larger information-based premia for external funds. But after controlling for age, we find that size also appears to be an important factor in determining the severity of financing constraints. Small, young firms appear to face relatively large barriers to using external finance for investment.

We also examine whether affiliation with pyramidal groups can reduce the premium firms must pay for external funds. We find that young firms not affiliated with a group exhibit investment that is quite sensitive to internal finance flows. Among these firms, small firms display the greatest sensitivity to internal finance. In contrast young, group-affiliated firms' investment is uncorrelated with their internal funds. This evidence is consistent with group membership providing young firms benefits in the form of low-cost external funds (Schiantarelli and Sembenelli, 2000).

Some large firms' investment also appears to be sensitive to fluctuations in internal funds. While large firms are not typically thought to face financing constraints, some researchers have suggested that a correlation between large firms' investment and their internal funds may be symptomatic of agency problems associated with "free cash flow." We find that the positive effect of cash flow on large firms' investment is concentrated among large, young, nonaffiliated firms.

² See, for example, Bonbright and Means (1932), Williamson (1975), Daems (1978), Bebchuck, Kraakman and Triantis (2000), and for Italy, Brioschi, Buzzacchi and Colombo (1989).

The remainder of the paper is structured as follows. Section 2 provides a more detailed discussion of the institutional features of the Italian economy and its capital markets. Section 3 more fully develops the testable hypotheses that flow from these institutional features. Section 4 describes the data. Section 5 presents the empirical methods that we employ to test our hypotheses and the results, along with tests of their robustness. Section 6 concludes.

2. Institutional features of Italian capital markets and industry

A. THE STRUCTURE OF ITALIAN CAPITAL MARKETS

Many authors have drawn a distinction between financial systems that are “market based” (e.g., the US and UK) and those that are “bank based” (e.g., France, Germany, Japan).³ In a market-based economy a large proportion of economic activity is contained within publicly traded firms. Bank-based financial systems are those where firms rely more on bank debt than bonds, equity markets are thin, and publicly traded firms are sparse. In a bank-based system banks may also play a powerful role in corporate governance.

Italy exhibits many features consistent with a bank-based financial system. Bank debt is by far the most important source of outside funds for Italian firms. Cobham, Cosci and Mattesini (1999) show that bank loans are the largest net source of external finance over the period 1983-1993, accounting for as much as 20 percent of net funds. Non-bank sources of debt, other than trade credit, are sparse. Very few companies in Italy have publicly traded corporate debt and a commercial paper market has not yet been developed. Furthermore, the development of institutional investors, such as investment funds, merchant banks, and especially pension funds, is at an early stage.

But while banks provide most of the external finance used by Italian firms, until 1993 banks were not allowed to hold equity in firms and they do not play the same central role as banks in a Japanese *keiretsu*, which tend to sit at the center of Japanese industrial groups. Furthermore, the Italian banking system until very recently was mostly state-owned and heavily regulated, which limited its effectiveness. Because the Bank of Italy could and did restrict entry (e.g., imposing geographical boundaries to individual banks operations; restricting new branches) competition in the banking sector was limited. In addition, the market for banking services was segmented. Some banks, *Aziende di Credito Ordinario* (Commercial banks) could directly provide only

³ See Mayer (1989), Franks and Mayer (1990), Aoki (1990), Albert (1991), and Prodi (1991).

short-term credit, while medium and long term credit was granted through independent branches of the commercial banks and through Special Credit Institutions.

Like other Continental European countries, the stock market is not an important source of finance in Italy. Very few Italian companies trade publicly, even companies that are quite large (e.g., Ferrero, Fininvest, Barilla). In 1993 only 222 firms traded on the stock exchange in Milan (141 in 1980) and the total capitalized value of firms was 120,983 million Euros, approximately 7.8% of GDP. Pagano, Panetta, and Zingales (1998), using a data set highly representative of the Italian economy, state that during the period 1982-1992 there were only 76 new listings of non-financial companies on the Milan Stock Exchange. In contrast, there were over 3000 new listings in the US during a similar time period.⁴ Since few firms trade publicly and no large institutional investors exist, the market for corporate control is also poorly developed.

The ownership of Italian firms is tightly concentrated. In a comprehensive study La Porta, Lopez-de-Silanes and Shleifer (1999) find that ownership in publicly traded Italian companies is highly concentrated within a single family and controlling families participate in top management. Using 1993 data for Italian firms, Bianchi, Bianco, and Enriques (1999) find that the largest shareholder owned 51.4% of the firm, on average. In nearly 30% of listed firms, the largest shareholder was an “individual” (a family). Ownership is even more concentrated among non-listed companies. Many other industrialized countries in Western Europe (e.g. France, Belgium, Germany, Denmark, etc.) share the Italian model of corporate governance to a limited degree (Becht and Roell, 1999). As a result, our analysis and empirical findings may be applicable to other European countries.

B. INDUSTRIAL STRUCTURE

Compared with most industrialized countries, the structure of Italian industry is characterized by a very large share of small and medium sized enterprises. In 1996, manufacturing firms in Italy with less than 100 employees accounted for more than 70 percent of employment. In contrast, US data from 1992 shows that firms with less than 100 employees accounted for approximately 20 percent of employment (Trau' 1999). Many have pointed to the proliferation and success of small firms in Italy as an important factor in the development and growth of the economy. Small firms compete successfully in the market for exports and contribute positively to the balance of trade.⁵ But while small Italian firms appear to exhibit no

⁴ Loughran and Ritter (1995).

⁵ Specific examples of industries with a large share of small firms and excellent export performance include industries such as textile, clothing, leather articles and specialized suppliers of machinery such as machine tools.

cost disadvantages associated with small scale, they do not appear to take advantage of growth opportunities that should accompany successful economic performance.

Some literature has suggested that underdeveloped financial markets are an impediment to the growth of Italian small and medium sized firms. Small firms do not grow because they cannot obtain the necessary financial resources for expansion. Other research focuses on the reluctance of the owner/manager to share control with non-family members.⁶ The artisan tradition in Italy has also been suggested as a constraint on growth, as has the relative lack of protection minority shareholders receive under Italian securities law.⁷ A branch of research most closely associated with the research of Robert Putnam (1993) suggests that relatively small firms in northern Italy (where most manufacturing activity takes place) may survive and prosper because of the existence of “social capital.” Social capital is a difficult to measure set of relationships between firms or people that reduces the risk of opportunistic behavior and therefore lowers the cost of exchange and increases the gains from cooperation.⁸

A second important feature of Italian industrial structure is the existence of pyramidal groups. These groups are typically headed by a parent company which holds equity stakes in a number of firms. These equity stakes may either be direct holdings (where Company A holds a controlling stake in B) or indirectly through other member firms that it controls (Company A controls B, and B holds a controlling stake in C). These groups differ from the holding company-subsidary relationship that is common in the US, as firms in Italian groups remain legally independent from the parent firm.

