

Capital Structure Decisions During a Firm's Life Cycle

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Abstract The study reported here examines the financing choices of small and medium-sized firms, i.e., those most vulnerable to information and incentive problems, through the lens of the business life cycle. We argue that the controversy in the empirical literature regarding the determinants of capital structure decisions is based on a failure to take into account the different degrees of information opacity, and, consequently, firms' characteristics and needs at specific stages of their life cycles. The results show that, in a bank-oriented country, firms tend to adopt specific financing strategies and a different hierarchy of financial decision-making as they progress through the phases of their business life cycle. Contrary to conventional wisdom, debt is shown to be fundamental to business activities in the early stages, representing the first choice. By contrast, in the maturity stage, firms re-balance their capital structure, gradually substituting debt for internal capital, and for firms that have consolidated their business, the pecking-order theory shows a high degree of application. This financial life-cycle pattern seems to be homogeneous for different industries and consistent over time.

Keywords Capital structure · Financial growth cycle · Financing decisions · Small and medium-sized firms · Source of finance

JEL Classifications G30 · G32

1 Introduction

An analysis of the international literature on capital structure, as one of the main elements in determining value, shows that a principal research priority is the attempt to apply capital structure theory to small firms (Berger and Udell 1998; Michaelas et al. 1999; Romano et al. 2001; Gregory et al. 2005).¹ Small and medium-sized firms play an essential role in the European economy. They account for more than 95% of the total number of operating firms and for around two-thirds of jobs and half of the turnover in the non-agricultural business sector (European Commission and Eurostat 2001). Given their economic relevance, the role of small and medium-sized firms and their ability to grow and be successful are essential for economic development. The ability of firms to grow

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¹ Zingales (2000) also has emphasized the fact that "...the attention shown towards large firms tends partially to obscure (and often ignore) firms (of small and medium size) that do not have access to the (public) financial markets...".

is important because it has been suggested that firms with low or negative growth rates are more likely to fail (Phillips and Kirchhoff 1989). Due to the prominent role of such firms in the economy, the source of finance to support their business is a crucial question. In particular, Storey (1994) suggests that firm growth is affected by the availability and cost of funding. The availability of finance for investment is vital to the sustainability and viability of small and medium-sized firms. Their growth, considering both start-up and existing companies, significantly depends on access to external finance. Small businesses are likely to suffer most from information and incentive problems and thus are particularly constrained in their capacity to obtain external finances (Berger and Udell 1998). Carpenter and Petersen (2002) show empirically that the growth of small firms is constrained by the source of finance. Therefore, much of the attention surrounding the growth of small and medium-sized firms is affected by capital structure decisions (Gregory et al. 2005).

Among the several aspects that distinguish small from large companies,² one of the most important is *informational opacity* (Berger and Udell 1998). This informational opacity, in the form of costly verification, adverse selection, and moral hazard, typically affects the financial policy of small firms, specifically in terms of debt and external equity sources.³ Costly verification and adverse selection problems tend to favor debt contracts, whereas moral hazard problems tend to favor external equity contracts (Berger and Udell 1998). The lack of external finance and, in particular of debt or equity, may reflect an entrepreneurial choice, but it can also be due to inefficient local financial institutions. Specifically, the effects of financial institutions on the various types of external finance differ so that the relative amount of debt may

depend strictly on the abilities of these institutions to solve information problems, e.g., by engaging in screening, contracting, and monitoring activities (Beck et al. 2002).⁴

In one of the most interesting studies on the capital structure of small business, Berger and Udell (1998) asserted that general financial theory is not applicable to all businesses. Instead, the particular phase of a business's *life cycle* determines the nature of its financial needs, the availability of financial resources, and the related cost of capital. This approach supports financial behaviors that are life-cycle-specific. As argued by Kaplan and Stromberg (2003), the changing degree of informational opacity that a firm faces drives its financial life cycle. From its inception to maturity, the financial needs of a firm change according to its ability to generate cash, its growth opportunities, and the risk in realizing them. This will be reflected by evolving financing preferences and the nature of the specific financial choices that a firm makes during its life cycle. As a consequence, firms at the earlier stages of their life cycles, which arguably tend to have larger levels of asymmetric information, more growth opportunities, and reduced size, should have specific capital structure drivers and should apply specific financing strategies as they advance through the different phases of their life cycles.

Despite recent attention to this topic, data on the financing structure of firms during the course of their life cycles is rather limited, and results are inconclusive (Gregory et al. 2005). Thus, we still need to extend our understanding of firms' financial choices in this area, verifying, in particular, the existence of a *pro-tempore* optimal capital structure and the drivers that are potentially relevant to explain capital structure decisions as the firms progress along the different phases of their life cycle.⁵ In some contexts, equity (specifically, venture capital) has been shown to play a role in the early stages, while debt becomes relevant only in the late stages. In other contexts, the support of a financial intermediary (bank) is fundamental in

² Large firms use a variety of financing instruments, both public and private, while small firms typically use bank loans and private equity, mainly based on the financial support of the entrepreneur and his or her family. Moreover, small businesses do not issue securities that are priced in public markets.

³ According to Berger and Udell (1998), the opportunities to invest in positive net present value projects may be blocked if potential providers of external finance cannot readily verify that the firm has access to a quality project (adverse selection problem), ensure that the funds will not be diverted to an alternative project (moral hazard problem), or costlessly monitor use of the revenue by the firm they invest in (costly state verification).

⁴ Beck et al. (2002) showed that small firms are the most credit-constrained by underdeveloped institutions.

⁵ Moreover, this topic is also of particular interest in the valuation of the firm, considering that capital structure decisions, which differ throughout the stages of the life cycle of the firm, directly affect the opportunity cost of capital and the market value of the firm.

the early stages, whereas the capital structure is rebalanced in later stages. There is common consensus regarding the importance of the institutional environment in which a small firm is based (Beck et al. 2002, 2005). To operate in the USA or in Italy, small businesses must have access to a different variety of financial solutions in order to sustain their business in the light of asymmetric information. Thus, the financing preferences of these firms are complex, and the appropriateness of the available options deserves further research.

The study reported here contributes to this area of research in that it seeks to verify whether the life cycle is a relevant factor in a firm's financing behavior. Empirical analysis is used to evaluate the role of the life cycle and the differences in the determinants of the debt/equity ratio throughout the life cycles of Italian small businesses. Specifically, the following questions are addressed: Do Italian firms have different financial structures during different stages of their life cycles? How do Italian capital structure determinants change in the course of a firm's life cycle?

The paper is structured as follows. The first part examines the strategic financing choices of firms through a formal research hypothesis. In the second part, the sample is introduced, the variables and the model are applied, and the results are shown. The third part presents the conclusions and a discussion of the implications for management and for future research.

2 Capital structure and financial life cycle

The concept that firms evolve through a financial life cycle is well established in the literature. There is, however, disagreement regarding sequential financing choices and the debt/equity ratio. Moreover, the life-cycle paradigm does not fit all small businesses (Berger and Udell 1998), and differences exist not only in terms of management determination but also in terms of different *industry affiliations* and *institutional environments* in which firms operate (Harris and Raviv 1991; Beck et al. 2002; Rajan and Zingales 2004; Utrero-González 2007). In their review of the capital structure literature, Harris and Raviv (1991) note that it is generally accepted that firms in a given *industry* will have similar leverage ratios, which are relatively stable over time, while leverage ratios vary

across industries. Specifically, the industry is a significant determinant of leverage, which alone has been found to explain up to 25% of within-country leverage variation (Bradley et al. 1984). Moreover, the *institutional environment* also has a crucial influence on capital structure decisions, as recently documented by Titman et al. (2003) for large companies, and by Gaud et al. (2005) for small firms. More than the type of financial system (market-based or bank-based), it is the efficiency of the financial system (Rajan and Zingales 1995; Wald 1999; Booth et al. 2001) and of the general institutional context (Petersen and Rajan 1994, 1995; Berger and Udell 1995) that determines the financial growth of firms affecting capital structure decisions. Therefore, hypotheses on capital structure determinants must take industry affiliation and the institutional environment into account. This is very much the case for firms that are particularly opaque and affected by asymmetric information.

2.1 Financial life cycle: theory and hypothesis

Several hypotheses, as synthesized in Table 1, can be proposed for the consideration of the life cycle in explaining firms' financing behavior.

