Chapter 10
Sources of Financing for New Technology Firms: Evidence from the Kauffman Firm Survey

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Abstract This article uses data from the Kauffman Firm Survey to explore the financing sources and strategies of new technology-based firms. Findings reveal that technology-based firms, and particularly high tech firms, raise larger amounts of capital at startup than firms on average. These findings also suggest that, contrary to the Pecking Order and Life Cycle theories, owners of high tech firms are both willing and able to use external equity as a financing source.

10.1 Introduction

Technology-based firms have been and will continue to be important contributors to the U.S. economy. For the last two decades, technology firms have been a major source of innovation, business development and growth, and new jobs. Securing funding for new technology-based firms is particularly problematic, however. Many such firms are built upon intellectual capital rather than on physical assets, so it is difficult to determine the value and prospects of the firm. The problem of asymmetric or incomplete information is especially acute (Brierley, 2001), often resulting in a shortage of capital or capital that can only be obtained under unfavorable terms and conditions.

Prior research suggests that the owners of new technology-based firms use a combination of personal equity and debt that is often secured by the personal assets of the entrepreneur. In this sense, new technology-based firms are not that different from new firms in general. As technology-based firms grow, however, it becomes increasingly important for them to attract external sources of capital. External debt in the name of the business is often a problem, since many of these firms have few tangible assets that can be used as collateral (Colombo and Grilli, 2007). There is

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also a higher risk of failure for firms based on new technologies, which serves as an added deterrent to bank lending (Guidici and Paleari, 2000). Some technology-based firms may be able to attract external equity in the form of angel investor and venture capital (Audretsch and Lehmann, 2004). This can also be a challenge as well, since it is difficult for investors to evaluate the demand for new technologies and products.

In this paper we will examine the financing sources and strategies of new technology-based firms using the Kauffman Firm Survey data. We identify not only sources of financing, but also financing gaps which may impede the launch, growth, and survival of technology-based small firms. Finally, we compare the patterns of financing observed in the data with the patterns prescribed by theory.

10.2 Capital Structure Theory

Capital structure refers to the mix of debt and equity used by firms to finance their long-term (fixed) assets. Debt is capital that has been loaned by other parties and must be repaid. In contrast, equity represents the investment made by owners or shareholders and is a permanent source of capital. As with other inputs to the firm, i.e. labor, equipment, facilities, both debt and equity have a cost. The mix of long term debt and equity is referred to as the firm's capital structure. The blended cost of the various sources of long term debt and equity is referred to as the firm's weighted average cost of capital (WACC).

Within the field of finance, capital structure theory is grounded in the work of Modigliani and Miller (1958) who initially wrote on the subject of capital structure in the electric utility industry. This theory, henceforth referred to as M&M, contends that firms will select the mix of debt and equity that maximizes the value of the firm and minimizes its weighted average cost of capital, both of which, in their theory, occur simultaneously. M&M's work was groundbreaking at the time, and has served as the basis for capital structure theory for almost 50 years.

Unfortunately, however, M&M does not necessarily hold for new, privately held firms, because it is based on the assumptions that there are no transaction costs of any kind and that investors and managers have the same information about the firm. M&M also assumes that firms have access to the full range of debt and equity alternatives. In the case of new firms in general, and technology-based firms in particular, however, informational asymmetries abound. Further, unlike, larger, publicly held firms, small firms typically do not have the option of issuing stocks and bonds, because the costs of doing so are prohibitive for smaller firms. Alternatively, they tend to be heavily reliant on other sources of capital including personal sources, bank loans, supplier credit, funding from private investors, venture capital, and, in some instances, government sources of funding.

