

An Empirical Investigation of the Financial Growth Life Cycle

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Abstract

Purpose - This paper empirically examines the financing of small and medium sized enterprises (SMEs) through a financial growth life cycle model. Reporting and analysing a large primary data set across six age categories, a number of statistical tests are conducted to test the financial growth life cycle model (Berger and Udell, 1998).

Design/methodology/approach - Data in publicly available databases is generally unsuitable to examine the financial life cycle model, thus a questionnaire survey was employed to collect data. Because of the well-documented reticence of SME owners to reveal detailed financial information (Avery et al., 1998), data was requested in percentage form. This innovative methodology was successful, as 92 percent of respondents disclosed detailed financing data. A response rate of 42.6 percent across six industry sectors provided data to employ parametric techniques.

Findings – Analysis of respondents' capital structures across age groups indicates distinct changes in sources of finance employed by firms over time. Financing choices are consistent with Myers's (1984) pecking order hypothesis, and the importance of profitability in financing SMEs is emphasised. Contrary to conventional wisdom, respondents in the youngest age category report a relatively high use of debt financing. This is explained by the provision of firm owners' personal assets to secure firm debt.

Originality/value - The key contribution of this paper is to provide an empirical examination of the financial growth life cycle model by combining a number of statistical tests. This approach is significantly different to that traditionally adopted in empirical investigations of SME financing, which is to examine the applicability of theories developed in corporate finance on panel data. Additionally, it presents data on personal sources of finance employed by firm owners, which is typically not available, even in comprehensive secondary databases.

Keywords - Financial growth life cycle, Capital structure, Pecking order theory, Agency theory, Small and medium sized enterprises.

Paper type Research paper.

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Introduction

Researchers conducting empirical investigations of SME financing adopt theoretical approaches developed in the field of corporate finance, especially pecking-order (Ou and Haynes, 2006; Daskalakis and Psillaki, 2009; Mac an Bhaird and Lucey, 2010) and agency theories (Chittenden et al., 1996; Michaelas et al., 1999), and to a lesser extent trade-off theory (Sogorb Mira, 2005). These studies typically examine determinants of financial resources employed by firms, relating them to firm or owner characteristics. Commonly testing regression models on panel data, these studies view firm financing as a 'static' process, rather than a dynamic, ever-changing progression. In general these studies do not explicitly address how the stage in a firm's life cycle influences capital structure, notwithstanding regression models employing age as an independent variable. The lack of studies investigating the extent and type of financing employed at various stages of growth is an important omission (Hussain and Matlay, 2007), as a firm's funding requirements vary significantly over the course of its life cycle, along with access to various sources of financing. An advantage in adopting this approach is that it details the most important sources of finance at each stage in the life cycle, facilitating identification of potential funding gaps at various points in a firm's development. Analysis of capital structure employing the life cycle approach may thus assist SME owners, practitioners, and policy makers in planning and providing for appropriate financing and supports at relevant stages in a firm's development. It can also inform the perennial 'debate' on debt or equity gaps in the provision of SME funding by providing a more holistic overview of SME financing (i.e. the 'financing gap' issue is not continuous, but is directly related to the stage in a firm's development).

The purpose of this paper is to describe and empirically examine the financial life cycle model by conducting a number of bivariate statistical tests on financing data of a sample of Irish SMEs. Capital structures of 275 firms are categorised by five sources of equity and two sources of debt, and analysed across six age groups. This statistical treatment facilitates examination of changes in sources of finance employed over time, particularly changes in proportions of finance sourced 'inside' and 'outside' firms through development and maturity. Furthermore, comparison of sources of finance employed at start-up with those employed at present illustrates how firms' capital structures evolve over time. In employing a combination of statistical tests on firms' capital structures, the concern of testing a life cycle effect with cross-sectional data is partly ameliorated. The paper is structured as follows. Firstly, the life cycle theory of the firm and its application to firm financing is outlined. The sample frame, data collection process and research method are then described. In the following sections, empirical results are presented and discussed. The conclusion is followed by suggestions for further research and policy implications.

Theoretical review

Life cycle theory of the firm

The stage model or life cycle theory of the firm originates in economics literature (Penrose, 1952, 1959; Rostow, 1960), and is used to describe the progression of the successful firm

through growth phases. A biological analogy is sometimes used to describe "...the cyclical quality of organizational existence. Organizations are born, grow, and decline. Sometimes they reawaken, sometimes they disappear" (Kimberly and Miles, 1980: ix). The life cycle model describes the development and progression of the firm as a linear sequential process through a number of stages. Numerous stage models have been developed in the management and organisational studies literature (D' Amboise and Muldowney, 1988; Poutziouris, 2003), although the number of stages is not standardised (Lester et al., 2008). For example, Steinmetz (1969) proposes a model based on three phases of growth, whilst Lester et al. (2008) propose a five-stage model of organisational growth and development. In deriving a taxonomy of growth stages for high-technology organisations, Hanks et al. (1994) identify common developmental stages based on the comparison of a number of stage models, namely start-up, expansion, maturity, diversification, and decline. Specifying age categories for each developmental stage in a universal life cycle model is difficult because of intra industry differences. Attempts to assign specific age groups thus tend to be confined to particular sectors (Hanks et al., 1994).