The use of internal resources as a substitute for external finance must be acknowledged, as in the pecking-order theory, because these reflect the severity of asymmetric information problems. Accordingly, in this study, Hypothesis 1 deals with the role of profitability and the preferences regarding internal resources versus debt. Hypotheses 2 and 3, each of which is further divided into two formulations, address the different theoretical financial preferences during the life cycle of a firm. Hypothesis 2a attempts to describe the financial life cycle with respect to the age of a firm, while Hypothesis 3a is the reverse formulation. Hypothesis 2b attempts to describe the financial life cycle with respect to the role of a firm's reputation, while Hypothesis 3b is the reverse formulation. Finally, due to the fact that the previously mentioned effects can be heterogeneous for different industries and for firms operating in different institutional contexts, we explicitly take industry affiliation and the context of analysis into account.

Hypothesis 1: pecking-order theory The main approach to interpreting capital structure choices

Table 1 Main hypotheses

Hypothesis	Description of the hypothesis
H1 (pecking-order theory): Myers (1984), Holmes and Kent (1991), Chittenden et al. (1996), Michaelas et al. (1999)	Financial managerial preferences depend on the costs of information asymmetries and of transaction costs, pushing for the utilization of retained earnings as a first choice, followed by debt, and then by equity. The level of debt in a firm's capital structure is adjusted in response to the differences in sensitivity to financial needs of the firm over its life cycle. More profitable firms will retain earnings and become less leveraged
H2a (financial life cycle): Fluck (2000), Kaplan and Stromberg (2003), Carey et al. (1993), Helwege and Liang (1996)	A life-cycle pattern of firm financing assumes that small firms, which are particularly sensitive to asymmetric information problems, will use outside equity first (such as venture capital finance) and retained earnings, issuing debt as the last step to satisfy their subsequent financing needs
H2b (reputational effect): Fluck et al. (1998), Diamond (1989)	Young firms, without past experience and a track record, have a low debt capacity. A reputation argument supports the convenient use of debt only in the maturity stage
H3a (reverse financial life cycle): Petersen and Rajan (1994), Hamilton and Fox (1998)	Young firms rely on the closest sources of financing, i.e., family capital and bank capital based on family pledges. Firms rebalance their capital structure at the maturity stage. As the firm matures, internal self-generated financial resources substitute debt and the fraction of borrowing declines
H3b (reputational searching effect): Diamond (1991)	Young firms seek to obtain certification of their quality and acquire credibility in the product market by submitting themselves to monitoring by banks. At the maturity stage, monitoring becomes secondary; as the track record signals both quality and reliability, the debt level declines

from the asymmetric information point of view is the pecking-order hypothesis (Myers 1984), which suggests that firms finance their needs in a hierarchical fashion. Myers (1984) and Myers and Majluf (1984) have pointed out the role of managerial preferences in the choice of financing resources. These choices are made by considering the relative costs of the various sources of finance due to information asymmetries and transaction costs. The pecking-order theory proposes that firms prefer to use internal sources of capital, relying on external sources only when the internal ones are exhausted. As a result, firms prefer to use less information-sensitive securities, with retained earnings being the most preferred financing source, followed by debt, and then equity capital.⁶ This implies that more-profitable firms will retain earnings and become less leveraged, while less-profitable firms will become more leveraged, thus demonstrating an inverse relation between

profitability and financial leverage. The pecking-order theory seems particularly relevant for small and medium-sized firms due to their typical features and limited access to external finance (Holmes and Kent 1991). In particular, the pecking-order hypothesis provides an instrumental tool for the analysis of the strategic financing problem of firms along the life cycle (Rocha Teixeira and dos Santos 2005). It states that no optimal level of debt becomes “objectively” evident; rather, it becomes apparent as a firm's situation changes over time. Thus, the proportion of debt in a firm's capital structure is adjusted in response to the impending financial needs of the firm over its life cycle. Empirical evidence from previous studies that have examined small and medium-sized firms (Chittenden et al. 1996; Michaelas et al. 1999) was consistent with the pecking-order argument, since leverage was found to be negatively related to profitability. Therefore, the empirical model employed here included profitability, defined as earnings before interest, taxes, depreciation, and amortization (Ebitda) to capital (Michaelas et al. 1999; Fama and French 2002; Sogorb-Mira 2005).

⁶ Pinegar and Wilbricht (1989), in their survey, observed that external debt is strongly preferred over external equity as an approach for raising funds.

Hypothesis 2a: financial life cycle For start-ups, which are “the most informationally opaque” type of business, it is difficult to obtain external funding (Berger and Udell 1998). Information opacity prevents investors in small firms from distinguishing between high-quality and low-quality companies. Consequently, Berger and Udell (1998) argued that debt, due to the higher interest rate applied by lenders to hedge against the higher default probability, is costly for young firms. Due to asymmetric information, young, informationally opaque firms are less leveraged. This phenomenon can inhibit small firms from using external funding at all (Weinberg 1994), in addition to the fact that cash-flows are needed to service interest payments, and small and young businesses are typically not able to generate positive cash-flows in the early stages. Consequently, according to Fluck (2000) and to the empirical results of Carey et al. (1993) and Helwege and Liang (1996), young firms are financed mainly by insiders, business angels, and venture capital. Equity as a source of funds allows the soundness of an investment to be monitored, while “patient” capital can wait for long-term economic returns on investments and thereby meet the long-term financial needs of a young firm. Especially given an imperfect market, the venture capitalist professionally supports a young firm with his or her financial resources and skills (Kaplan and Stromberg 2003). In this context, Carey et al. (1993) and Helwege and Liang (1996) showed that small entrepreneurial firms frequently issue outside equity before they issue debt. Bank debt is typically more readily available after a firm has achieved significant tangible assets that might be collateralized. The use of debt increases over time and becomes particularly important in the maturity stage of a business (Berger and Udell 1998). As a firm goes through its life cycle, becoming mature and less informationally opaque, its financing choices change, including better access to the debt market (Chittenden et al. 1996). Therefore, leverage increases with age, as young firms are financially constrained while old firms have convenient access to external finance. Therefore, this life-cycle pattern of firm financing assumes that small firms will use outside equity first (such as venture capital finance) and retained earnings, issuing debt at last to satisfy their subsequent financing needs. This approach contrasts with that described in the pecking-order

model mainly with respect to the financing choices of start-up firms.

Hypothesis 2b: reputational effect A reputation argument also supports the convenient use of debt only in the maturity stage. Young firms, without past experience and a track record, have a low debt capacity. Vice versa, firms that have consolidated their business, with a past history, past profitability, track record, and credibility and reliability in the product market, are not constrained in the credit market and can obtain finance under good economic terms. These firms can have developed a positive reputation to be spent on the financial market (Diamond 1989). Therefore, early in the life cycle, small businesses have little repayment history or record of profitability upon which external suppliers of funds can rely. For such firms, internal resources (from entrepreneurs or their families) are fundamental, and when these are exhausted, venture capital becomes the primary choice. After a period of sufficient profits as well as of reliability and credibility in the market, firms can gain a positive reputation and are thus able to readily obtain the required financing, including debt (Hirshleifer and Thakor 1992). As the firm matures, outside stakeholders can examine the firm's track record and its creditworthiness over time. A firm's reputation can mitigate the problem of asymmetric information and improve its access to external sources of funding, such as trade credit and bank debt (Diamond 1989). Thus, gaining a reputation in the market over time and reducing moral hazard problems provide older firms with better conditions for using debt as a source of finance. As stated by Diamond (1989), older firms will be able to increase their use of debt. Empirically, Fluck et al. (1998) find that the proportion of funds from insiders increases during the early stages of a firm's life cycle, while the proportion of outsider finance declines. However, at some point this relationship reverses. They interpret this result as a consequence of the development of a positive reputation in credit markets that allows the firm to obtain cheaper sources of external financing.

Hypothesis 3a: reverse financial life cycle Entrepreneurs' financial resources and those of their families are, by definition, limited. Thus, for a young firm, insider financial resources are usually not sufficient to allow start-up and growth. The role of

debt funds in providing the needed financial support beginning at the start-up phase and continuing thereafter can be explained by the entrepreneur's aim to sustain growth and retain control of the business (Hamilton and Fox 1998).⁷ Berger and Udell (1998) observed that young firms may be heavily financed by external debt from financial institutions because this funding is not entirely external.⁸ When loaning money to small businesses, most financial institutions require that the owners personally guarantee the loan. These guarantees provide the institution with legal recourse to the personal wealth of the small-business owner in the event of default. Similarly, Petersen and Rajan (1994) found that young firms (less than 2 years old) rely most heavily on loans from the owner and his or her family and then on bank loans. Moreover, in the initial years of the business, the largest incremental source of funds is from banks, with the dependence on personal funds gradually decreasing. As the firm grows, a devoted entrepreneur will remain inclined to re-inject self-generated financial resources into the firm. These funds provide further capital and, consequently, the fraction of borrowing from banks declines as the firm matures. Therefore, firms rebalance their capital structure at the maturity stage. Empirically, Robb (2002) reports, in contrast to Fluck et al. (1998), that younger firms use relatively more debt than older firms. Moreover, according to Petersen and Rajan (1994), leverage decreases with the age of the firm, as young firms are externally financed while mature ones mainly use retained earnings and equity. These authors suggest that firms follow a "pecking order" of borrowing over time, starting with the closest sources, i.e., family capital and bank capital based on family pledges, and then progressing to more external sources.