Since M&M, several additional capital structure theories have emerged which may, in fact, be more applicable for small, new firms. Myers (1984) and Myers and Majluf (1984) developed a "pecking order" theory of finance. According to this theory, insiders have information about the firm that outsiders do not necessarily have. Because of this informational asymmetry, outside share purchasers will tend to under-price a firm's shares. In light of that, insiders prefer to use internal equity

in the form of retained earnings or debt before they resort to issuing external equity. Thus, there is a "pecking order" of financing sources geared toward allowing the business owner to retain the maximum amount of control for as long as possible. According to this theory, firm owners prefer to use internal equity first, followed by short-term debt, long-term debt, and, finally, new external equity.

As noted by Coleman and Cohn (2000), the pecking order theory is particularly applicable to firms that are small and privately held, precisely because the informational asymmetries are so large. Since small, privately held firms do not publish annual reports or submit reports to the Securities and Exchange Commission, their financial statements are not publicly available. Thus, outsiders have no way of knowing the financial condition of the firm. Their response to this lack of information is to assume a higher level of risk, and in turn, to demand a higher cost for equity capital. External equity is very costly for small, privately held firms, and is typically their last choice in terms of financing alternatives.

Berger and Udell (1998) put forth a "life cycle" theory of financing which contends that firms use different types of financing for different stages of growth. They noted that small, privately held firms, in particular, are "informationally opaque". Thus, they have a difficult time obtaining external sources of financing and tend to be more reliant on insider financing such as the personal financial resources of the firm owners, and, in instances where the firm is profitable, retained earnings. According to Berger and Udell, when firm owners do have to turn to external sources of financing, their preference is for debt rather than equity because debt does not require them to give up ownership or control of the firm. Informational asymmetries are particularly severe for early stage firms, those in the seed or developmental stages. As the firm moves through its life cycle, however, it becomes less "opaque" and has access to a broader array of funding sources.

If we consider these three theories of capital structure, we can understand why the case of new technology-based firms is particularly problematic. These firms are often informationally opaque because many are built upon new and proprietary technologies making it difficult to attract external sources of capital. At the same time, however, new technology-based firms are often subject to the pressures of rapid growth as they move through their life cycle, particularly if they focus on products, services, or markets that experience dramatic increases in demand. In light of these characteristics, it would seem inevitable that new technology-based firms would have to draw upon both internal and external sources of capital to launch, develop their products and services, manage rapid growth, and survive. This research will attempt to determine if their use of debt and equity is consistent with previously articulated theories of capital structure, or if it differs in substantive ways.

10.3 Prior Research

To date, there have been few research studies specifically targeting the financing strategies of new technology firms. A review of literature done by Brierley in 2001 (Brierley, 2001) cited a small number of studies conducted prior to that time. Those

studies that had been done, however, suggested that new technology-based firms face particular difficulties. These difficulties are associated with a lack of tangible assets that can be used as collateral, products that have little or no track record, and entry into untested markets. Brierley (2001) noted that angel investors and venture capitalists who might serve as funding sources to this sector have a difficult time identifying and evaluating the potential of high tech companies. He observed, however, that firms that were capable of securing SBIR (Small Business Innovation Research) awards or other external sources of funding were more likely to survive.

Brierley's findings were supported by an earlier study of firms that had received SBIR funding conducted by Lerner (1999). Lerner made use of a data set of firms that received SBIR funding between 1983 and 1997 compiled by the U.S. General Accounting Office. He found that SBIR awardees enjoyed substantially greater employment and sales growth than firms that did not receive awards. He also observed that SBIR awardees were more likely to receive venture capital funding. Lerner concluded that receipt of an SBIR award may convey information to potential investors thereby at least partially reducing the informational asymmetries associated with new technology-based firms. Audretsch (2002) also addressed the importance of SBIR funding, noting that a significant number of new technology-based firms would not have been started without its support.