Similar to the stage model developed in the organisational studies literature, the financial life cycle theory models firm resourcing across a number of development stages. Presented as a descriptive concept in early textbooks (Weston and Brigham, 1978), it outlines sources of finance typically available at various growth stages of the firm, along with potential financing problems that may arise at each stage. The financial life cycle model incorporates elements of trade-off, agency (Jensen and Meckling, 1976), and pecking order theories (Myers, 1984; Myers and Majluf, 1984), and describes sources of finance typically advanced by funders at each stage of a firm's development. The commonly held view is that nascent and start-up firms have difficulty accessing external finance, as this is when problems related to information opacity are most severe (Huyghebaert and Van de Gucht, 2007). The most important sources of finance at this stage are personal savings of the firm owner, and finance from friends and family (Ullah and Taylor, 2007). These informal sources of equity exceed venture finance as the main source of capital for start-up companies, even in the US which is considered the most advanced economy in the world in the provision of venture capital (Bygrave and Quill, 2007). The contribution of the firm owner in nascent firms is not confined to equity, but commonly includes the provision of quasi-equity in the form of personal assets used as collateral to secure business debt (Basu and Parker, 2001). Whilst a firm may obtain sufficient capital to initiate trading, a lack of planning may lead to problems of undercapitalisation in the earliest stages. In extreme cases, particularly in the face of competition, the firm may not be able to continue in business (Cressy, 2006).

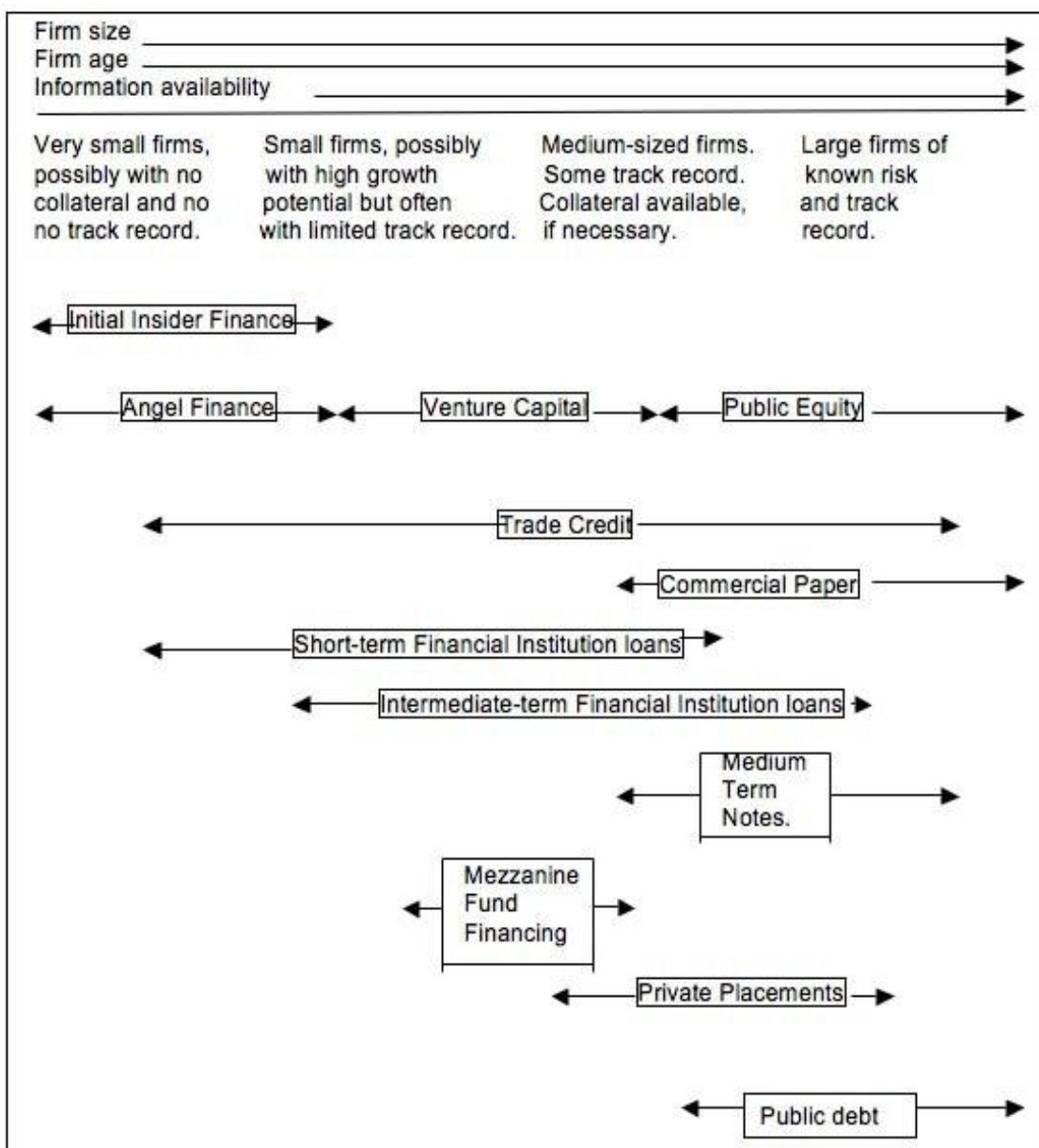
As successful firms survive nascent and start-up phases, and mature through growth stages, personal funding becomes relatively less important as investment finance is increasingly sourced from retained profits. Furthermore, accumulation of a trading history facilitates access to increased sources and amounts of external financing, particularly bank finance and trade credit. Rapidly expanding firms lacking adequate working capital to meet increased costs may experience liquidity problems at this stage (Bates and Bell, 1973). Firms faced with the problem of overtrading often seek to alleviate these liquidity problems by increasing their overdraft facility. Thus, it is common for SMEs to have high levels of short-term debt (Ray and