⁷ Furthermore, since small businesses are usually owner-managed, the owner/managers often have strong incentives to issue external debt rather than external equity in order to retain ownership and control of their firms (Berger and Udell 1998); indeed, venture capitalists seek to take part in corporate decisions.

⁸ The availability of external finance to small business is likely to be highly dependent upon the institutional environment (Demirgüç-Kunt and Maksimovic 1996). An information-poor environment, characterized by a weak system of investor protection and poorly developed mechanisms for information sharing, will lack venture-capital markets and has only a limited ability to sustain small business without collaterals.

Hypothesis 3b: certification hypothesis Young firms seek to obtain certification of their quality by submitting themselves to monitoring by banks. This action supports the credibility and the quality of the business with regard to other stakeholders. Thus, in the initial stage of its life cycle, a firm will allow itself to be monitored by a bank in order to overcome the handicap of its lack of reputation, credibility, and reliability, as well as its difficulties in acquiring customers and interacting with stakeholders (Diamond 1989, 1991). This reputation-based capital can be used to reinforce the quality perception of the business by other stakeholders in the product market (Berger and Udell 1998). Vice versa, monitoring becomes of secondary importance in the maturity stage, when the firm grows to the point that it becomes self-sufficient in providing signals on its quality and reliability, based on its cumulative history. Therefore, according to Diamond (1991), the role of the growth cycle in the use of debt is linked to a firm's ability to gain a reputation in the market. In this regard, monitoring is important for reducing information asymmetries and screening moral hazard problems. Young firms lack credibility and thus a positive reputation that is advantageous when interacting with stakeholders (customers, suppliers, employees, etc.). For this reason, financial intermediaries play a critical role in private markets as producers of information on the borrower. They can assess small-business quality and address information problems, through the activities of screening, contracting, and monitoring, before granting credit. Intermediaries screen potential customers (firms) by conducting due diligence control, including collecting information about the business, the market in which it operates, any collateral that may be pledged, and the entrepreneur or start-up team. Diamond (1991) argued that the lack of a track record and of creditworthiness can be balanced by the firm through its decision to submit itself to bank monitoring, which can confirm the quality of the business and support its competitiveness. Monitoring of private information is more efficiently delegated to a financial intermediary rather than to numerous equity investors (Diamond 1984).⁹

⁹ In a second scenario, Diamond (1989) observed that the institutional environment, in which incentive and informational problems can be more or less severe, influences the use of debt funds; if moral hazard is sufficiently widespread, then firms will build their reputation by being monitored by a financial intermediary.

To sum-up, Hypothesis 1 suggests the existence of an order of preferences in the financing choices of small and medium-sized firms that face asymmetric information problems. The financial growth cycle suggests the possible existence of a different order of preferences regarding the use of debt along the life cycle of the firm. According to Hypotheses 2a and 2b, in the absence of family financial resources, early-stage firms start by using equity sources of finance and then rebalance their capital structure in later years using debt. Conversely, according to Hypotheses 3a and 3b, in the absence of family financial resources, firms start by using debt as the source of finance and rebalance their capital structure in later years, reducing the use of debt. In general, financial preferences along a firm's life cycle can be heterogeneous according to industry affiliation and vary according to the institutional environment. Thus, our analysis has to control for these factors.

2.2 Role of industry affiliation and institutional context

Industry affiliation may have a relevant influence upon financing choices (Lopez-Garcia and Aybar-Arias 2000). Firms within a particular industry, facing similar prevailing circumstances, tend to adopt an analogous financing pattern (Cassar and Holmes 2003). A review of the literature (Harris and Raviv 1991) suggested a strong relationship between industry classification and average firm leverage ratio, highlighting the existence of differences across industries but consistency within them. Hall et al. (2000) point out that agency costs may also vary across industries and lead to inter-industry differences in financial structure. In general, the life cycle of the firm is affected by the kind of industry a firm operates in. The effect of industry affiliation on the life cycle was suggested as early as 1981 by Weston and Brigham. They claimed that the life cycle differs between high-growth and low-growth industries, or between emerging and traditional industries. Industry-specific features affect the role of tangible asset, business risk, and growth opportunity, thereby influencing their debt ratios. For example, firms operating in high-growth industries carry less leverage because they have stronger incentives to signal that they do not engage in adverse selection and moral hazard costs in the form of underinvestment and asset

substitution. By contrast, firms operating in low-growth industries should use debt because of its disciplinary function in avoiding the misuse of free cash flows. However, small and medium-sized firms in high-growth industries have, as stated by Michaelas et al. (1999), a greater demand for funds and, *ceteris paribus*, a greater preference for external financing through debt. Young firms, and especially those operating in fast-growing sectors, tend to have greater external financing requirements than firms in low-growth sectors. Empirical findings provide strong support for the hypothesis that industry has an influence on the capital structure of small and medium-sized firms. Hall et al. (2000) and Michaelas et al. (1999), for UK small and medium-sized firms, Lopez-Garcia and Aybar-Arias (2000), for Spanish small and medium-sized firms, and Van der Wijst and Thurik (1993), for West German small and medium-sized firms, observed that leverage ratios vary across industries. Therefore, the role of industry affiliation seems to be relevant, but the effect on capital structure of small and medium-sized firms needs to be controlled for.

Previous studies have also highlighted the existence of systematic differences in the capital structure claims issued by companies operating in different institutional contexts (Rajan and Zingales 1995; Chittenden et al. 1996; Demirgüç-Kunt and Maksimovic 1998; Hall et al. 2004; Lopez-Iturriaga and Rodriguez-Sanz 2008; Utrero-González 2007). The efficiency of the institutional context can reduce problems of opportunism and asymmetric information, with significant effect on the relative magnitude of the costs and benefits associated to debt. The most prevalent research has examined companies that face a wide range of institutional environments and has been based on cross-country studies (Chittenden et al. 1996; Levine 1997; Booth et al. 2001; Titman et al. 2003; Hall et al. 2004). However, recent literature has focused on differences in institutional setting at the local level (Guiso et al. 2004). In a single country, institutional differences can exist at a local level, playing a crucial role in determining corporate financial decisions. Petersen and Rajan (2002) documented the importance of distance in the provision of bank credit to small firms, especially in a country in which problems of asymmetric information are substantial. This argument is close to contemporary debates appearing in *Economic Geography*, a journal

interested in understanding firm financing across different regional contexts (Martin 1999; Pollard 2003), and in *Regional Economics* (Dow and Montagnoli 2007). Specifically, research into the relationship between law and finance (La Porta et al. 1999) takes into account the role of institutional factors, such as the efficiency of financial and enforcement systems. According to Titman et al. (2003) a principal source of the wedge influencing capital structure choices may be asymmetric information and the cost of contracting between companies and potential providers of external financing. This wedge is particularly large in the presence of a poorly developed financial system.¹⁰ A well-developed financial system can facilitate the ability of a company to gain access to external financing, providing cheaper financing to worthy companies (Guiso et al. 2004). Moreover, differences in financial development also reflect differences in credit protection (Cheng and Shiu 2007).¹¹ Due to the risk of default and the difficulty in getting back the liquidation value of the collateral, judicial enforcement affects the ex-ante availability of agents to provide finance. Although the legal system applies all over a country, court efficiency does not function equally between one area and another. Therefore, among different geographical areas, more developed and efficient local institutions should allow for a higher use of debt.

The influence of local institutional factors on capital structure decisions is particularly relevant for small and medium-size firms. These firms face different menus of choices, opportunities, and constraints according to the geographical context in which they are based (Pollard 2003). While large companies that can operate multinationally are affected by country-scale institutional factors, smaller companies are influenced, on the other hand, by local

institutional factors that still seem to be important despite the international phenomenon of market integration (Guiso et al. 2004).