Several studies have stressed the prominence of personal financing for new technology-based firms. They note that technology ventures are more risky than traditional businesses, and their prospects for success are more difficult to predict. In light of that, it is often difficult to obtain either external debt or equity. Moore (1994) surveyed a sample of high technology firms in Britain and found personal financing was the most important source of financing at startup. In his study, only 7% of technology startups were able to secure bank financing compared with 40% of all firms. Moore further noted that as the firms in his study matured, their financial constraints became less severe, and the firms in his study relied increasingly on banks and external equity as sources for expansion capital. Westhead and Storey (1997) also addressed the problem of financial constraints in a study of small high tech British firms. Twenty-five percent of the firms they surveyed reported that financing was a "continual" problem. In analyzing the results of their survey, the authors found that more technologically sophisticated firms were more likely to report continual financial constraints than firms based on less complex technologies.

These findings were echoed in a subsequent study of Danish information technology and biotechnology companies conducted by Bollingtoft et al. (2003). Their findings revealed that personal savings were the principal source of capital for new technology firms. The authors concluded, however, that different technology industries rely on different sources of capital. Bollingtoft et al. found that while firms in IT relied on personal savings and bank loans to some extent, those in biotechnology were much more reliant on external equity in the form of venture capital. Like Westhead and Storey (1997), Bollingtoft et al. concluded that it is more difficult to assess the risks associated with complex technologies. Thus, entrepreneurs in those fields have to put more effort into searching for capital and may have to rely more

on external equity obtained from investors who have knowledge and expertise in that field.

Guidici and Paleari (2000) found evidence of financing constraints in a study of Italian technology-based small firms, particularly for newer firms. In their study, 73% of startups were financed exclusively with the entrepreneurs' personal wealth. Short and long term debt represented the next most frequently used source, and only a small percentage of firms used external equity. In interviews with their sample firms, Guidici and Paleari found that the entrepreneurs were reluctant to open the firm to outside investors. In instances when outside equity was considered, it was typically used as a means to gain not only additional capital but additional competencies in the areas of technology or managerial expertise. The authors concluded that their findings provided support for the "Pecking Order Theory" of financing.

In another study of Italian firms, Columbo and Grilli (2007) also found that a financing hierarchy existed. The vast majority of firms in their study relied on internal sources of funding at startup and sought outside financing only when their personal financial resources were exhausted. At that point, the entrepreneurs turned to bank loans as a source of financing, and, finally, to outside private equity. Columbo and Grilli found that firms that relied on debt financing as an alternative to external equity raised dramatically less capital leading the authors to conclude that new technology-based firms suffer from credit rationing. They concluded that even if technology-based firms were able to get access to bank loans, the amounts provided were not sufficient to fund their growth.

In a study of German firms, Audretsch and Lehmann (2004) tried to establish a link between financing sources for technology-based firms and subsequent performance. Their findings revealed that venture capital-backed firms outperformed firms that did not receive venture capital. In contrast, firms that were financed by friends and family exhibited substantially lower growth rates. They concluded that venture capitalists specialize in a small group of targeted industries such as biotech and technology, thus leveraging their expertise in exchange for higher returns. Finally, Audretsch and Lehman found an inverse relationship between the amount of debt and the amount of equity used by technology-based firms leading them to conclude that traditional banks alone are not sufficient as a source of financing for innovative firms and particularly technology-based firms.

Several studies provide support for a "life cycle theory" of financing. Freear and Wetzel (1990) conducted an early study of new technology-based firms to find that sources of equity capital shifted as firms matured. They studied 284 technology-based firms launched in New England and found that 38% used no outside equity. Of those firms that did use outside sources of equity, private individuals were the most common source, followed by venture capitalists. However, venture capitalists provided much larger amounts of equity capital on average, compared with private individuals. Freear and Wetzel also found that while private investors dominated in the earliest stages of firm development, venture capitalists were more prominent in later rounds of financing.