Hutchinson, 1983, Michaelas et al., 1999). Short-term debt is neither sufficient nor appropriate for firms requiring large amounts of additional external finance for investment, however. These requirements are more suitably fulfilled by long-term debt, or by raising external equity through a private placement or an initial public offering of common stock. Firms requiring large amounts of external equity are characterised by the pursuit of a high growth strategy, and may be involved in the development of products or services based on new technology, such as NTBFs for example (Ullah and Taylor, 2007). A consequence of the sale of firm equity for the owner is loss of control and managerial independence, although a number of authors indicate that this outcome may be compatible with the firm owner's goals (Berggren et al., 2000; Hogan and Hutson, 2005). On reaching maturity firms have acquired a trading history, and typically have access to a broad range of resources. Sources of finance accessed at this stage are generally determined by preferences of firm owners, rather than supply side restrictions. A number of firms may then enter a stage of decline due to diminishing returns (Steinmetz, 1969), whereupon the firm may be liquidated or taken over.

The financial growth life cycle model developed by Berger and Udell (1998) presents firms on a size/age/information continuum, and describes the increasing array of financing options available to the firm as it survives and grows. Reproduced in figure 1, the model incorporates changes in availability of information and collateral in describing sources of finance available to firms over time. Berger and Udell (1998) thus conceptualise the sequencing of funding over the life cycle of the firm centred on information opacity and following a financial pecking order. Smaller, more informationally opaque firms are depicted to the left side of the continuum relying on "...initial insider finance, trade credit, and/or angel finance" (Berger and Udell, 1998: 622). As firms advance along the continuum, they gain access to increased sources of external debt and equity capital. Ultimately, firms may access greater amounts of capital in public debt and equity markets.

Empirical evidence for the financial growth life cycle model is limited, with a couple of notable exceptions (Fluck et al., 1998; Gregory et al., 2005). The former study finds that, contrary to predictions of the financial growth life cycle model, external sources of finance exceed internal sources for the youngest firms. Furthermore, Fluck et al. (1998) find that the contribution of the firm owner increases initially and then decreases in firms over 12 years old. The initial increase in use of insider financing is explained by firm owners employing retained earnings for investment because of potential difficulties in raising external finance explained by the monopoly-lender theory (Rajan, 1992). The subsequent decrease in use of internal sources is explained by older firms sourcing increasing amounts of external debt due to reputation effects (Diamond, 1989). Results from Gregory et al.'s (2005) study partially support the financial growth life cycle, although they conclude that SME financing cannot be encompassed in a 'one size fits all' universally applicable model.

Figure 1 Firm continuum and sources of finance



Source: Berger and Udell (1998: 623).