3 Italy as context of analysis

Any research into the Italian economy must take into account the distinctive features of the Italian industrial and financial structure. In Italy, there is a high concentration of small and opaque firms well-suited for testing theories on asymmetric information. While the proliferation of small-scale enterprises has often been pointed to as one of the reasons for Italy's economic success, the limited types of external funds available to Italian companies make them prone to financing constraints. Small Italian firms are financially vulnerable because of their dependency on financial institutions for external funding. In Italy, as in other bank-based countries, financial institutions have a significant impact on the supply of credit available to small businesses to support their growth.

Capital markets in Italy are relatively undeveloped compared not only to those in the USA but also, to some extent, to those of other large European countries. Although Italy has a bank-oriented financial system, the Italian banking system, until very recently, was not allowed to hold equity in companies and was mostly state-owned and heavily regulated, which limited its effectiveness. Very few companies in Italy have publicly traded corporate debt. Bank debt is by far the most important source of outside funds for Italian firms, and bank loans are the largest net source of external financing. Due to the lack of transparency regulations and high information asymmetries, contract costs between borrowers and lenders are high. Non-bank sources of debt, other than trade credit, are few. In relationship-based lending, such as often occurs in Italy, banks acquire information over time through contact with the firm, its owner, and its local community, and they use this information to decide on the availability and terms of credit to grant to the firm.

The institutional framework of the Italian financial system, has, for a long time, been marked by a very restrictive regime in terms of the geographical mobility of banks (Alessandrini and Zazzaro 1999). Their operative sphere and the structure of Italian industry, which is largely based on networks of small

¹⁰ It appears that firms can raise finance more easily as the financial system develops because physical collateral becomes less important, while intangible assets and future cash flows can be financed. As the financial system develops, it should be possible to easily appreciate the soundness of the firm's projects and of its managerial behaviors (Rajan and Zingales 1995).

¹¹ Judicial enforcement is important because the financial system and the regulations governing it work in the interests of investors, protecting creditors only to the extent that the rules are actually enforced.

and medium-sized firms, have made the local bank a primary actor in the development of local economies (Banca d'Italia 2008). A significant disparity exists among different macro-areas in the country. In particular, the South of Italy is characterized by underdevelopment and inefficiency in the financial system as well as in the enforcement system. In this case, a poor institutional environment is provided, especially for small and medium-sized firms.

By taking these financial and industrial features of Italy into account, the role of the institutional context in affecting financing decisions for small and medium-sized firms is evident. In the light of these arguments, Italy represents an interesting case study. It has a financial system that is highly integrated with international financial markets. However, the level of efficiency of the financial system is different from one region to another (Guiso et al. 2004). Moreover, although Italy has a perfectly integrated market from a legal and regulatory point of view, and the same laws apply throughout the country, the enforcement system differs at local levels (Bianco et al. 2005). Furthermore, Italy is appropriate for this kind of study because its economy is dominated by small and medium-size firms that do not have the opportunity to overcome local constraints by expanding nationally or internationally. Thus, Italy provides an ideal laboratory for testing the effect of institutional factors on capital structure.

4 Methodology and data

4.1 Sample

Guiso (2003) highlighted the fact that Italy has many more small businesses than are found in countries at similar stages of development. Kumar et al. (1999) noted that the 3.2 million firms in Italy have an average of 4.4 employees, whereas the average firm size, measured by the number of employees, in Germany, France, and the UK is 10.3, 7.1, and 9.6, respectively. In Italy, firms with fewer than 100 employees account for close to 70% of total employment, while in Germany, France, and the UK such firms do not contribute more than 30% to overall employment.

As discussed above, small businesses strictly depend on external finance and, at the same time,

are vulnerable to asymmetric information problems. They can thus be constrained by leverage decisions. For this reason, capital structure is a topic relevant for small firms because it influences their growth patterns. In Italy, credit availability has a strong impact on the growth potential of small firms and on the creation of new ones (Guiso et al. 2004). Therefore, small and medium-sized Italian firms provide an interesting case study for analyzing the relationship between asymmetric information, growth cycle, and capital structure decisions. The sample employed in the study was stratified according to the definition of small and medium-sized firms defined by EU criteria and based on information obtained from the database. Data were obtained for firms with fewer than 250 employees and total sales of less than 40 mln €. Firms appear in the sample only if they meet the minimum size requirements equal to total sales of over 2 mln €. The AIDA (Analisi Informatizzata Delle Aziende) database, collected by Bureau Van Dijk, was used for selecting the companies comprising the study sample. A panel-data analysis was carried out to examine empirically the previously described hypotheses.¹² The panel sample comprised 10,242 Italian non-financial small and medium-sized firms not involved in a bankruptcy process. The period studied was from 1996 to 2005. The dataset was restricted to observations that embodied all essential variables for which a record of a period of at least 5 years was available. The number of firm-year observations was well balanced across the sample. All of the variables used in the study were based on book values.

4.2 Methodology and dependent variable

To understand corporate financing decisions concerning the capital structure of small firms, sensitivity to asymmetric information along the life cycle was verified. This was done with an empirical procedure that considered our research hypotheses. To account for information opacity across the different stages of the life cycle, we estimated the following general model:

¹² Several outliers were deleted from the dataset in order to reduce their impact on the results. All firm-year observations for which variables used in the estimation were below the 1st percentile or above the 99th percentile were deleted.

$$\text{Leverage} = f[\text{Age}, \text{Age}^2, \text{Profitability}, \text{Dummy South}, \text{Size}, \text{Tangibility}, \text{Ownership Structure}, \text{Growth Opportunities}, \text{Industry Dummies}, \text{Time Dummies}]$$

Empirically, we applied a least-squares dummy variable (LSDV) approach, as applied by Michaelas et al. (1999). Since the sample was quite large (69,694 observations), there were no problems concerning degrees of freedom in the application of a fixed-effects model estimated in the LSDV form. This approach introduces firm type (industry) and time-specific effects into the regression equations, which, in turn, reduce or avoid bias with respect to omitted variables. As a result, the firm type (industry) and the time-specific effects of both the omitted and included variables are captured (Showalter 1999). The econometric technique used in the model included the computation of heteroskedasticity-consistent standard errors. The dependent variable used as a proxy of capital structure was financial leverage. This was calculated as the ratio of financial (or interest-bearing) long-term and short-term debt (excluding trade debt) divided by the total financial debt plus equity (as in Rajan and Zingales 1995; Giannetti 2003; Titman et al. 2003).

The above-described model is intended to analyze capital structure decisions along the life cycle through the use of the variable *Age*. This variable was calculated as the natural logarithm of the number of years since the date of its foundation. This number was used to determine the phases of the firms during their life cycles, their development of a reputation, and the amount of available information on the firms and their quality.¹³ A positive (or negative) relationship between this variable and debt levels was expected according to Hypotheses 2a and 2b (3a and 3b). In addition, capital structure variation at specific threshold points, as argued by Berger and Udell (1998), was taken into account. Specifically, changes in capital

structure can be a non-linear function of a firm's age, as considered by Brewer et al. (1996). Thus, to account for non-linearity in the model, we included the squared term of the variable *Age* (named *Age*²).¹⁴

Although the use of the variable *Age* is commonly suggested in the literature (Diamond 1989; Petersen and Rajan 1994) and applied in empirical analysis (Brewer et al. 1996; Michaelas et al. 1999; Hall et al. 2004; Hyytinen and Pajarinen 2008) to investigate corporate financial decisions during the firm's life cycle, it can have some limitations. Whereas this variable offers data points for prospective lenders, reducing the information asymmetry problem, it could be a rough proxy for reputation. Indeed, each firm could also build or harm its reputation over time (it is possible in the upcoming years that the firm loses its reputation rather than building it up). Therefore, it is convenient to account for possible limitations in the use of the variable *Age* by providing a robustness check. Hence, to account for the possibility that older firms do not gain any positive reputation, we run the model also including the variable denoted "Credit Reliability", which is a credit-driven measure of firm's financial reliability. With the use of this variable in the model, it is possible to validate the insights provided by the variable *Age* and its effect on capital structure choices. In particular, the variable Credit Reliability refers to the Novscore indicator provided in the AIDA database by the private company Novcredit (www.novcredit.it). This indicator is created by applying almost the same methodology used by banks to appreciate the firms' financial worth; as such, it is supposed to capture the financial quality of the firms independently of its age. Specifically, Credit Reliability was created by considering the fundamentals of the firms and by observing more than 400,000 financial positions related to firm fairness in transactions and punctuality in payment with financial stakeholders.