Manigart and Struyf (1997) conducted an exploratory study of financing sources for a sample of high technology startups in Belgium. Their results revealed that the

most important source of financing was the entrepreneur himself, followed by bank financing because it did not require the entrepreneur to relinquish control. In the case of bank financing, however, substantial amounts of collateral were required to combat informational asymmetries. The firms surveyed also used funding from private individuals, venture capitalists, non-financial companies, and universities. Manigart and Struyf found that only a small number of startups used venture capital, because they did not want to give up control to outside parties, even if that meant hampering the growth of the firm. For those firms that survived, however, almost half used venture capital to fund later stages of growth. The authors concluded that the roles of private investors and venture capitalists are complementary with private investors playing a larger role in startup financing while venture capitalists play a greater role in funding early growth.

These findings were echoed in a more recent study by Bozkaya and De La Potterie (2008), which examined a sample of new Belgian firms to find support for both the life cycle and pecking order theories. Initially, development funding almost always came from personal savings and family and friends. As firms matured and became less informationally opaque, however, they were able to attract angel investors and venture capital financing. The authors concluded that the longer the entrepreneurial firm was able to survive on its own with internally generated funds, the lower the cost of external capital and the more control retained by the entrepreneur. In this sense their findings are consistent with Myers' pecking order theory of finance. They also concluded that, as the firm matures and moves through different stages of its "life cycle", different sources of funding become substitutes for each other. Thus, personal sources of financing are replaced by bank financing which is in turn replaced by angel and venture capital funding.

In contrast, Hogan and Hutson (2005) concluded that the pecking order theory does not do a good job of explaining the capital structure strategies of new technology-based firms. They surveyed a sample of Irish software companies to find that those firm owners not only used more external equity than debt but actually preferred external equity to debt. They noted that banks are not particularly appropriate sources of capital for high tech firms, because most of their loans are collateralized, and technology firms are based on intellectual rather than physical capital. Hogan and Hutson observed the venture capitalists and angel investors specialize by industry and are able to provide not only capital but also time and expertise. In their study, they found that entrepreneurs were willing to trade off ownership and control in exchange for the longer term goals of growth and value. Their findings are consistent with earlier work done by Hustedde and Pulver (1992) using a sample of U.S. firms seeking equity capital. In that study the authors found that those entrepreneurs who were willing to surrender a higher percentage of equity to outside investors were more successful in raising equity capital.

This study, using the Kauffman Firm Survey data, will be one of the first studies of small technology firms using a large, longitudinal database of new U.S. firms. We will identify the financing sources, both debt and equity, used by new technology firms at startup and in subsequent years. We will also determine the amounts of

financing used, and the relative importance of internal versus external sources of debt and equity. In this fashion, we hope to identify not only financing sources but also financing constraints that may impede the growth and development of new technology firms. We will also determine if the capital structures of these new firms are consistent with previously articulated theories of capital structure.

10.4 Data

The Kauffman Firm Survey (KFS) is a longitudinal survey of new businesses in the United States. This survey collected information on 4,928 firms that started in 2004 and surveys them annually. This cohort is the first large national sample of firm startups that will be tracked over time. These data contain detailed information on both the firm and up to ten business owners per firm. In addition to the 2004 baseline year data, there are 3 years of follow up data (2005–2007) now available. Additional years are planned. Detailed information on the firm includes industry, physical location, employment, profits, intellectual property, and financial capital (equity and debt) used at startup and over time. Information on up to ten owners includes age, gender, race, ethnicity, education, work experience, and previous startup experience. The detail provided by these data allows us to compare the financial strategies and the use of both debt and equity for new firms over the period 2004 through 2007. For more information about the KFS survey design and methodology, please see Robb et al. (2009a). A public use dataset is available for download from the Kauffman Foundation's website and a more detailed confidential dataset is available to researchers through a data enclave provided by the National Opinion Research Center (NORC). For more details about how to access these data, please see www.kauffman.org/kfs.