Methodology and data collection

One of the greatest challenges in SME research is to obtain reliable, detailed, standardised, up-to-date accounting and finance information. Data required to conduct an empirical study of firm financing across a life cycle model is not readily available, and secondary databases, such as exist, are replete with issues related to coverage error, consistency, standardisation, and representativeness, as younger, newer firms are typically underrepresented on such listings. Researchers in the US and the UK overcome these issues by compiling databases on SME financing through the National Survey of Small Business Finances (NSSBF) and the United Kingdom Survey of Small and Medium-sized Enterprises' Finances (UKSMEF) respectively. In the absence of comparable sources in the Irish case, data was sourced employing a questionnaire survey. The population surveyed was the Business World 'Next 1,500' list of

firms, a comprehensive list of Irish SMEs employing greater than 20 employees, compiled from multiple sources and updated annually. The sample was substantially amended and modified to attain a list of independent, non-financial firms within the parameters of the European Commission (2003) definition. Independently held enterprises were selected, as these enterprises are deemed to have control over their financing decision, whereas subsidiaries' capital investment needs may be provided or dictated by the parent company. Additionally, the parent company may provide guarantees and/or collateral for subsidiaries' debt requirements. An advantage of the sample frame employed is that it is not restricted by sector or geographical location, although all firms listed have a lower bound of 20 employees. From a surveyed sample of 702 firms, 299 responded, representing a response rate of 42.6%.

The nature of the financing data required for this study is sensitive, due in part to the interconnectivity of owners' income with firm financing (Ang, 1992; Avery et al., 1998). Consequently it is difficult to source accurate financing data from questionnaire respondents (Cox et al., 1989). For example, the Small Business Survey in the UK reported that "...Unfortunately, some 29 per cent of businesses could not, or would not, provide information on turnover" (Small Business Service, 2006: 4). Due to the reluctance of firm owners to report this data, sources of financing were requested in percentage rather than absolute form. Responses to this question provided rich data, and this methodology proved successful in limiting non response, as 92 per cent of respondents provided usable replies (notwithstanding the potential for reporting error (Cox et al., 1989)). A detailed profile of respondents by age, industrial classification and size is provided in tables I and II.

Table I Age and industry profile of respondents

Panel A.		Panel B.	
Firm age (n=297)	Proportion of respondents (%)	Industry type (n=295)	Proportion of respondents (%)
< 5 years	5.1	Metal manufacturing and engineering	15.6
5-9 years	17.2	Other manufacturing	21.3
10-14 years	12.8	Computer software development and services	17.3
15-19 years	10.4	Distribution, retail, hotels, and catering	27.5
20-29 years	21.5	Other services	9.1
>30 years	33.0	Other	9.2

Table II Size profile of respondents defined by employees and turnover

Panel A.		Panel B.	
Employees (n=296)	Proportion of respondents (%)	Gross sales turnover (€) (n=294)	Proportion of respondents(%)
20-50	42.4	< €1 m	3.1
50-99	30.5	€1 m - €2,999,999	11.6
100-250	27.0	€3 m - €4,999,999	13.3
		€5 m - €9,999,999	31.6
		€10 m - €20 m	32.0
		> €20 m	8.5

As described in table I, over 50 percent of respondents are more than twenty years old. At the other end of the spectrum, 22 percent of firms are less than ten years old. A potential age bias was investigated by recategorising age groups, and composing three age groups of approximately equal size. Results of statistical tests on recategorised age groups were compared with results on all age groups, and found to be similar. This finding suggests that age bias is not a primary concern.

Distribution of debt and equity across age groups

Financing data of respondents is categorised by two sources of internal funding and six sources of external funding, and presented in table IV. One-way Anova analysis is based on two assumptions; normal distribution of data, and homogeneity of variances. Analysis of skewness and kurtosis values for sources of financing, along with results of a one-sample Kolmogorov-Smirnov test (reported in table III) indicate that the data are not symmetrically distributed. Violation of this primary assumption of Anova when analysing small samples indicates that a nonparametric alternative should be employed, such as the Kruskal Wallis Chi-Squared test. This is not necessary when using larger samples, because the central limit theorem states that the sampling distribution of the mean approaches a normal distribution as the sample size increases. A further consideration in using Anova is that it is quite insensitive to departures from normality and homogeneity of variances (Hair et al., 2006: 410).

Financing data reported in table IV reveal distinct differences in sources of finance employed by respondents over time, although the proportion of finance sourced from internal and external sources is approximately equal for the total sample. This result is consistent with previous studies (Berger and Udell, 1995). The single most important source of capital for firms in the youngest age category is the personal savings of the firm founder, and funds from friends and family. Respondents in older age categories report diminishing reliance on these resources as a proportion of financing over time, due to an increasing dependence on retained profits, which are the single most important source of finance for all firms except those in the youngest age category. Use of retained profits as a proportion of total financing increases for all firms less than 30 years old, peaking for firms between 20 and 29 years. Use of retained profits falls slightly as a proportion of financing for firms over 30 years old, which may be attributed to declining profit margins for the most mature respondents.