The model also considers and controls explicitly for the possible existence of non-homogeneous

¹³ With regard to the variable *Age*, which was used to proxy reputation, we would like to comment that we followed what was indicated by Diamond (1989), who considers reputation to mean the good name a firm has built up over the years, and Petersen and Rajan (1994), who found that older firms, which ought to be of higher quality, have higher debt ratios. In particular, Diamond (1989) suggests that the "reputation of the enterprise" may be measured as a function of variables such as age and/or length of service.

¹⁴ In the empirical analysis, other functional forms were tested, but they did not add relevant significance to the model.

financial growth patterns in capital structure determinants. Regarding *industry affiliation*, as shown by Harris and Raviv (1991), the relevance of industry-specific features on capital structure decisions requires the inclusion of industry dummies in the model based, in our analysis, on the classification's first two-digits. However, considering that Cassar and Holmes (2003) indicate that the control of industry grouping in the regressions had limited effect on the inferences, although industry effects were generally found to be significant, it is useful to verify whether small and medium-sized firms may experience different financing life cycles, both within and across industries. Specifically, at the empirical level, to verify the existence of non-homogeneous effect among industries, the analysis compares the results considering sub-samples of firms operating in different industries. As industry controls, 12 industry groupings based on two-digit Ateco codes (Italian Standard Industrial Classification) were created: Food, Drink, and Tobacco Industry; Textile and Clothing Industry; Paper and Allied Products; Printing and Publishing; Chemical and Pharmaceutical; Manufacture of Non-Metallic Products; Manufacture of Metal Products; Mechanical, Electrics, and Electronics Production; Other Manufacturing Industry; Public Utilities (water, gas, electricity, and waste); Communication and Transportation; Construction.

Furthermore, the role of the *institutional context*, fundamental in the provision of funds to small and medium-sized firms, is considered in the model by taking into account the well-known differences in the South of Italy, which is characterized by a poorly developed and inefficient institutional context in comparison to that of other Italian macro-areas. Regions that are financially better developed can offer credit to firms at a reasonable price. By contrast, in the regions in the South of Italy with a low level of financial development and low protection from the courts, the large amount of asymmetric information makes it unlikely that a small firm will have access to reasonably priced external financing. For these reasons, the dummy South, a dummy equal to one for regions south of Rome, is expected to reflect the negative influence of a poor and inefficient institutional context on access to debt, particularly in the case of young firms which are typically in need of external finance.

Several other proxies that have been used mainly in the empirical literature were selected as explanatory variables. The variable *Size*, measured by the log of total assets, is included in the model (Michaelas et al. 1999; Sogorb-Mira 2005). Since large firms tend to have more easily collateralized assets and more stable cash flows, a company's size is inversely related to the probability of default, allowing it to carry more debt. Diamond (1991) also noted that large established firms have better reputations in debt markets, which allow them to carry more debt. In the model, we also considered the *Tangibility* of assets, measured as the ratio of property, plant, and equipment to total book assets, that can be used as collateral in the request for credit (Ang 1992; Van der Wijst and Thurik 1993). Similar to the issue of size, tangible assets or collateral, by conveying information to investors on the quality of a firm, reduce the degree of information asymmetry and opaqueness (Bonaccorsi di Patti and Dell'Ariccia 2004). *Growth Opportunities* is an important variable to account for (Titman and Wessels 1988; Michaelas et al. 1999; Sogorb-Mira 2005). We used as proxy the "industry weighted sales growth", defined as the industry-adjusted percentage change in sales from the previous to the current year. Specifically, we weighted the firm's sales growth with the sales growth experienced in the industry to control for sources of variance in the variable that are not company-specific. In particular, the industry sales growth, used as the denominator to weight the firm's sales growth, is calculated by comparing the sum of the sales of each firm in one industry with the sum of the sales registered in the previous year by firms in the same industry. Due to the fact that the governance of a firm, and thus its financial decision-making, is strictly influenced by the *Ownership Structure* (Jensen and Meckling 1976), our analysis contained a variable that addressed different levels of ownership control, with 0 defined as ownership concentration at less than 5%, and eight representing greater than 50% direct or indirect control of a firm.

4.3 Descriptive statistics

A preliminary study of our data sample is reported in Table 2, showing the main descriptive statistics for dependent and explanatory variables.

A brief review of the whole sample shows that the means and medians of several of the variables are asymmetrically distributed. However, since small and medium-sized firms typically comprise a heterogeneous group, this result was not unexpected. Only the variable *Size* was not asymmetrically distributed. Furthermore, financial debt relative to the capital of the mean firm was about 45%. A comparison of the mean value with the median value, and taking the standard deviation (about 31%) into account, showed that financial debt, as a source of finance, varied considerably across firms.

The results shown in Table 2 also suggest that the whole sample, with an average firm age of 22 years, showed a profitability of about 10%, albeit with a certain degree of heterogeneity (the standard deviation was 8.5%). On average, 22% of the firms' assets were tangible (at least half of the sample had a tangibility of about 19%). The average growth opportunities for firms in the sample, proxied by the industry-weighted sales growth, was about 31%. The ownership level of the small and medium-sized Italian firms in the sample was, on average, between 25 and 50%, although for at least half of the sample, the level was more than 50%.

To examine the effect of the institutional context, we sorted the sample between the South (9,586 firms, about 14% of the whole sample) and the other macro-areas of Italy. The last two columns in Table 2 highlight that firms located in the South of Italy are less leveraged and younger and have lower profitability and sales growth.

As shown in Table 3, we scrutinized the effect among 12 industries to investigate possible behavioral differences across industry lines.

Table 3 shows a prevalence of firms in the industries of Construction and Mechanical, Electrics, and Electronics (including instrument engineering and vehicles). Firms operating in the Public Utility industry are, on average, younger, and showed a lower use of debt. Firms operating in the Food, Drink, and Tobacco Industry, Textile and Clothing Industry, and Paper and Allied Products are, on average, older and showed a higher use of debt. There are firms in the Public Utility industry and in Communication and Transportation that have really high growth opportunities (compared to the industry mean).

The correlations between the dependent variable and independent variables are provided in Table 4.

The univariate relationships did not show any particular relevant correlation.

5 Empirical results

The determinants of capital structure for small and medium-sized firms in Italy are described here by exploring the relationship between capital structure and a set of explanatory variables across the life cycle of a firm. Column 1 of Table 5 presents the basic results of the LSDV analyses.¹⁵

When the whole sample is considered (Table, 5 column 1), in terms of the existence of a financial growth cycle, the variable *Age*, expressed in logarithmic form, and its squared term showed a significant nonlinear relationship with leverage. In the start-up and the growing stages, firms use debt as a critical financial resource to sustain their business. In the consolidation and maturity stages, debt still plays a central role, but to a slightly lesser extent.

As illustrated in Fig. 1, young firms showed the need of debt to support their business.

Especially in a country like Italy, where the private equity market is poor and the financial system is bank-based, the role of debt seems to be fundamental. After the early stage, as a firm starts to show increased profitability and a capacity to generate financial resources internally, it slowly rebalances its capital structure. Older firms, which have consolidated the business, finance their operations using accumulated internal resources, rebalancing their capital structure. Empirically, our results support the evidence of Robb (2002), who argued that younger firms use relatively more debt from financial institutions than older firms.

With regard to the control variables, the empirical evidence on the whole sample, shown in Table 5 column 1, suggests that the coefficients of Profitability, Dummy South, and Ownership Concentration were negatively related to leverage, while those of

¹⁵ Overall, we examined the values for adjusted R^2 , F test, T tests and Durbin–Watson test to assess the statistical significance of the model. The regression models were always statistically significant (p value of the F test < 0.01) with a relevant adjusted R^2 , indicating that the variables accounted for a substantial part of the variation in leverage across companies. From the Durbin–Watson value, which was generally close to 2, an absence of autocorrelation was observed.