A survey conducted by the Bank of Italy suggests that the overwhelming majority of Italian economic activity takes place within firms affiliated with groups. The proportion of firms affiliated with groups has generally grown between the late 1980's through the mid 1990's. We present evidence below to show that a large proportion of firms in our sample are also affiliated with groups (see Table 1).

⁶ Barca (1994, p. 194) writes that there is no general constraint on the growth for small Italian firms and no clear evidence of bank credit rationing. He suggests that the true constraints are caused by a lack of an efficient re-allocation of control, the conflicting interests of the family and the firms, and the lack of financial institutions that would make the re-allocation of control easier.

⁷ La Porta, Lopez-de-Silanes, Schleifer and Vishny (1997) consider the institutional and legal framework of Italy and its origin in the French Civil Law and Commercial Code. Compared to the Anglo-Saxon common law, this framework provides relatively less protection to investors and debtors against expropriators by insiders, has a lower quality of law enforcement, and increases the cost of debt and equity finance.

⁸ Social capital is a concept that has received a great deal of attention in several branches of the social sciences (*supra* note 1, Coleman, 1990, and Fukuyama, 1995). However, it has not been as fully embraced in economics because of the difficulty associated with measuring it. See Knack and Keefer (1997) for an attempt to measure social capital with survey data.

A series of recent research papers have examined the potential reasons for firms to become affiliated with groups, but conclusive evidence establishing the principal source of their formation has not yet been established.⁹ Most explanations center on how groups affect corporate governance and the intra-group allocation of financial resources. Groups allow for the separation between ownership and control in an economy with thin equity markets. Another key reason that groups may exist is that they allow the formation of internal capital markets. When the financial system is not well developed and potential sources of funds for expansion are expensive or scarce, internal capital markets can reduce the severity of financing constraints. Parent firms can direct intra-group transfers of funds to a constrained member firm. In addition, large parent companies or group member firms that specialize as liaisons with domestic or international banks might gain access to funds at a lower cost than a constrained member firm acting alone.

Group membership may also lead to incentive problems between controlling and minority shareholders that have the potential to lead to value-destroying investments. Controlling shareholders in the parent firm can expropriate minority shareholders' wealth in several ways. The controlling firm can set artificially low transfer prices for intermediate materials the parent company uses as inputs, increasing cash flow in the parent firm (where the controlling family's stake might be proportionally much higher). Controlling shareholders might also direct group funds toward member firms with poor investment opportunities, but whose business activities provide the controlling shareholder with non-pecuniary benefits. Groups also minimize the bankruptcy risk for the controlling shareholder on top of the pyramid when the affiliated firm undertakes risky projects.

3. The link between finance, investment, and Italian corporate governance

The financing constraint literature focuses on the relationship between a firm's financial strength and its ability to gain access to funds to use for investment. A central proposition of this literature is that imperfections in capital markets create a wedge between the cost of internal and external finance. Recent research argues that the principal source of the wedge may be due to asymmetric information between firms and potential suppliers of external finance. This wedge might be particularly high not only for Italian firms, but firms in many other continental European countries where equity markets are poorly developed and few alternatives to bank finance exist.

⁹ See Brioschi, Buzzacchi, Colombo (1989), Barca (1996), and Bianchi, Bianco, Enriques (1999).

Research on financing constraints and their impact on the real activity of firms has been very active for the last decade. Many studies have focused on the behavior of US firms, but much evidence exists to suggest that financing constraints affect the behavior of firms in many countries. In a recent survey of the international evidence Schiantarelli (1996, p. 206) states that “for a substantial subset of firms, informational asymmetries and incentive problems generate significant departures from the model derived under the assumption of perfect capital markets.”

Figure 1 depicts a standard model of a financing hierarchy.¹⁰ The horizontal axis measures the flow of finance and the firm’s investment (I). The vertical axis measures the cost of finance as well as the return on capital spending. The supply of finance schedule (S) illustrates the standard depiction of a financing hierarchy and consists of three regions. The internal finance portion of the schedule has a constant shadow cost (R) and its length (CF) represents the flow of internal finance. Once internal finance is exhausted, firms must turn to debt finance, which may be more costly when capital markets are imperfect. The marginal cost of debt is upward sloping because both financial distress costs and moral hazard increase with leverage. Debt finance may be particularly costly in Italy, where capital markets are highly regulated and its institutional structure provides for few alternatives to bank debt.¹¹

When the marginal cost of debt becomes sufficiently high, firms may turn to new share issues. The cost of new shares to the firm is denoted V . The wedge between V and R represents the both direct issue costs of new shares and the lemons premium. Empirical measurements based on US data suggest that the cost of new equity is very large, particularly for a firm that wishes to become publicly traded. One well-known corporate finance textbook makes the point succinctly: “It costs a lot of money to go public.”¹² Within the Italian institutional context, owner-managers of small, closely-held firms may be averse to issuing shares because they attribute a very high value to the control rights of the firm.¹³ For these managers, equity embodies a significant non-pecuniary cost and the distance between V and R is very high indeed. Thus, managers might fail to issue shares even if the returns from investment are high.

When firms face a wedge, internal and external funds are no longer perfect substitutes, and variations in the flow of internal funds will cause the supply of finance to shift, leading to a

¹⁰ See, for example, Fazzari, Hubbard and Petersen (1988).

¹¹ In addition, financial regulations in place until 1993 made it very difficult for most firms to raise capital internationally. The impact of these regulations was felt differentially, however, as large companies with foreign subsidiaries circumvented these regulations easily.

¹² Grinblatt and Titman (1998).

¹³ The high cost of going public and the costs of losing control is well documented in the literature on Italian corporate governance. (See Pagano, Panetta, and Zingales, 1998, and Barca, 1996.) The high concentration of ownership shares in both quoted and non-quoted firms is consistent with owner-managers viewing control rights as highly valuable.

change in the firm's investment expenditures. Many have argued that small firms are likely to face large premia for external finance. Carpenter and Petersen (1998) explain why a similar model is likely to describe the growth of small US firms. Schiantarelli (1996) argues that smaller firms are more prone to idiosyncratic risk. In many industries where small firms are important (e.g., high-tech industries, and in Italy, perhaps the fashion industry) the bulk of their assets are firm specific or intangible. Furthermore, Cornell and Shapiro (1988) argue that small, growth companies are likely to face particularly severe adverse selection problems because of the "credibility gap between management and investors." In addition to the US, empirical evidence suggests that small firms face financing constraints in many countries.¹⁴

Research has focused on firm size as one of the potential determinants of a firm's access to funds because it is thought to be correlated with factors, such as idiosyncratic risk, that determine the size of the wedge firms must pay for external finance. But Schiantarelli (1996) states clearly an important additional rationale for the adoption of size as a criterion to identify financially constrained firms: "insofar as size is positively correlated with age, [small firms] are less likely to have developed a track record that helps investors to distinguish good firms from bad." For young firms without track records, lenders may charge a significant premium for external funds or refuse to make them available at all.¹⁵

We argue that while small firms in the US might tend to be young, many small Italian firms are mature, with substantial track records and time to have developed long relationships with one or more lenders.¹⁶ Indeed, if the desire to maintain family control represents an additional constraint on Italian firms' growth, the correlation between size and age might be quite weak. As a result, size does not capture the track record firms develop with lenders. A key contribution of our paper is that Italian firms' size may proxy poorly for the size of the wedge, and using size alone to identify finance constrained firms is unlikely to be a successful research strategy. Because young firms lack reputational capital with lenders, they are likely to face more severe financing constraints. It is only after controlling for age that small firms' investment may display a sensitivity to changes in the flow of internal funds.