Table III Distribution statistics of dependent variables and test for normal distribution

Dependent variable	Skewness	Kurtosis	Kolmogorov-Smirnov Z	
			Statistic	Significance
Personal savings and funds from 'f' connections	2.79	7.38	6.47	.00*
Retained profits	0.59	-1.29	4.84	.00*
External equity	2.52	4.56	6.78	.00*
Long-term debt	3.05	9.24	8.01	.00*
Short-term debt	1.51	1.08	5.65	.00*
Total debt	0.96	-0.46	4.69	.00*

* Denotes the data differs from a normal distribution. This result is statistically significant at the 99% level of confidence.

External sources of financing are classified by three categories of external equity and two categories of debt, along with off balance sheet financing. External equity comprises venture capital, government funding, business angels and private investors, and is of greatest importance to firms less than five years old. Venture capital is an important source of finance for 7 per cent of respondents, and its use is most prevalent in firms aged less than ten years. The relatively high use of venture capital reported by firms less than five years old is unexpected, as venture capitalists typically do not invest in products and services in the earliest stages of development (Smith and Smith, 2004); although Gompers (1995) and Berger and Udell (1998) note that venture capital may be used to finance product development costs in some cases. Respondents' reported use of venture capital reflects the high rate of investment by Irish venture capitalists in early-stage companies relative to both Europe and the US (Mulcahy, 2005). Firms aged between five to nine years and ten to fourteen years report sourcing 16 per cent and 10 per cent of capital structure respectively from venture capitalists. This finding is consistent with the view that venture capitalists invest in companies with proven technology to finance "...full-scale marketing and production" (Berger and Udell, 1998: 623). Outside these age categories venture capital is used by only two firms.

9 per cent of respondents report sourcing finance from business angels and private investors. This source of finance is particularly important for firms aged less than five years, comprising 17 per cent of capital structure for respondents in this age category. This result emphasises the importance of angel and private investor finance for nascent and start-up firms (Berger and Udell, 1998; Smith and Smith, 2004). Use of finance from this source diminishes considerably in respondents with older age profiles. Government grants include high-technology equity grants and grants to export oriented firms with high-growth potential, and are typically accessed by firms in the earliest stages of development. These sources are employed by 16 per cent of respondents, and are most important for firms in categories less than ten years old, comprising 5 per cent of their capital structure.

Table IV One way Anova of the sources of finance employed by respondents across age categories

Firm age (n=275)	Internal sources of financing (%)			External sources of financing (%)								
	Personal savings of founder(s), funds from friends & family	Retained profits	Total internal financing	Venture capital	Business Angels and private investors	Govt. Grants and equity	Total external equity	Short term bank loans & overdraft	Long term debt	Total debt	Off Balance sheet financing (leases,etc.)	Total external financing
<5 years	22 (.31)	9 (.16)	31 (.32)	15 (.33)	17 (.35)	5 (.13)	37 (.44)	11 (.19)	18 (.31)	29 (.34)	3 (.05)	69 (.38)
5-9 years	15 (.22)	27 (.34)	42 (.36)	16 (.29)	8 (.18)	5 (.08)	29 (.35)	19 (.32)	7 (.15)	26 (.33)	3 (.08)	58 (.39)
10-14 years	11 (.21)	32 (.39)	43 (.40)	10 (.27)	4 (.14)	1 (.04)	15 (.32)	30 (.36)	6 (.19)	36 (.37)	6 (.13)	57 (.41)
15-19 years	12 (.26)	43 (.40)	55 (.41)	4 (.14)	2 (.07)	0 (.01)	6 (.15)	24 (.27)	10 (.26)	34 (.36)	5 (.08)	45 (.37)
20-29 years	11 (.23)	50 (.40)	61 (.36)	2 (.11)	1 (.06)	2 (.04)	5 (.13)	22 (.26)	6 (.17)	28 (.30)	6 (.20)	39 (.31)
>30 years	7 (.19)	47 (.40)	54 (.40)	0 (.00)	7 (.21)	1 (.02)	8 (.21)	26 (.32)	7 (.15)	33 (.34)	5 (.09)	46 (.36)
Total	11 (.22)	40 (.39)	51 (.39)	5 (.19)	5 (.17)	2 (.05)	13 (.26)	22 (.30)	8 (.19)	31 (.34)	6 (.13)	49 (.37)
One way Anova F statistic	.340	.000***	.005***	.001***	.060*	.001***	.000***	.043***	.014*	.460	.176	.020*

***, **, * Statistically significant at the 99%, 95% and 90% level of confidence respectively. Standard deviations in parentheses.