Table 2 Descriptive statistics

Variable	Whole sample				Sample of firms located in the North of Italy (mean value)	Sample of firms located in the South of Italy (Mean value)	ANOVA test on mean differences (<i>F</i> test and <i>p</i> value)
	Mean	Standard deviation	25%	Median	75%		
Leverage	0.453	0.313	0.143	0.498	0.725	0.408	228.807 (0.000)
Profitability	0.099	0.085	0.050	0.085	0.135	0.081	539.4 (0.000)
Age	2.85	0.740	2.48	2.99	3.332	2.70	452.0 (0.000)
Dummy South	0.135	0.344	0	0.00	0		
Size	16.37	0.65	15.99	16.35	16.77	16.36	0.67 (0.412)
Tangibility	0.221	0.174	0.080	0.187	0.320	0.212	1450.8 (0.000)
Ownership	5.78	2.85	3.00	8.00	8.00	5.62	14.50 (0.000)
Growth Opportunity	0.360	1.685	-0.021	0.289	0.540	0.336	21.75 (0.000)
Number of observations	69,694				60,108	9,586	

ANOVA: Analysis of variance

Table 3 Descriptive statistics by industries

Industries	Leverage	Profitability	Age	Dummy South	Size	Tangibility	Ownership	Growth opportunity	Number of observations
Food, Drink, and Tobacco Industry	0.502	0.089	2.943	0.242	16.41	0.284	5.291	0.324	6,902
Textile and Clothing Industry	0.541	0.096	2.991	0.159	16.17	0.194	5.351	0.281	7,204
Paper and Allied Products	0.499	0.100	2.942	0.126	16.40	0.287	5.351	0.225	2,983
Printing and Publishing	0.399	0.112	2.845	0.098	16.42	0.212	6.511	0.294	2,051
Chemical and Pharmaceutical	0.381	0.118	2.70	0.122	16.42	0.266	6.210	0.387	7,467
Manufacture of Non-Metallic Products	0.454	0.109	2.872	0.186	16.35	0.296	5.473	0.372	4,064
Manufacture of Metal Products	0.464	0.112	2.867	0.110	16.36	0.244	5.535	0.332	8,364
Mechanicals, Electrics, and Electronics	0.419	0.108	2.815	0.072	16.36	0.169	6.116	0.431	13,170
Other Manufacturing Industry	0.477	0.102	2.833	0.085	16.30	0.233	5.372	0.317	2,630
Public Utilities	0.299	0.091	2.442	0.176	16.71	0.430	6.537	0.561	870
Communication and Transportation	0.478	0.102	2.922	0.222	16.31	0.333	5.476	0.483	2,423
Construction	0.461	0.063	2.851	0.192	16.29	0.123	5.655	0.395	1,1566

Table 4 Correlations between dependent and independent variables

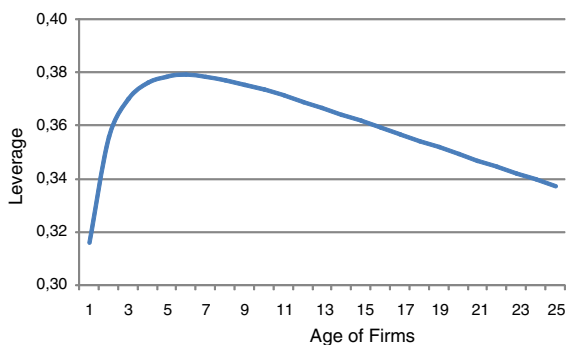
Variable	Leverage	Age	Profitability	Dummy South	Size	Tangibility	Ownership	Growth opportunity
Leverage	1.000							
Age	-0.022**	1.000						
Profitability	-0.166**	0.003	1.000					
Dummy South	-0.057**	-0.080**	-0.088**	1.000				
Size	0.107**	0.140**	-0.099**	-0.003	1.000			
Tangibility	0.032**	0.009*	0.096**	0.143**	0.048**	1.000		
Ownership	-0.072**	-0.113**	-0.014**	-0.020**	0.078**	-0.048**	1.000	
Growth opportunity	-0.013**	-0.083**	-0.025**	0.031**	0.013**	-0.029**	0.015**	1.000

*, ** p values associated with correlations significant at the 0.05 and 0.01 level (two-tailed analysis), respectively

Table 5 Determinants of capital structure decisions

Variables	Whole sample		Sample of firms located in the North of Italy Column 3	Sample of firms located in the South of Italy Column 4
	Column 1	Column 2		
Constant	0.316**	0.372**	0.385**	0.288**
Age	0.071***	0.133**	0.086***	0.063**
Age ²	−0.020***	−0.041**	−0.025***	−0.015***
Credit reliability		−0.257**		
Profitability	−0.94***	−0.858***	−1.096***	−0.607***
Dummy South	−0.094***	−0.176*		
Size	0.041***	0.035*	0.030***	−0.043
Tangibility	0.135***	0.054**	0.147***	−0.020
Ownership	−0.007***	0.012	−0.018***	−0.005***
Growth opportunity	0.014***	0.032	0.019**	−0.011
Industry and time dummies	Yes	Yes	Yes	Yes
Number of observations	69,694	8,783	60,108	9,586
Adjusted R ²	0.114	0.085	0.157	0.125
F test	229.47***	43.12***	225.46***	19.871***
Durbin–Watson	1.985	1.946	1.978	1.964

*, **, *** *p* values associated with correlations significant at the 0. 10, 0.05 and 0.01 level, respectively

**Fig. 1** The general effect of age on leverage

Size, Tangibility, and Growth Opportunities positively affected the use of debt. In particular, Profitability was negatively related to leverage, as also found by Van der Wijst and Thurik (1993); Chittenden et al. (1996), and Jordan et al. (1998). This relationship is in line with the pecking-order theory. When profitability increases, debt is replaced by internal funds; conversely, debt is used as the second choice to finance the firm when profitability decreases. Small and medium-sized firms tend to use retained profits as much as possible and then raise debt only when additional finance is essential. Firms with higher profits will, therefore, need to borrow

less, as they will first make use of internally generated funds before falling back on debt. It seems that asymmetric information problems lead the firms' owners to strictly prefer internal sources of finance to minimize interference in the business on the part of external financial stakeholders. Higher profitability, in the presence of asymmetric information, allows entrepreneurs/managers to be less dependent on creditors for financial resources. Firms with a better performance are able to use internally generated financial resources, thus reducing their reliance on debt. The indicator Dummy South was negatively and significantly related to leverage, suggesting that for small and medium-sized firms the efficiency of local institutional context is important in determining capital structure decisions. In the South of Italy, a macro-area with poor investor protection and low efficiency of the institutional context, small firms are less able to obtain external finance in the form of debt. The results reveal the existence of scale effects in the use of debt, through a coefficient of the variable Size as a significant determinant of leverage. The positive relationship between size and debt, also reported by Van der Wijst and Thurik (1993) and Chittenden et al. (1996), indicated that the larger the firm the higher the leverage ratio it is able to achieve and maintain. This finding provides evidence of the

financial barriers faced by smaller firms. The variable Tangibility, as proxy of the ability to provide collateral for a loan, was positive and statistically significant. Consistent with the results of previous studies (Van der Wijst and Thurik 1993; Chittenden et al. 1996; Jordan et al. 1998; Michaelas et al. 1999; Hall et al. 2004), tangible assets supported credit requests, and higher fixed assets were associated with higher debt. The information asymmetry and agency problems of small businesses force them to obtain debt-type finance by offering collateral, in the form of fixed assets, to guarantee the repayment of loans. By pursuing this strategy, more debt becomes available to small firms at a lower cost. From the viewpoint of transaction cost economics, tangible assets usually have less specificity, which increases their use as collateral for debt (Williamson 1988). Firms with a high level of Ownership Concentration are supposed to have fewer opportunistic problems and, as a consequence, have been shown to be less in need of debt to mitigate problems of free cash flow (De Miguel and Pindado 2001). In this view, owners do not need debt to increase management efficiency. Entrepreneurs who own a substantial fraction of the firm shares may directly control their businesses, a feature that has an important effect on debt, since highly concentrated ownership implies a higher commitment to the firm and a greater incentive to not lose control to banks through bankruptcy. The relationship between Growth Opportunities and leverage was also positive and significant. It should be noted that our analysis considers book-value measure of growth opportunity based on past results and does not include a measure for expected growth, such as the market-to-book ratio, which is commonly used for listed firms.

In Table 5, column 2, to account for any possible limitation in the use of the variable Age and to consider the possibility that each company can build or harm its reputation over time, we applied a robustness proof, controlling for a credit-driven measure of financial reliability in the analysis. Specifically, jointly with the variable Age, we enclosed the variable Credit Reliability. Due to the fact that information for the variable Credit Reliability is not provided for all the firms, there is a reduction of about 87% in the sample. A correlation of 0.31 between the variable Age and the variable Credit Reliability, though statistically significant, does not affect the results without creating

problems of multicollinearity. As shown in Table 5, column 2, the inclusion of the variable Credit Reliability did not modify the effect of Age on Debt, allowing us to control for the possible limitation that can arise through the use of the variable Age. The variable Credit Reliability showed the same statistically significant sign as the variable Age. Therefore, the results provided applying our general model (Table 5, column 1) seem to be robust when a credit-driven proxy of financial reliability is included in the analysis (Table 5, column 2).