Young firms with poor access to funds may solve their organizational problems through membership in a pyramidal group. Group affiliation allows firms to tap financial resources

¹⁴ See Schiantarelli (1996) for a survey of the international evidence.

¹⁵ A recent survey by Mediocredito Centrale based on a stratified sample of Italian firms for the period 1992 to 1994 suggests that financial institutions tend to charge a premium for funds to small firms, for high technology firms, and for firms located in Southern Italy (Scanagatta, 1999).

¹⁶ Detragiache, Garella and Guiso (2000) find that 89% of small and medium sized Italian firms have more than one bank relationship, compared to approximately one-half of small and medium sized firms in the US. They also find that firm age is positively and significantly correlated with the number of bank relationships it develops.

available through the group's internal capital markets. In terms of the model, the wedge an informationally disadvantaged firm faces for external finance shrinks upon joining a group. The wedge becomes equal to the cost of finance for the group's liaison to the capital markets, plus any associated costs from the intra-group transfer of financial capital. Therefore, because they have access to an internal capital market, affiliated firms' investment may be less sensitive to changes in internal finance than nonaffiliated firms' investment.

4. Data and summary statistics

The database we use was constructed at CERIS using the balance sheet data collected by Mediobanca investment bank extracted from an unbalanced panel of private companies over the period 1977 to 1993¹⁷. The panel includes only firms with at least five consecutive observations, so that each firm has a time series of at least five and at most seventeen years. The five-year requirement is the minimum number of observations necessary for the dynamic specifications we use in the econometric section, which involves first differencing as well as lagging most variables. Each firm is allocated to its primary industry defined according to the three-digit NACE REV. 0 classification. Whenever a major merger, acquisition, or divestiture occurs the panel drops the observation for that year and breaks up the time series because that observation is unlikely to be comparable with the previous and following ones. Because specific data on capital spending is not available in this dataset (or generally in Italian accounting datasets) we calculate investment as the difference in fixed capital assets.

The database contains information on group affiliation. Firms are classified as either independent or as affiliated with a group. Firms are allowed to transit in and out of groups during the sample period.

We calculate the age of the firm using data from Mediobanca and Dun and Bradstreet. The age data are termed *anno di costituzione* (literally, year of formation) by Mediobanca and *anno di fondazione* (literally, year of foundation) by Dun and Bradstreet. The age variable does not change when the firm undergoes a change in legal structure. When there is a transformation of firm structure from a divestiture of a division or a spin-off from a parent company it can potentially lead to the classification of a mature firm as "young." Since spinoffs are likely to be

¹⁷ The database is built from the yearly directory *Le Principali Società Italiane*. Each annual volume includes balance sheets, profit and loss accounts and other general information. Firms are included in the Mediobanca directory on the basis of a variable size measure. Between 1977 and 1984, firms with sales larger than Lit 10bn were included, between 1985 and 1986, firms with sales of at least Lit 20bn and between 1987 and 1993, firms with sales of at least Lit 25bn. For a complete description of the original database see Margon et. al. (1995).

large, our empirical analysis takes partial account of this problem because we split by age, size, and group affiliation. Firms where age is measured with error will tend to be large, young, affiliated firms.

We define young firms as those 15 years old or less.¹⁸ Firms may transit between the young and mature categories during the sample period. We use the value of real sales to distinguish between large and small firms. Small firms are those whose real sales in the initial year of the sample period put them at the 30th percentile (25.562 billion lira, equal to 29.9 million 1980 USD) or below.

Table 1 describes the features of the data. Panel A shows the number of firms contained in each sub-group of the data, with the total observations in each sub-group in parentheses. We provide the number of observations in addition to the number of firms because firms are allowed to transit between age and affiliation categories during the sample period.¹⁹ More than two-thirds of the small firms in the sample are mature. Roughly twice as many large firms are affiliated with groups, regardless of age. Age appears to be correlated with whether or not small firms are affiliated with groups. Slightly fewer small, young firms are affiliated with groups than small, mature firms. The panel also shows that there are at least 57 firms in each sub-group, which indicates that our results, even for the smallest subset of data, are not based on just a few firms.

Panel B presents sample medians for some key real and financial variables, where the data have been split by age and size. For both age categories, the small firms in the sample have less than half as many employees as large firms (approximately 250 for small firms vs. over 500 for large firms). It is worth noting that the median number of employees for large firms in Italy is only slightly larger than the maximum number of employees (500) that would allow it to be classified as “small” by the US Small Business Administration. The median age of young firms is 5 years, the median age for mature small and large firms is 25 and 31 years, respectively. It is important to note that despite their difference in age there is little difference in the size of small, young and small, mature firms, supporting the idea that size may not be highly correlated with the severity of financing constraints faced by Italian firms.

Small firms’ sales, regardless of age, grow approximately one percent faster than large firms. Small firms’ investment, relative to the size of their capital stock (I/K) is slightly higher than that of large firms. The differences are very minor, however, and I/K is approximately 10 percent of capital for all columns of panel B. Cash flow scaled by capital is the same for large,

¹⁸ Deveraux and Schiantarelli (1989) defined young firms as those quoted for at least 12 years. We use the same definition to test the robustness of our results.

¹⁹ Because the firms are allowed to switch age categories, the number of firms in the young and mature categories will sum to more than the 1104 firms in the panel.

young and large, mature firms at the median, but small, mature firms exhibit slightly larger cash flow than small, young firms. Overall, young firms appear to use more long-term debt than mature firms do. Mature firms have relatively high levels of liquid assets (measured by net working capital). Net working capital scaled by capital for small, mature firms is almost 0.70, as opposed to 0.595 for small, young firms.

Panel C of Table 1 shows the summary statistics broken down into size, age, and affiliation categories. Affiliated firms tend to have more employees than nonaffiliated firms. The difference in size is smallest for the small, mature category. Affiliated firms also exhibit faster sales growth. Affiliated firms appear to face less financial pressure than nonaffiliated firms. They have higher cash flow than nonaffiliated firms. In addition, affiliated firms have lower stocks of both long and short-term debt than nonaffiliated firms. We calculated the firm's interest payments relative to the sum of interest payments plus cash flow. This ratio shows the proportion of internal finance devoted toward meeting interest expenses. The medians show that the burden of interest payments weighs more heavily on nonaffiliated firms. Among nonaffiliated firms, however, this ratio is smallest for small, mature firms.