Use of debt is observed in two categories, namely short-term bank loans and overdrafts, and long-term debt. Respondents report an increasing use of short-term debt as age profiles increase, comprising an average 22 per cent of capital structure for the total sample. Short-term debt is the second-most important source of funding after retained profits, excluding the youngest age category. Use of short-term debt by respondents is lowest for firms less than five years old, comprising 11 per cent of capital structures for firms in this age category. Its use is greatest in firms aged ten to fourteen years, comprising 30 per cent of their capital structures, thus following an approximately convex pattern over age categories.

Excluding the youngest age category, use of long-term debt also follows an approximate convex pattern, averaging 9 per cent of financing for the total sample. Reported use of long-term debt is similar to previous research, including the oft-quoted finding of Ray and Hutchinson (1983), that a majority of SMEs do not employ this source of finance. Over 80 per cent of firms reporting no debt are in the older age categories, revealing an increasing reliance on retained profits over time as long-term debt is repaid. Consistent with the pecking order theory, reported use of long-term debt in age categories other than the youngest is negatively related with age. Long-term debt comprises 18 per cent of the capital structure of firms less than five years old. This finding is contrary to the conventional wisdom that financial institutions

advance long-term debt to very young firms (Berger and Udell, 1998), although it is consistent with empirical evidence from previous studies (Fluck et al., 1998). Firms in the youngest age category reporting a high proportion of debt indicate that it is secured on the personal assets of the firm owner, and to a lesser extent by 'other guarantors'.

Lease finance comprises a relatively small proportion of capital structures of respondents, averaging 6 per cent for the total sample. 30 per cent of respondents employ lease finance, and it generally involves a small percentage of capital structure. Reported use of lease finance differs across age groups. It comprises 3 per cent of capital structure for firms less than ten years old, half of the average for the total sample. This is a surprising finding, because younger firms would not be expected to be restrained in access to lease finance, as problems of moral hazard should not apply because title of the machinery and equipment typically remains with the lessor. The lower use of lease finance as a proportion of capital structure by the youngest firms in this study may be accounted for by the fact that 50 per cent of firms in the two youngest age categories are in the 'computer software development and services' sector, and lease finance is generally not an important source for these firms.

Comparison of funding at present and at start-up – Paired samples t test:

Respondents report the sources of funding employed at start-up and at present. This data was examined using a paired samples t test, which compares means for two variables that represent the same group at different times (i.e. at start-up and at present). A low significance value for the t test, and a confidence mean not containing zero, indicates a significant difference between the two variables. The paired samples correlations were also examined. Since the two variables should represent the same group at different times, or two related groups, the correlation should be fairly high and the significance value low. Data in table V reveals this to be the case.

Table V Paired-samples correlations between sources of financing employed by respondents at start-up with those employed at present.

Source of financing	Correlation	Significance
Personal savings of founder(s), funds from friends and family	.232	.000***
Business angels and private investors	.681	.000***
Retained profits	.130	.024**
Government grants and equity	.299	.000***
Venture capital	.628	.000***
Short-term bank loans and overdrafts	.242	.000***
Off Balance sheet financing (leases, HP financing)	.530	.000***
Long-term debt	.334	.000***

***, ** Statistically significant at the 99% and 95% levels of confidence respectively.

Table VI Paired-samples t test comparing sources of financing employed by respondents at start-up with those employed at present.

Source of financing	Mean (%)	Standard deviation	Significance (2 tailed)
Personal savings of founder(s), funds from friends and family	26.1	.417	.000***
Business angels and private investors	-0.1	.141	.870
Retained profits	-32.4	.397	.000***
Government grants and equity	1.2	.094	.027**
Venture capital	-1.8	.149	.040**
Short-term bank loans and overdrafts	-8.3	.329	.000***
Off Balance sheet financing (leases, HP financing)	-1.8	.111	.004***
Long-term debt	-1.9	.223	.143

***, ** Statistically significant at the 99% and 95% levels of confidence respectively.

Results presented in table VI indicate significant differences between source of funding employed at start-up and at present for all but two sources. Reiterating the pattern observed in the previous section, personal sources of finance and government equity schemes are more important at the nascent stages of the firm, whilst retained profits, debt and leasing become increasingly important as the firm gets older. The largest difference observed is in the use of retained profits, at over minus 30 percent. This is not unexpected, and supports the life cycle model of financing and the pecking order theory. The second largest difference is in the use of personal savings of the firm owner and 'f' connections, at 26 percent. This figure emphasises the importance of these sources at start-up, and provides further support for the life cycle model of financing. The paired sample means for short term and long term debt are negative, implying that respondent firms have greater access to, and make greater use of debt finance at present than at start-up. The value for short term debt (minus 8.3 percent) is the third largest difference observed.