Columns 3 and 4 of Table 5 consider firms in different institutional contexts. In particular, although these showed a different average stock of debt, a similar financial life cycle resulted. Firms operating in the South of the country enjoy a lower availability of debt compared to firms operating in other areas. Differing roles for capital structure determinants are shown, mainly with regard to the variables Size, Tangibility, and Growth Opportunity, that are not significant in providing better access to credit for firms operating in the South of the country. Moreover, firms located in the South are less intent on substituting debt with internally generated resources compared to firms located anywhere else. Firms in the South are typically more financially constrained and, due to the fact that they have difficulty accessing the financial market and obtaining credit, their ability to substitute debt with internally generated financial resources is more reduced. Therefore, consistent with Petersen and Rajan's (1995) argument, our results confirm that small and medium-sized firms are penalized by a poorly developed institutional context.

Moreover, it is of interest, especially from a policy-making standpoint, to verify whether the financial growth pattern, generally resulting in Table 5, column 1, changes over time. Therefore, Table 6 shows the results of the effect of Age for a cross-sectional analysis from 1996 to 2005. All of the other variables and controls, such as the dummy South and the industry dummies, are enclosed.

The results in all of the regressions shown in Table 6 were always statistically significant (p value of F test always significant). From 1996 to 2005, the financial growth pattern that characterized small and medium-sized Italian firms is shown to be quite constant, without any economically and statistically significant changes over time. Therefore, Table 6 shows the existence of a significant financial growth

Table 6 Financial growth pattern over time

Years	Constant	Age	Age ²	Number of observations	Adjusted R ²
2005	0.341***	0.063***	−0.019***	8,992	0.132
2004	0.312***	0.058*	−0.017***	8,329	0.109
2003	0.326***	0.072***	−0.023***	8,245	0.105
2002	0.234**	0.067***	−0.018***	7,734	0.111
2001	0.238***	0.052**	−0.015***	7,537	0.118
2000	0.460**	0.069***	−0.021***	7,495	0.106
1999	0.457***	0.082***	−0.023***	6,895	0.132
1998	0.671***	0.105***	−0.028***	6,752	0.129
1997	0.532***	0.093***	−0.025***	6,460	0.117
1996	0.151*	0.124**	−0.027***	1,255	0.093

*, **, *** *p* values associated with correlations significant at the 0. 10, 0.05 and 0.01 level, respectively
Industry and time dummies are included in the model

Table 7 Financial growth pattern across industries

Industry	Constant	Age	Age ²	Number of observations	Adjusted R ²
Food, Drink, and Tobacco Industry	−0.334	0.084*	−0.021***	6,902	0.138
Textile and Clothing Industry	0.694***	−0.129*	0.011**	7,204	0.082
Paper and Allied Products	0.504***	−0.045	0.001	2,983	0.146
Printing and Publishing	−0.874	0.064*	−0.016***	2,051	0.113
Chemical and Pharmaceutical	0.171***	0.105***	−0.023***	7,467	0.142
Manufacture of Non-Metallic Products	−0.396**	0.062	−0.011*	4,064	0.156
Manufacture of Metal Products	−0.452**	0.135***	−0.031***	8,364	0.170
Mechanical, Electrics, and Electronics	0.111***	0.045***	−0.015***	13,170	0.113
Other Manufacturing Industry	−0.535**	0.084**	−0.025***	2,630	0.135
Public Utilities	0.495***	0.091**	−0.025***	870	0.083
Communication and Transportation	−0.366*	0.236***	−0.053***	11,566	0.054
Construction	−0.975**	0.088***	−0.020***	2,423	0.077

*, **, *** *p* values associated with correlations significant at the 0. 10, 0.05 and 0.01 level, respectively

Time dummies included in the model

pattern in the use of debt along the life cycle of the firms that is quite constant over time.

It is also interesting to verify whether this effect is homogeneous across industries. Table 7 shows the effect on capital structure of Age and its squared term for 12 industries. All of the other variables and controls, such as the dummy South and the time dummies, are enclosed.

The evidence in Table 7 shows the prevalence of the previous reported non-linear effect between Age and capital structure, with a few exceptions. In particular, firms operating in the Textile and Clothing Industry, characterized by the higher industry mean debt ratio among all the industries in the sample, showed an initial negative link between Age and the

use of debt that became positive in the long run. The variable Age and its squared term were not statistically significant when firms operating in the Paper and Allied Products Industry were considered, while the variable Age squared was only statistically significant when firms operating in the Metal Products Manufacture Industry were considered.

6 Capital structure determinants at different stages of a firm's life cycle: cluster analysis results

In this section, to verify the existence of different capital structure determinants for firms at different

stages of their life cycle, we sorted sample according to a cluster analysis approach. Instead of using a deterministic approach, for example, by identifying, alternatively, young firms, such as those less than 5, 10, or 15 years old, we applied an inductive criterion. The cluster analysis approach revealed whether there were structural differences arising within the sample and allowed us to sort the sample independently of the arbitrary sorting criterion. The number of clusters leading to the greatest separation (distance) was not known a priori; rather, it was computed from the data. The goal was to minimize variability within the clusters and maximize variability between clusters. The two-step cluster analysis employed here is an exploratory tool designed to reveal natural groupings (or clusters) within a dataset that would otherwise not be apparent (Chiu et al. 2001; He et al. 2005). The algorithm had several desirable features that differentiated it from traditional clustering techniques. First of all, it allowed for the handling of continuous variables (by assuming variables to be independent, a joint multinomial-normal distribution was applied to continuous variables) and for automatically selecting the number of clusters (by comparing the values of a model-choice criterion across different clustering solutions, the procedure automatically determined the optimal number of clusters). Four clusters representing different features were automatically identified. Cluster 1 was not representative and was deleted, as it included less than 1% of the firms in the entire sample. Cluster 2 represented about 14.5% of the entire sample and consisted of old firms with an average age of 58 years and a standard deviation of 13.2 (8.9% sales growth on average). Cluster 3 (about 39.7% of the whole sample) comprised mainly middle-aged firms (28 years old) with a standard deviation of 6.3 (10.2% sales growth on average). Cluster 4 (about 45.0% of the entire sample) represented young firms with an average age of 11 years and a standard deviation of 5 (17.7% sales growth on average). Based on the characteristics of the clusters obtained, shown in Table 8, clusters 4, 3 and 2, i.e., young, middle-aged, and old firms, were analyzed. In detail, Table 8 shows the main descriptive statistics for the three clusters.

Prior to the characterization of the three relevant groups of firms produced by the cluster analysis, it was important to verify the statistical significance of the values of the different variables among the three

groups. This was performed with a one-way analysis of variance (ANOVA), which establishes the existence of significant differences between the means of groups sorted by the cluster analysis. The significance value of the *F* test in the ANOVA analysis was, for all variables, far below 0.01. Since the test yielded a good significance value, it could be safely concluded that for all the variables, the differences between groups were statistically relevant. Thus, the hypothesis that the average values of the variables are equal across groups was rejected. As shown in Table 8, there are relevant differences between young and old enterprises, while the value of the middle-aged group is in between. The financial debt ratio of young firms was, on average, almost four percentage points higher than that of old firms. Overall, young businesses relied more than old firms on external debt as a source of finance. The distinction between young and old firms was even more striking in terms of the median value of financial debt: young firms had a median financial debt of 0.51, whereas that of old firms was 0.44. This result suggests that firm age moderates the financial-debt capacity of firms. Moreover, as theoretically assumed, growth opportunity decreases moving from young to middle-aged and old firms. Furthermore, old firms are larger, have more tangible assets, and tend to have less-concentrated ownership compared to young firms.

The descriptive findings on the three clusters revealed considerable differences in the financing patterns. However, since these simple descriptives do not control for the effects of other variables, the more interesting findings were further examined through regression analyses, as discussed below. Table 9 shows the LSDV regression results.