5. Econometric methodology and results

The empirical tests in this paper focus principally on two main hypotheses. First, we argue that the institutional structure of the Italian economy means that firm size alone is unlikely to be highly correlated with the size of the wedge for external funds. We argue that young firms without substantial track records may face a wedge between the cost of internal and external finance. Furthermore, we argue that within this sub-sample of firms, financing constraints are particularly likely to fall upon firms that are both young and small. Small, young firms suffer from a disadvantage because they have not developed relationships with lenders and they also face the greater idiosyncratic risk associated with small scale (e.g., lack of diversification across customers and products). As a result, small, young firms' investment should display a relatively large sensitivity to changes in their internal finance flows.

Second, we argue that group affiliation provides members that might otherwise face financing constraints with access to relatively low cost finance through intra-group transfers. Group affiliated firms should display investment that is less sensitive to changes in internal finance than nonaffiliated firms of a similar size and age.

To test our hypotheses we estimate the following equation²⁰:

$$\frac{I_{it}}{K_{it-1}} = \mathbf{b}_1 \frac{I_{it-1}}{K_{it-2}} + \mathbf{b}_2 \frac{I_{it-2}}{K_{it-3}} + \mathbf{b}_3 \Delta y_{it} + \mathbf{b}_4 \Delta y_{it-1} + \mathbf{b}_5 \Delta y_{it-2} + \mathbf{b}_6 \frac{CF_{it}}{K_{it-1}} + \mathbf{a}_i + \mathbf{l}_t + \mathbf{e}_{it} \quad (1)$$

where i indexes firms and t time. The firm's investment (scaled by its beginning of period capital stock) is represented by I/K , and Δy represents the growth in firm's sales. Using lagged investment captures some of the dynamics of the investment decision and sales growth captures accelerator effects that may influence investment. CF/K represents the firm's cash flow and is defined as value added less labor costs, taxes, and interest expenses. Cash flow is our proxy for the flow of internal finance. Since our primary emphasis is on age as a proxy for access to funds, we allow the coefficients of the control variables (including the time dummies) to vary across age categories. We interact cash flow with dummy variables that define its affiliation with a group and also its size. The definitions that we use to classify a firm as young, mature, small, or large are stated in section 4. The fixed firm specific factors (e.g., managerial ability, depreciation rates, etc.) are represented by α , and we remove them by first differencing the data. First differencing removes between-firm variation from the data. We also include a set of time dummies, λ , which remove the influence of common cyclical variation (e.g., overall macroeconomic conditions) in the data, including the variation in the user cost of capital.

One empirical challenge posed by the institutional features of the Italian economy is that because so few firms trade publicly, data on stock prices are not available but for a few very large firms. This is important because investment spending is a forward-looking exercise that depends on the firm's expectation of future profitability. Modeling expectations is notoriously difficult. But to the extent that expectations about future profits are correlated with current cash flow, failure to control for them may result in a biased estimate for cash flow.

Many investment studies conducted with US data have used stock prices to construct a proxy for Tobin's Q. The use of Tobin's Q allows researchers to avoid explicitly modeling expectations by arguing that they are embedded in stock prices, which are forward looking. While Tobin's Q is an important component of most empirical models of firm level investment, it is also widely known to be a noisy proxy for "fundamentals."

²⁰ See, for example, Bond, Elston, Mairesse, and Mulkey (1997) for a similar accelerator specification.

Our empirical strategy addresses the lack of Q in two ways. First, since we compare the sensitivity of investment to variation in cash flow of firms with different institutional and physical characteristics (e.g., size, age, and group affiliation) our focus on the difference of the estimated cash flow coefficients (as predicted by theory) across categories of firms is valid as long as any bias from the omission of investment opportunities affects each category of firm in the same fashion. Second, in the robustness section below we discuss results based on an alternative empirical model derived from the firm's Euler equations. While Euler equation techniques are also subject to some potential weaknesses (see, for example, Oliner, Rudebusch and Sichel, 1996, Schiantarelli, 1996, and Hubbard, 1998) they have the advantage of not requiring an expectations variable in the estimating equation.

To control for potential endogeneity of the regressors we use the generalized method of moments (GMM) instrumental variable technique. We use the DPD package developed by Arellano and Bond (1998, 1991) that is especially designed for dynamic panel data models. DPD computes test statistics for serial correlation and instrument validity. Moreover, it allows estimates to be computed from panel that, like ours, is unbalanced, and it provides standard errors and test statistics that are robust to heteroskedasticity.

The GMM results we report are one-step estimates.²¹ First differencing the data introduces a MA(1) process into the error term. Therefore, we use instruments dated $t-2$ and earlier. Information on the instrument set used in the regressions is included in the notes to the tables. Tests for second order serial correlation in the error term (presented in each of the tables containing our results) cannot reject the null of no second order correlation.

A. MAIN RESULTS

To conform to the literature, and to test our hypothesis that firm size may be a poor proxy for the degree to which Italian firms face financing constraints, we split the data by size and estimate equation 1. We found that while the cash flow coefficient for small firms was larger than that of large firms (0.088 vs. 0.052) it was not statistically significant (the p -values were 0.195 and 0.101 for small and large firms, respectively). The results support our strategy of using age in addition to size to separate firms into different categories.

The estimation results from the model when the data are split by the age of the firm are presented in table 2. In each of the tables to follow, the qualitative nature of the comparison of

²¹ Arellano and Bond (1981) show Montecarlo simulations that suggest inference based on asymptotic standard errors for the (more efficient) two-step GMM estimators can be an unreliable guide for hypothesis testing in finite samples.

the estimates for the control variables for young and mature firms is similar to those in table 2. For both young and mature firms, lagged investment is positive and significant, suggesting that adjustment costs cause firms to move toward their desired capital stock over time. However, the coefficient estimate on lagged investment is much larger for mature firms than for young, indicating slower speeds of adjustment. The second lag of investment is significant for mature firms, further suggesting a slower adjustment process for this class of firms. Sales growth enters positively and significantly for young firms, consistent with an accelerator effect. Current sales growth for mature firms, however, is negative (and insignificant in table 2), and the first lag is positive and significant.

The cash flow coefficients are our primary interest. For young firms the point estimate is 0.081, with a p-value of 0.195. Mature firms' investment exhibits less sensitivity to cash flow, and the point estimate is insignificant. If we use a tighter age split and define young firms as 12 years or less the wedge between the cash flow coefficients widens (0.106 and 0.001, respectively) and the point estimate for young firms is significant.²²

Table 3 refines the results of table 2 by splitting the firms by age and interacting a dummy variable with cash flow that controls for the size of the firm. The results indicate that, after controlling for age, small firms' investment is more sensitive to internal finance than large firms. There is little difference between the cash flow coefficients for small, young firms when they are compared to small, mature firms. (The results in Table 5 below indicate this similarity is caused by the pooling of affiliated with nonaffiliated firms.) If we use the more restrictive definition for young firms and define them as firms 12 years old or younger we find again that the wedge between small young and small mature firms' cash flow coefficients widens (0.160 and 0.118, respectively).

We once again split the data by age in table 4, but this time we interact a dummy variable with the cash flow coefficient that indicates group affiliation. The results show that regardless of age, nonaffiliated firms' investment is much more sensitive to cash flow than affiliated firms. The results are consistent with the hypothesis that group affiliation helps member firms to overcome financing constraints.