Results for business angels and venture capitalists are apparently contradictory of the previous section, but in the case of business angels the coefficient is extremely small (minus 0.134 percent) and statistically insignificant. The value observed in the use of venture capital financing is relatively small (minus 1.78 percent), but may be explained by the fact that venture capitalists typically do not finance firms at start-up. Over 70 percent of firms reporting use of this source are between five and fifteen years old, resulting in the small negative value. This is consistent with investment practices of venture capitalists.

Discussion

Observed capital structures highlight the importance of firm owners' personal contribution to capitalisation of the firm in nascent stages, emphasising two distinct features of SME financing; the extensive use of firm owners' personal resources (Evans and Jovanovic, 1989; Fairlie, 1999), and the significance of the risk taking propensity of firm owners in resourcing the sector. Progressing through age categories, retained profits become a proportionately more important source of funding for respondents, and are the single most important source of finance for all firms except those in the youngest age category. Observed increasing reliance on internal equity is consistent with the pecking order theory (Myers, 1984; Myers and Majluf, 1984), suggesting that respondents have a preference for internal sources of finance, which becomes increasingly available through the accumulation of retained profits. This result is consistent with empirical evidence from previous studies (Howorth, 2001; Vos et al., 2007; Cole, 2008), emphasising the primary importance of profitability in financing SMEs.

Use of short term debt follows an approximate convex pattern across age categories. The significant rise in use of short-term debt in the first three age categories is consistent with reputation theory (Diamond, 1989), indicating that respondents gain greater access to short-term debt as firms grow and mature and information asymmetries dissipate. Respondents in the youngest age category source 70 percent of their financing requirements from external sources. This includes a relatively high level of long term debt, which is secured on personal assets of the firm owner. Provision of 'quasi-equity' in the form of firm owners' personal assets as collateral to secure business loans is commonly under-emphasised, as it is not recorded on the firm balance sheet. Other providers of external finance to firms in the youngest age categories include venture capitalists, business angels, private investors, and government agencies. These sources comprise relatively small amounts, and are accessed by a small number of firms in targeted sectors.

Use of alternative sources of financing, such as deferred taxes and trade credit are not reported in this study, thus similar to Fluck et al. (1998), use of external finance is possibly underreported. There are contrasting views in the literature as to the importance of trade credit as a source of financing. Reporting findings from the Nottingham University Small Firms Unit, Binks et al. (1986) state that 55 per cent of respondents were consistently required to issue more trade credit than they received, whereas 10 per cent of firms were 'net receivers' of trade credit. This is consistent with the view that large businesses are able to take extended trade credit from SMEs, particularly new firms (Wilson and Summers, 2002). By contrast, other studies highlight the importance of trade credit as a source of finance (Robb, 2002), particularly for firms operating in poorly developed financial markets (Fisman and Love, 2003). In the present study, respondents were requested to indicate 'other' sources of financing, which were reported as less than 2 per cent. This is an indication that respondents are net 'givers' of trade credit rather than net 'receivers', which is consistent with empirical evidence detailing the relatively poor performance of Irish firms in late payment (Rafuse, 1996). This is confirmed by analysis of data from the Bureau van Dijk Amadeus database, which reveals that collection days are considerably greater than credit days for Irish SMEs during this period.

Whilst this data provides evidence of a financial growth life cycle, it must be viewed with caution for a number of reasons. Firstly, the one-way Anova is computed on cross-sectional rather than longitudinal data, thus ignoring potential effects of changes in the external environment on sourcing finance. A related issue is that the financial growth life cycle model assumes that firms have access to all external sources of financing when required. These supply-side factors may have a significant influence on the means of financing chosen. Secondly, although the age categories employed are similar to those used in previous studies, such as in LeCornu et al. (1996), they are arbitrary, and so a four year old firm is in a different category to a five year old firm. Thirdly, figures reported for financing at start-up may be prone to recall bias. This is tempered, however, by the fact that setting up a firm is a major event, and the firm owner is unlikely to forget the sources of finance used for such a momentous undertaking. Finally, the financial growth life cycle model depicts the resourcing of firms as a constant linear process over time. In reality SME financing is a more 'lumpy' or stochastic process. A related drawback is that the financial growth life cycle model as proposed by Berger and Udell (1998) suggests that the growth cycle of SMEs can be represented in a single universal model, ignoring not only differences in growth rates, but also differences in the availability and use of sources of capital.

Despite these caveats, empirical analysis of the financial growth life cycle model provides an important overview of the general trends in firm resourcing across age categories. An advantage of the statistical methodology employed is that it facilitates an examination of changes in the sources of financing employed over time, particularly changes in proportions of finance secured 'inside' and 'outside' the firm as it survives and matures.