The regression coefficients of the cluster analysis sub-samples were generally statistically significant, considering heteroskedasticity-consistent standard errors, except for one variable (growth opportunities) in the cluster of old firms. The regression coefficients obtained from the cluster analysis sub-samples retained the same sign as in the whole sample regression but differed in intensity, with different financial behaviors occurring across a firm's life cycle. The Chow test was applied to determine whether the coefficients in the regression model were the same in the separate sub-samples and, specifically, to verify whether the coefficients of the three groups were statistically different, testing the group

Table 8 Descriptive statistics for the three cluster groups

Variables	Cluster analysis sample						ANOVA test on mean differences (<i>F</i> test and <i>p</i> value)			
	Young firms' cluster			Middle-aged firms' cluster				Old firms' cluster		
	Mean	Median	Standard deviation	Mean	Median	Standard deviation				
Leverage	0.456	0.509	0.324	0.457	0.496	0.300	0.416	0.442	0.297	36.84 (0.000)
Age	2.300	2.485	0.584	3.313	3.296	0.217	4.031	3.970	0.208	4003.4 (0.000)
Profitability	0.101	0.087	0.090	0.098	0.085	0.078	0.092	0.078	0.081	79.15 (0.000)
Dummy South	0.162	0.175	0.08	0.108	0.124	0.06	0.073	0.090	0.05	268.7 (0.000)
Size	16.28	16.27	0.69	16.43	16.39	0.59	16.56	16.51	0.56	483.0 (0.000)
Tangibility	0.224	0.183	0.187	0.239	0.192	0.158	0.242	0.203	0.164	33.14 (0.000)
Ownership	6.03	8.00	2.73	5.59	8.00	2.92	5.18	8.00	3.15	107.18 (0.000)
Growth opportunity	0.451	0.394	0.432	0.342	0.317	0.281	0.254	0.281	0.490	872.3 (0.000)
Number of observations	31,354			27,637			10,102			

Table 9 Determinants of capital structure decisions for the three cluster groups

Variables	Cluster analysis samples		
	Young firms' cluster	Middle-aged firms' cluster	Old firms' cluster
Constant	0.345***	0.191***	0.140***
Profitability	−0.420***	−0.760***	−0.912***
Dummy South	−0.182***	−0.150***	−0.075**
Size	0.060***	0.043***	0.020***
Tangibility	0.241***	0.167***	0.055***
Ownership	−0.011***	−0.005***	−0.011***
Growth opportunity	0.028**	0.012*	0.003
Number of observations	31,354	27,637	10,102
Adj. R^2	0.142	0.163	0.194
F test	107.49***	191.83***	204.85***
Durbin–Watson	1.989	1.991	2.009

*, **, *** p values associated with correlations significant at the 0. 10, 0.05 and 0.01 level, respectively

Industry and time dummies were included in the model

coefficients against 0. Using this approach, we verified that the coefficients were not equal and, as a consequence, economic differences in the parameters were established.

As illustrated in Table 9, Profitability was negatively related to leverage in line with the pecking-order theory. Specifically, there is an increasing intensity in the negative effect of profitability on leverage which resulted moving from young to middle-aged, and, finally, to old firms. After the early stage, as a firm starts to show increased profitability and a higher capacity to generate resources internally, the substitution effect became higher between internal financial resources and debt. Young firms are less able to support their business without debt because investments consume internally generated resources so that more finance, typically from debt-holders, is required. In the maturity stage, all internally generated resources can be used mainly to rebalance capital structure, thereby reducing debt. Therefore, considering profitability, it seems that the pecking-order theory is more effective in explaining capital structure decision for old firms with a consolidated business. The effect of the variable Dummy South on leverage, particularly relevant in determining capital structure decisions, suggests that inefficiency in the institutional context causes problems and difficulty with access to credit, probably generating financial constraint, especially for young firms. Since mature firms can seek credit away from the local environment or can have access to alternative funds, they can distance

themselves from local inefficiencies in the credit market in order to operate within a better financial arena. The positive coefficient of the variable Size on leverage, revealing the existence of a relevant scale effect, was greater for younger small firms than for older ones. This supports the suggestion that the ability of young firms to use debt depends on their size. While the results showed, as expected, that Tangibility has a positive relationship with debt, its intensity varied across firm's life cycles. Young firms are more reliant on collateral assets to secure debt and obtain credit. This effect decreases, but is still relevant, in the middle-aged and mature stages. As also highlighted by Berger and Udell (1998), young firms, with generally shorter banking relationships, are more likely to be required to pledge collateral. Older firms, with closer and longer banking relationships, do not have to rely on collateral to obtain external capital. Growth opportunities were not statistically significant for old firms, in contrast to the results for young and middle-aged firms, as also reported by other authors (Chittenden et al. 1996; Jordan et al. 1998). The high leverage ratios of young and middle-aged firms were consistent with the pecking-order theory. Start-up, young, and middle-aged firms are likely to have insufficient earnings to support their business with internal finance. Given the reluctance of small-business owners to issue equity, due to asymmetric information problems and control considerations, young, and middle-aged firms are likely to have more debt.

7 Conclusions

In the study reported here, we have analyzed the strategic financing choices of small businesses through the lens of the business life cycle, verifying the existence of a life-cycle pattern and observing that this pattern is homogeneous over time and quite similar among different industries and institutional contexts. The business of small and medium-sized firms, i.e., those most vulnerable to information and incentive problems, is often constrained by the lack of access to external finances. Understanding the financial features of small and medium-sized firms at different stages of the business life cycle allows managers and policy-making institutions to support firm development correctly.

Our empirical analysis revealed several interesting findings. As hypothesized by Berger and Udell (1998), we found that the degree of informational opacity is a key determinant of a firm's financing behavior, even more so when the various stages of its life cycle are taken into account. Different sensitivities to information asymmetries affect the hierarchy of capital structure decisions according to the changing economic conditions that characterize firms at different phases of their business life cycle. In general, higher profitability allows managers to be less dependent on creditors for financial resources. In our study, this was particularly true for mature firms, while young firms were more dependent on external finance (debt) to support their business. Despite the high cost of debt for start-up and young Italian firms, the support conferred by debt is essential to the early stages of a firm's life.¹⁶ Internal resources are not sufficient to finance a young business, and the lack of a private equity market increases the role of banks in providing financial support. Therefore, start-up and young firms need an increasing amount of debt, which seems to be the first choice, while they gradually rebalance their capital structure after a consolidation of the business by substituting debt for internal capital. Thus, the pecking-order theory seems

to have a high magnitude for firms in their mature stage.

This financial life-cycle pattern for small and medium-sized firms seems to be homogeneous for different institutional contexts, consistent over time and prevalent across different industries. It has the same magnitude when firms located in the South of Italy, where the financial system is more inefficient and investor protection poorer, are compared with firms located in other macro-areas of Italy. In nine of the 12 industries analyzed, a similar life-cycle pattern resulted. Therefore, notwithstanding the fact that small and medium-sized firms showed different average leverage across industries and institutional contexts, the financial growth pattern resulted as similar. Moreover, while the existence of a financial growth pattern is relevant and robust over time and across industries and institutional contexts, there are systematic differences across the firm's life cycle in the capital structure determinants. Controversy in the existing empirical literature on the determinants of capital structure can be based on a failure to take into account explicitly the different degrees of information opacity, and, consequently, firms' characteristics and needs at specific stages of their life cycles.

From a political point of view, this result showed that: (1) start-up and young firms have a relevant need of external finance to sustain their business, independently of the industry affiliation and of the place where these firms are located; (2) in Italy, a typically bank-based country, considering that the venture capital and private equity market is at a very early stage, the role of debt is crucial for sustaining small and medium-sized firms at early stages; (3) due to the fact that debt is not a suitable source of finance for start-up and young firms, policy-makers should foster the development of a financial system that would be able to sustain small and medium-sized firms with "patient" capital in the form of equity finance.

To summarize, contrary to conventional wisdom, debt is fundamental to the business of Italian firms in the early stages of their life cycle, while mature firms rebalance their capital structure by substituting debt for internal capital. Indeed, our results are in line with the work of Giannetti (2003), who found that this is especially true in countries where the financial market is not well developed and not highly efficient. As is well known, debt is not the right source of

¹⁶ Although young firms do not have as many tangible assets that can be easily evaluated or pledged as collateral and have little repayment history or record of profitability upon which external suppliers of funds can rely, they resulted in being directly in need of debt to grow.

finance for start-up and young firms that are typically in need of “patient” equity capital. The resulting financial life-cycle pattern seems to dominate over time and across different industry affiliations and the institutional context. This issue is highly consequential for research on capital structure and deserves more detailed investigation which, at the same time, should consider the stages that make up the business life cycle. If firms can raise more of their capital with equity, they will be better able to make longer term investments. This suggests directions for future research that focus on the relationship between investment horizons and institutional factors.

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