In table 5, we present the results from the most general version of our empirical model. We separate firms by age, and we interact dummy variables for size and for group affiliation with cash flow. Several comparisons can be made. We find that small, young, nonaffiliated firms, the group most likely to face financing constraints, exhibit the greatest sensitivity to cash flow

²² Age splits using a more restrictive definition of "young" (e.g., 10 years) left us with an unacceptably small number of young firms to perform our empirical analysis.

(the cash flow coefficient is 0.473).²³ Their investment is also more sensitive to cash flow than small, mature, nonaffiliated firms (who display a cash flow coefficient of 0.130) suggesting the importance of building a relationship or establishing a track record with a lender. The t-test statistics of the inequality between the two coefficients is 1.32 (p-value=0.093). Third, young nonaffiliated firms, regardless of size, have larger cash flow coefficients than affiliated firms, consistent with group affiliation providing access to an internal capital market.²⁴ In addition, affiliated firms, with the exception of the small, young subset, exhibit cash flow coefficients that are statistically insignificant. Lastly, large, affiliated firms, regardless of age, have cash flow coefficients that are both statistically insignificant and economically very small. These firms are likely to have the track records, collateral, and access to internal capital markets that allow them to buffer shocks to internal finance.

B. ROBUSTNESS

In addition to our examination of the results, which we discussed above, from using different definitions of age, we performed other tests of the robustness of our results. As discussed, the lack of stock price data for Italian firms makes controlling for investment demand with Tobin's Q impossible. However, an alternative empirical technique makes use of the firm's Euler equations. This technique has the advantage of not explicitly requiring a variable to control for investment demand. The application of Euler equation techniques to investment models has also been subject to criticism (Oliner, Rudebusch, and Sichel, 1996). Nevertheless, we estimated the regressions using an empirical representation of the Euler equation very similar to that used by Bond and Meghir (1994).²⁵ In addition, to be consistent with their model we used their definition of cash flow (value added less labor costs).

²³ When we adopt the more restrictive age definition in this specification all coefficients for young firms are less precisely estimated.

²⁴ Our data allows the categorization of groups by size (small, medium, and large). For robustness we have re-estimated this specification after including firms belonging to small business groups in the "non-affiliated" sub-sample. We follow Schiantarelli and Sembenelli (2000) who consider that the information on the organization of small groups is less precise and that these groups may be considered more similar to independent firms than to large diversified groups with regards to the existence of internal capital markets and strong relationships with lenders. We found that our results were robust to this change and that the young, small, and more broadly defined, "non-affiliated" firms have larger and more significant cash flow coefficients than the other sub-samples.

²⁵ Bond and Meghir derive the firms Euler equation for optimal capital accumulation when there are convex adjustment costs. The specification of our model is $(I/K)_{it} = b_1(I/K)_{it-1} + b_2(I/K)_{it-1}^2 + b_3D(CF/K)_{it-1} + b_4(Y/K)_{it-1} + d_t + \alpha_i + u_{it}$, where **D** represents the vector of dummy variables that define the firms size and affiliation status, CF represents gross operating margin (value added minus labour cost), Y represents the firms output, d_t represents a set of time dummies designed to control for common cyclical variation (which include variation in the user cost of capital), and α represents a firm fixed effect. Our model differs from Bond and Meghir only in the sense that they include a debt variable in the model.

The Euler equation results are very similar to those we obtained by estimating equation 1. Qualitatively, young firms display larger cash flow coefficients than mature firms, small firms display larger cash flow coefficients than large firms once age is controlled for, and nonaffiliated firms display larger cash flow coefficients than affiliated firms. More specifically, for the results analogous to those in table 5 (where we estimate separate regressions for young and mature firms, and interact cash flow with size and affiliation dummies in each regression) we find, as before, that small, young, nonaffiliated firms display the largest sensitivity to cash flow ($CF/K=0.173$, $p=0.003$) of any group of firms we examine. They also display larger cash flow coefficients than small, young, affiliated firms ($CF/K=0.052$, $p=0.001$) and larger coefficients than small, mature, nonaffiliated firms ($CF/K=0.065$, $p=0.522$). Among young, nonaffiliated firms, small firms display slightly larger cash flow coefficients than large firms (0.173 vs. 0.158). None of the cash flow coefficients were significant for mature firms. Overall, our findings are very robust to this change in estimating technique, and suggest that our results are not driven by an omitted investment demand variable.

We also re-estimated the results in tables 2 through 5 above. But instead of using an age dummy variable for these regressions, we interacted the firm's age with cash flow. The point estimate from this interacted variable shows how the sensitivity of the firm's investment changes as it ages one year. Since the interaction attempts to fit a linear relationship between the firms cash flow coefficient and its age, this type of model is quite restrictive, and the estimate of the cash flow*age coefficient was seldom significant. However, in most regressions the point estimate was negative, consistent with our hypothesis that the severity of financing constraints tends to decline with age. Lastly, we estimated a simple sales accelerator model using contemporaneous (instrumented) sales-capital ratio along with two of its lags and cash flow interacted with size and affiliation variables as we have in table 5. The qualitative nature of our results did not change.

6. Conclusion

This paper examines a large group of Italian firms. We find evidence to suggest that the institutional structure of the Italian economy has an important impact upon firms' access to finance. Because of this institutional structure, by itself firm size in Italy is not a particularly good determinant of the size of the information-based premium that firms must pay for external finance. By examining both the age and the size of the firm we are better able to identify a set of firms that face financing constraints.

Our regression results show that both age and size are important factors that determine the severity of financing constraints in Italy. Small, young firms exhibit investment that is relatively sensitive to changes in internal finance flows. But we also find strong evidence to suggest that membership in Italian pyramidal groups appears to reduce the size of the wedge firms face for external finance. We find that the investment of firms that are affiliated with groups displays a much smaller sensitivity to internal finance fluctuations than nonaffiliated firms in the same size and age category.

Lastly, we find that the investment of large, young, nonaffiliated firms is relatively sensitive to changes in cash flow. These results are harder to characterize. Because of their short track record, these firms may face difficulties acquiring sufficient financial resources in a highly regulated financial system with a poorly developed capital market even though they are large. But while most research assumes that the relationship between internal finance and firm activity reflects the influence of financing constraints that lead firms to forgo profitable investment projects, Bertero and Rondi (1999), Carpenter (1995), Kathuria and Mueller (1995) and Vogt (1994) among others, argue agency problems between owners and managers (or controlling and minority shareholders) might also generate a relationship between investment and cash flow. As a consequence, these firms may choose not to become affiliated with groups because their managers may not wish to subject themselves to the potential monitoring and loss of control that comes with group membership. Whether these firms' managers are driven by the desire to consume on the job we must leave to future research. The thin market for corporate control in Italy allows at least for the possibility that for some firms, agency problems will lead to value-destroying investments and suggests this issue may be a fruitful line of inquiry.