Conclusions

This paper aims to add to the literature on firm financing by providing an empirical examination of the financial growth life cycle model. This study differs from previous papers, which typically examine the applicability of approaches based on information asymmetry and agency theory (for a comprehensive review of this literature see Mac an Bhaird (2010)). An advantage of the financial growth life cycle approach is that it incorporates changes in availability of information and collateral over time in detailing how capital structure varies with firm age. It is thus useful for firm owners and policy makers in planning and providing for adequate financing and supports at relevant stages in a firm's development. Empirical evidence presented in this study suggests that SME resourcing broadly corresponds to a financial growth life cycle model, and is consistent with propositions of the pecking order theory (Myers, 1984; Myers and Majluf, 1984). Similar to previous studies (Berger and Udell, 1998), firms in the nascent stages of development are largely dependent on the resources of the firm owner, friends and family. Provision of the personal assets of the firm owner as collateral for business debt is particularly important, as evidenced by the relatively high use of debt by respondents in the youngest categories. Thus, consistent with Fluck et al. (1998), external sources of finance exceed internal sources for the youngest firms. Internal equity becomes the most important source of financing over time, as firms increasingly employ retained profits for investment. This source is augmented by short-

term debt, which, consistent with Diamond's (1989) reputation theory, is employed progressively more as age profiles increase. Increasing use of these two sources reduces reliance on personal sources of funding of the firm owner over time, although the owner may continue to provide personal assets and guarantees to secure debt financing for the firm (Voordeckers and Steijvers, 2006). A small number of respondents source equity from venture capitalists, business angels, private investors, and government grants. These sources of external equity are generally employed by firms in specific sectors with a defined profile, and are most important for firms in the youngest age groups. Respondents' capital structures are consistent with results from previous empirical studies (Berger and Udell, 1998, Gregory et al, 2005), i.e. firms acquire increased access to financing options, especially debt financing, as information asymmetries dissipate over time. Findings support the central proposition that "...[perhaps] the most important characteristic defining small business finance is information opacity" (Berger and Udell, 1998: 616). Notwithstanding empirical support for the financial growth life cycle theory, it is important to emphasise that SME financing cannot be encompassed in a 'one size fits all' universally applicable model (Gregory et al., 2005). This issue could perhaps be addressed in future studies as suggested below.

Suggestions for further research and policy implications

The paucity of empirical studies adopting a life cycle approach when investigating firm financing could be addressed in future research by extending the methods of data collection and analysis employed in this study. Analysing longitudinal data from large samples has the potential to produce accurate results at an increased number of points in a firm's life cycle, facilitating development of more sophisticated financial growth life cycle models by considering sectoral differences in asset structure, growth rates, and temporal capital requirements. Employing longitudinal data reduces difficulties with recall and survivorship bias, and facilitates examination of capital structures of non-surviving firms, including modelling of how different financing decisions might improve survival rates. Inclusion of macroeconomic data such as interest rates and changes in GDP would facilitate investigation of capital structures under different economic conditions. Additionally, perhaps an 'event study' approach would greatly enhance our understanding of the life cycle of SME financing, as this tends to be a 'lumpy' rather than a linear process. Considering the favourable response rate to sensitive financing questions posed on the questionnaire instrument in this study, future researchers might profitably seek sensitive data in percentage rather than absolute form. This technique offers considerable advantages to researchers seeking to collect financial data where no published source exists, and will become increasingly beneficial as the EU Administrative Burdens Exercise is likely to reduce the availability of published accounting data in countries where such information is presently readily available.

Policy implications emanating from this study arise from observed capital structures, which highlight the importance of sources of internal equity in resourcing SMEs. Public policy focussed on the development of a strong, sustainable SME sector should concentrate on

encouraging increased investment by focussing on the sources of finance preferred by firm owners. Previous studies proposed that the aim of increasing investment in SMEs could be achieved by fiscal policies incentivising reinvestment of earnings through providing tax incentives for a percentage of profits retained in the firm (Chittenden et al., 1998; Michaelas et al., 1999), although some studies cast doubt on the effectiveness of tax-reduction policies on investment levels (Hubbard, 1997). The potential reduction in taxation burden of SMEs under this proposal is of greater benefit in countries with high rates of corporate tax. Effectiveness of such a policy in Ireland is reduced because of the relatively low corporate tax rate of 12.5 per cent. Possibly of more relevance in the Irish context is the disproportionate level of incentives for diverse investment options; for example, the greater concentration of public resources in providing tax incentives for property investment compared with a lack of similar incentives for investing in the small business sector. Reconsideration of public policy to provide greater incentives for investing in SMEs would provide a 'more level playing field' for investment, and would raise levels of productive capital. Similarly, SME owners currently have a greater tax incentive to extract retained earnings from the firm and invest in a personal pension plan than to reinvest them in the business. Public policy aimed at developing and expanding capacity of the SME sector should consider making it more attractive for SME owners to reinvest retained profits than to extract them from the firm.

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