Our results have interesting implications for Italian industrial policy. They suggest that the policies directed toward encouraging the growth and development of the small business sector in Italy be narrowly targeted toward firms at an early stage in their life cycle. A more broadly based policy directed toward small firms in general may not be effective on a cost benefit basis as many small Italian firms may wish to remain small. Providing small, mature firms with low-cost government finance, for example, amounts to a redistributive subsidy toward small firms, and not necessarily an effective development policy. This issue, too, we leave to future research.

References

- Albert M. (1991), "Capitalisme contre capitalisme", *L'histoire immédiate*, Seuil, Paris.
- Aoki M. (1990), "Toward an Economic Model of the Japanese Firm", *Journal of Economic Literature*, 38 (1).
- Arellano M., Bond S. (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58, p. 277-298.
- Arellano M., Bond S. (1998), "Dynamic Panel Data Estimation Using DPD98 for Gauss: A Guide for Users", mimeo, December.
- Bagnasco A. (1977), *Tre Italie: la problematica territoriale dello sviluppo italiano*, Il Mulino, Bologna.
- Barca F. (1996), "On Corporate Governance in Italy: Issues, Facts and Agenda", Fondazione ENI Enrico Mattei, Nota di Lavoro, n. 10.
- Barca F. (1994), *Imprese in cerca di padrone. Proprietà e controllo nel capitalismo italiano*, Editori Laterza, Roma-Bari.
- Bebchuck L., Kraakman R., Triantis G. (2000), "Stock Pyramids, Cross-Ownership, and Dual Class Equity: The Creation and Agency Costs of Separating Control from Cash Flow Rights," in *Concentrated Ownership*, Randall Morck ed. University of Chicago Press
- Becattini G., Sengenberger W., Pyke F. (1990), (eds.), *Industrial Districts and Inter-Firm Co-operation in Italy*, International Labour Office, Geneva.
- Becht M., Roell A. (1999) Blockholdings in Europe: An International Comparison, *European Economic Review* (43)4-6, 1049-1056
- Bertero E., Rondi L. (1999), "Managerial Discretion and Investment Decisions of State-Owned Firms: Evidence from a Panel Italian Companies", *Financial Markets Group*, Special Paper n. 119, London School of Economics, London.
- Bianchi M., Bianco M., Enriques L. (1999), "Pyramidal Groups and the Separation Between Ownership and Control in Italy," mimeo.
- Bonbright J.C., Means G. (1932), *The Holding Company: Its Public Significance and Its Regulation*, New York, McGraw Hill.
- Bond S., Elston J., Mairesse J., Mulkay B. (1997), "Financial Factors and Investment in Belgium, France, Germany, and the U.K.: A Comparison Using Company Panel Data", *NBER Working Paper*, n. 5900.
- Bond S., Meghir C. (1994), "Dynamic Investment Models and the Firm's Financial Policy," *Review of Economic Studies*, 61(2), 197-222.
- Brioschi F., Buzzacchi L., Colombo M.G. (1989) "Risk capital financing and the separation of ownership and control in business groups", *Journal of Banking and Finance* 13, p. 747-772.

- Buzzacchi L., Pagnini M. (1994), "Meccanismi di funzionamento dei criteri interni dei capitali: un'indagine empirica del caso italiano, *Temi di Discussione*, Banca d'Italia, n. 240.
- Carpenter R.E. (1995), "Finance Constraints or Free Cash Flow? A New Look at the Life Cycle Model of the Firm" *Empirica*, 22, 185-209.
- Carpenter R.E., Petersen B. (1998), "Is the Growth of Small Firms Constrained by Internal Finance?" mimeo, January 2000.
- Cobham D., Cosci F., Mattesini F. (1999), "The Italian financial system: neither bank based nor market based," *The Manchester School*, 67(3), p. 325-345
- Coleman J.S. (1990), *Foundations of social theory*, The Belknap Press of Harvard University Press, Cambridge, MA.
- Cornell, B., Shapiro A. (1988), "Financing Corporate Growth," *Journal of Applied Corporate Finance*, 1, 6-22.
- Daems H. (1978), *The Holding Company and Corporate Control*, M. Nijhoff, Social Sciences Division, Boston, Lidden.
- Detragiache E., Garella P., and Guiso L. (2000), "Multiple versus Single Banking Relationships: Theory and Evidence," *Journal of Finance*, 55(3), 1133-1161
- Devereux A., Schiantarelli F. (1989), "Investment, financial factors, and cash flow: evidence from UK panel data", in *Information, Capital Markets and Investment*, ed. by R.G. Hubbard, University of Chicago, Press.
- Fazzari S., Hubbard R.G., Petersen B. (1988), "Financing Constraints and Corporate Investment", *Brooking Papers on Economic Activity* 1, p. 141-96.
- Franks J., Mayer C.P. (1990), "Capital Markets and Corporate Control: a Study of France, Germany and the UK", *Economic Policy*, n. 10.
- Fukuyama F. (1995), *Trust: the social virtues and the creation of prosperity*, The Free Press, New York.
- Grinblatt M., Titman S. (1998), *Financial Markets and Corporate Strategy*, Irwin: McGraw-Hill.
- Hubbard R.G. (1998), "Capital-Market Imperfections and Investment", *Journal of Economic Literature*, 36, p. 193-225.
- Impenna C., Pagnini M. (1993), "Holding e gruppi industriali in Italia: mercato e gerarchia nei circuiti dei capitali interni", *Finanza Imprese e Mercati*, 5 (2), p. 151-176.
- Kathuria R., Mueller D. (1995), "Investment and Cash Flow: Asymmetric Information or Managerial Discretion", *Empirica*, 22, p. 211-234.
- Knack S., Keefer P. (1997), "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *Quarterly Journal of Economics* 112(4) p. 1251-88
- La Porta R., Lopez-de-Silanes F., Shleifer A. (1999), "Corporate Ownership Around the World", *Journal of Finance*, 54(2), p. 471-517.
- La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R.W. (1997), "Legal Determinants of External Finance", *Journal of Finance*, Vol. 52(3), p. 1131-1150.

- Locke R. (1995), *Remaking the Italian Economy*. Cornell University Press.
- Loughran T., Ritter J. (1995), "The New Issues Puzzle," *Journal of Finance*, 50(1), p. 23-52.
- Margon D., Sembenelli A., Vannoni D. (1995), "Panel Ceris su dati d'impresa: aspetti metodologici e istruzioni per l'uso", CERIS *Working Paper Series*, n. 7.
- Mayer C.P. (1989), "Financial Systems, Corporate Finance, and Economic Development", in *Information, Capital Markets and Investment*, ed by G. Hubbard, University of Chicago, Press.
- Myers S.C., Majluf N.S. (1984), "Corporate Financing and Investment Decisions when Firms Have Information that Investors do not Have", *Journal of Financial Economics*, 13, p. 187-221.
- Oliner S., Rudebusch G., Sichel D. (1996), "The Lucas Critique Revisited: Assessing the Stability of Empirical Euler Equations for Investment," *Journal of Econometrics*, 70(1), 291-316.
- Pagano M., Panetta F., Zingales L. (1998), "Why do companies go public? An empirical analysis," *Journal of Finance* 53(1) p. 27-64.
- Piore M., Sabel C. (1984), *The Second Industrial Divide*, Basic Books, New York.
- Prodi R. (1991), "C'è un posto per l'Italia fra i due capitalismi?" *Il Mulino*, n. 337, Bologna.
- Putnam R. (1993), *Making Democracy Work: civic traditions in modern Italy*, Princeton University Press., Princeton.
- Scanagatta G. (1999), "Vincoli finanziari alla crescita delle imprese di piccola dimensione", in Traù F. (ed.), *La «questione dimensionale» nell'industria italiana*, Il Mulino, Bologna.
- Schiantarelli F. (1996), "Financial Constraints and Investments: Methodological Issues and International Evidence", *Oxford Review of Economic Policy* 12, p. 70-89.
- Schiantarelli F., Sembenelli A. (2000), "Form of Ownership and Financial Constraints: Panel Data Evidence From Leverage and Investment Equations", *Empirica*, forthcoming.
- Traù F. (1999) (ed.), *La «questione dimensionale» nell'industria italiana*, Il Mulino, Bologna.
- Vogt S.C. (1994), "The Cash Flow/Investment Relationship: Evidence from U.S. Manufacturing Firms," *Financial Management*, Summer, 3-20.
- Williamson O.E. (1975), *Markets and Hierarchies: Analysis and Antitrust Implication*, The Free Press, New York.

Figure 1

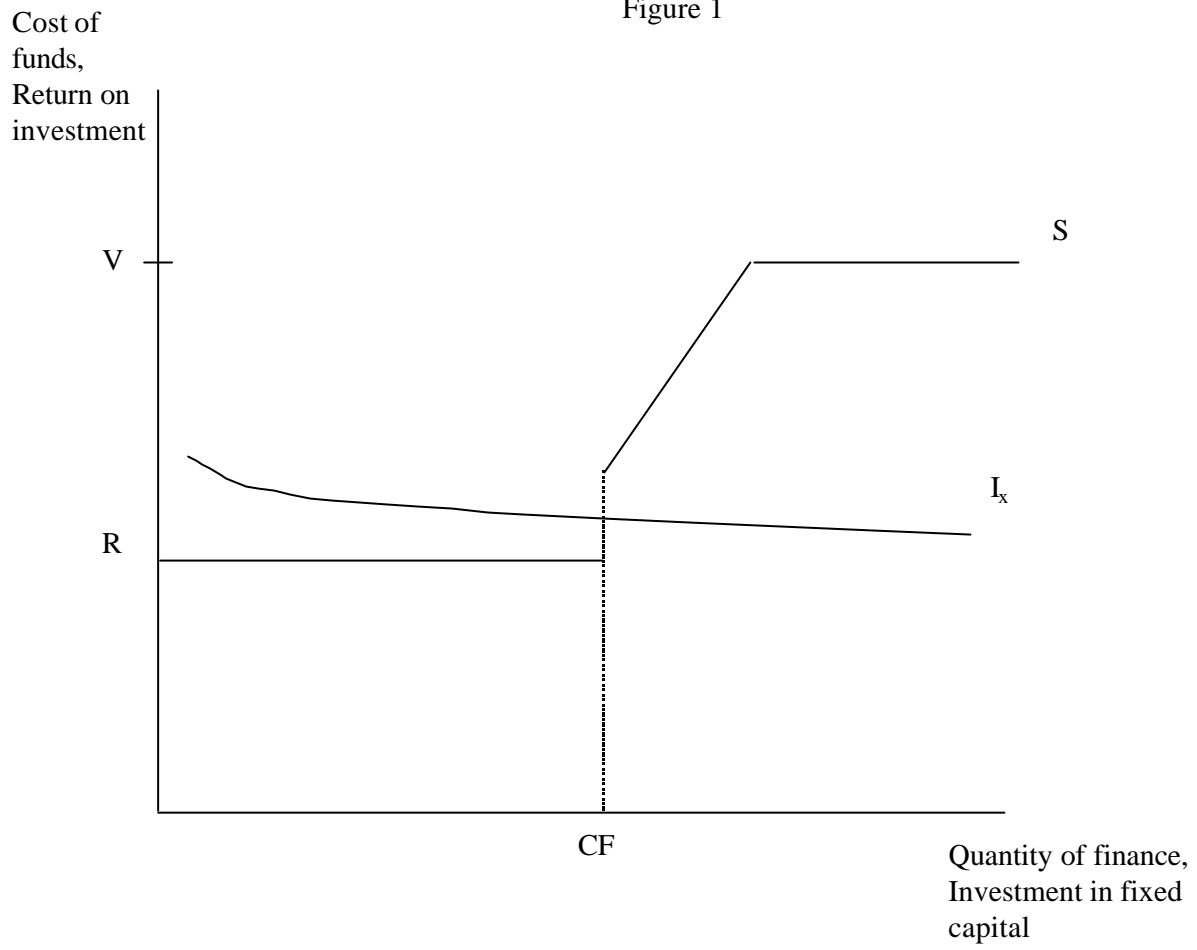


Table 1 - Sample Composition

Panel A: Number of Firms (Observations) in each sub-group									
<i>Young</i>					<i>Mature</i>				
409 (2261)					847 (5916)				
<i>Small</i>		<i>Large</i>			<i>Small</i>		<i>Large</i>		
127 (664)		282 (1597)			255 (1717)		592 (4199)		
<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>
57 (270)	70 (394)	94 (516)	188 (1081)	140 (943)	115 (774)	206 (1361)	386 (2838)		

Panel B: Sample Medians for Firms Categorized by Age and Size									
<i>Young</i>					<i>Mature</i>				
<i>Small</i>		<i>Large</i>			<i>Small</i>		<i>Large</i>		
Employees	256	545			237	521			
Age	5	5			25	31			
I/K	0.101	0.096			0.102	0.098			
Sales Growth	0.038	0.027			0.037	0.028			
CF/K	0.097	0.106			0.114	0.106			
Interest Expense / (interest expense + cf)	0.389	0.372			0.358	0.380			
Long Term Debt/ K	0.183	0.164			0.151	0.159			
Short Term Debt/ K	0.229	0.211			0.208	0.218			
Net Working Capital/ K	0.595	0.615			0.694	0.697			

Panel C: Sample Medians for Firms Categorized by Age, Size, and Group Status									
	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	<i>Nonaffiliated</i>	<i>Affiliated</i>	
Employees	190	288	424	611	228	250	364	679	
Age	5	5	5	4.82	30	22	29	33	
I/K	0.091	0.107	0.099	0.095	0.101	0.102	0.100	0.098	
Sales Growth	0.033	0.043	0.021	0.032	0.031	0.047	0.022	0.031	
CF/K	0.082	0.112	0.101	0.111	0.107	0.124	0.096	0.111	
Interest Expense / (interest expense + cf)	0.443	0.365	0.447	0.342	0.412	0.297	0.445	0.355	
Long Term Debt / K	0.187	0.178	0.203	0.146	0.181	0.108	0.188	0.143	
Short Term Debt / K	0.269	0.212	0.279	0.181	0.217	0.200	0.257	0.199	
Net Working Capital / K	0.582	0.600	0.653	0.589	0.663	0.742	0.662	0.723	

Table 2: Investment equations: 1104 firms
Young is <= 15 years old
 GMM estimates in first differences
 Dependent variable I_{it}/K_{it-1}

	<i>Young</i>	<i>Mature</i>
I_{it-1}/K_{it-2}	0.149 (1.838)	0.274 (5.525)
I_{it-2}/K_{it-3}	0.031 (1.016)	0.069 (10.337)
Δy_{it}	0.121 (1.886)	-0.037 (-1.243)
Δy_{it-1}	0.034 (1.229)	0.043 (2.039)
Δy_{it-2}	0.052 (1.983)	0.020 (1.151)
CF_{it}/K_{it-1}	0.081 (1.294)	0.020 (0.561)
M_1		-5.938 [868]
M_2		1.416 [698]
w_1		470.9 [38]
Sargan (<i>p-value</i>)		221.1 [196] (0.105)

The instrument set includes the second and third lag of each independent variable, the capital stock, and the time dummies, interacted with an age dummy.

Legend:

One-step estimates. T-statistics in round brackets. All standard errors are robust to time series and cross-section heteroskedasticity.

M_1 = Test for first order correlation in the residuals (normal distribution).

M_2 = Test for second order correlation in the residuals (normal distribution).

w_1 = Wald Test of joint significance of coefficients (χ^2 distribution).

Sargan = Sargan test of the correlation of the instruments with the error term (χ^2 distribution).

Degrees of freedom in square brackets.

Table 3: Investment equations: 1104 firms
Young is ≤ 15 years old
S = Small L = Large (real sales split)
 GMM estimates in first differences
 Dependent variable I_{it}/K_{it-1}

	<i>Young</i>	<i>Mature</i>
I_{it-1}/K_{it-2}	0.142 (1.846)	0.264 (4.947)
I_{it-2}/K_{it-3}	0.029 (0.964)	0.063 (5.422)
Δy_{it}	0.110 (2.025)	-0.047 (-1.637)
Δy_{it-1}	0.034 (1.242)	0.037 (1.857)
Δy_{it-2}	0.051 (2.000)	0.016 (0.955)
$CF_{it}/K_{it-1} \cdot S_i$	0.130 (1.856)	0.126 (1.718)
$CF_{it}/K_{it-1} \cdot L_i$	0.008 (0.199)	0.028 (0.938)
M_1	-6.086 [868]	
M_2	1.296 [698]	
w_1	402.7 [40]	
Sargan (<i>p-value</i>)	277.1 [246] (0.084)	

The instrument set includes the second and third lag of each independent variable, the capital stock, and the time dummies interacted with an age dummy, and for cash flow, a size dummy as well.

Legend:

One-step estimates. T-statistics in round brackets. All standard errors are robust to time series and cross-section heteroskedasticity.

M_1 = Test for first order correlation in the residuals (normal distribution).

M_2 = Test for second order correlation in the residuals (normal distribution).

w_1 = Wald Test of joint significance of coefficients (χ^2 distribution).

Sargan = Sargan test of the correlation of the instruments with the error term (χ^2 distribution).

Degrees of freedom in square brackets.

Table 4: Investment equations: 1104 firms
Young is <= 15 years old
NA = Not Affiliated A = Affiliated to groups
GMM estimates in first differences
Dependent variable I_{it}/K_{it-1}

	<i>Young</i>	<i>Mature</i>
I_{it-1}/K_{it-2}	0.152 (1.881)	0.262 (4.718)
I_{it-2}/K_{it-3}	0.034 (1.168)	0.064 (5.171)
Δy_{it}	0.130 (2.231)	-0.045 (-1.521)
Δy_{it-1}	0.028 (1.079)	0.034 (1.757)
Δy_{it-2}	0.041 (1.491)	0.015 (0.903)
$CF_{it}/K_{it-1} \cdot NA_i$	0.285 (2.280)	0.229 (2.829)
$CF_{it}/K_{it-1} \cdot A_i$	0.022 (0.616)	0.018 (0.586)
M_1		-6.237 [868]
M_2		1.220 [698]
w_1		369.4 [40]
Sargan (<i>p-value</i>)		252.8 [246] (0.370)

The instrument set includes the second and third lag of each independent variable, the capital stock, and the time dummies interacted with an age dummy, and for cash flow, an affiliation dummy as well.

Legend:

One-step estimates. T-statistics in round brackets. All standard errors are robust to time series and cross-section heteroskedasticity.

M_1 = Test for first order correlation in the residuals (normal distribution).

M_2 = Test for second order correlation in the residuals (normal distribution).

w_1 = Wald Test of joint significance of coefficients (χ^2 distribution).

Sargan = Sargan test of the correlation of the instruments with the error term (χ^2 distribution).

Degrees of freedom in square brackets.

Table 5: Investment equations: 1104 firms
Young is ≤ 15 years old
S = Small L = Large (real sales split)
NA = Not Affiliated A = Affiliated to groups
 GMM estimates in first differences
 Dependent variable I_{it}/K_{it-1}

	<i>Young</i>	<i>Mature</i>
I_{it-1}/K_{it-2}	0.139 (1.817)	0.266 (5.013)
I_{it-2}/K_{it-3}	0.027 (0.900)	0.064 (5.477)
Δy_{it}	0.088 (1.694)	-0.055 (-1.665)
Δy_{it-1}	0.025 (0.908)	0.034 (1.599)
Δy_{it-2}	0.045 (1.723)	0.015 (0.877)
$CF_{it}/K_{it-1} \cdot S_i NA_i$	0.473 (1.893)	0.130 (1.272)
$CF_{it}/K_{it-1} \cdot S_i A_i$	0.113 (1.434)	0.146 (1.227)
$CF_{it}/K_{it-1} \cdot L_i NA_i$	0.367 (1.777)	0.168 (0.708)
$CF_{it}/K_{it-1} \cdot L_i A_i$	-0.035 (-0.692)	0.015 (0.362)
M_1		-6.114 [868]
M_2		1.392 [698]
w_1		410.6 [44]
Sargan (<i>p-value</i>)		253.4 [242] (0.294)

The instrument set includes the second and third lag of each independent variable, the capital stock, and the time dummies interacted with an age dummy, and for cash flow, a size dummy as well.

Legend:

One-step estimates. T-statistics in round brackets. All standard errors are robust to time series and cross-section heteroskedasticity.

M_1 = Test for first order correlation in the residuals (normal distribution).

M_2 = Test for second order correlation in the residuals (normal distribution).

w_1 = Wald Test of joint significance of coefficients (χ^2 distribution).

Sargan = Sargan test of the correlation of the instruments with the error term (χ^2 distribution).

Degrees of freedom in square brackets.

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