The sampling frame for the KFS is based on the Dun & Bradstreet (D&B) database, which was partitioned into sampling strata defined by industrial technology categories (based on industry designation). The high and medium technology strata were defined based on categorization developed by Hadlock et al. (1991), which took into account the industry′s percentage of R&D employment and classified the businesses into technology groups based on their Standard Industrialization Classification (SIC) codes. High technology businesses were oversampled. Specifically, the original sampling design called for 2,000 interviews to be completed among businesses in two categories of high-technology businesses and 3,000 interviews to be completed among businesses in all other industrial classifications. The industries that make up each technology strata are listed in Table 10.1. Firms are defined as high tech, medium tech, and low tech. For more information on the survey methodology and sampling frame, see Robb et al. (2009a). A subset of the confidential dataset is used in this research – those firms that have data for all four survey years and those that have been verified as going out of business over the 2004–2007 period. This reduces the sample size to 3,974 businesses.

Table 10.1 Technology strata definitions

Technology stratum	SIC Code	Industry
High tech	28	Chemicals and allied products
	35	Industrial machinery and equipment
	36	Electrical and electronic equipment
	38	Instruments and related products
Medium tech	131	Crude petroleum and natural gas operations
	211	Cigarettes
	291	Petroleum refining
	299	Miscellaneous petroleum and coal products
	335	Nonferrous rolling and drawing
	371	Motor vehicles and equipment
	372	Aircraft and parts
	376	Guided missiles, space vehicles, parts
	737	Computer and data processing services
	871	Engineering and architectural services
	873	Research and testing services
	874	Management and public relations
	899	Services, not elsewhere classified
	229	Miscellaneous textile goods
	261	Pulp mills
	267	Miscellaneous converted paper products
	348	Ordnance and accessories, not elsewhere classified
	379	Miscellaneous transportation equipment
Low tech/non tech		All other industries

10.5 Descriptive Statistics

Tables 10.2, 10.3, 10.4, 10.5, and 10.6 provide descriptive statistics for 2004 and 2007 for high tech and low tech firms included in the Kauffman Firm Survey. These statistics reveal some striking differences between the two groups. Table 10.2 demonstrates that high tech firms were less likely to be organized as sole proprietorships or partnerships (27.4% vs. 43.2%) than as limited liability entities or corporations (72.7% vs. 56.8%) at startup. High tech firms were also less likely to be home-based (38.4% vs. 47.8%). In terms of revenues, profits, assets, and employment, high tech firms outperformed low tech firms in all four measures during the startup year. In fact, the employment potential for high tech firms was particularly noteworthy. Although 41% of low tech firms had employees in 2004, 46.9% of high tech firms had employees. Further, high tech firms employed a larger number of employees on average than low tech firms (2.9 vs. 1.9).

These differences persisted into the third follow-up year. By 2007, only 20.4% of high tech firms were organized as either sole proprietorships or partnerships compared to 40.5% of low tech firms. High tech firms were thus much more likely to start and to evolve into a more complex organizational structure. By 2007 also, two-thirds (68.3%) of high tech firms had employees compared to 56.7% of low tech

Table 10.2 Firm outcomes in 2004 and 2007

	2004		2007 (Surviving)	
	High tech	Low tech	High tech	Low tech
Sole Proprietorship	0.238	0.372	0.192	0.352
Partnership	0.036	0.06	0.012	0.053
Corporation	0.409	0.269	0.465	0.297
Limited Liability Corporation	0.318	0.299	0.331	0.295
Home Based	0.384	0.478	0.331	0.471
Employer Firm	0.469	0.41	0.683	0.567
Employment	2.893	1.898	6.438	3.692
Revenues	78096.84	53775.27	258237.43	151357.81
Profits	31916.13	22743.11	84169.00	53146.17
Assets	107241.65	72694.78	215022.36	123665.12

Source: Kauffman Firm Survey Microdata. Sample includes only surviving firms over the 2004–2007 period, and firms that have been verified as going out of business over the same period. The original sample size in 2004 was 4,928

Table 10.3 Firm innovation

	2004			2007		
	All firms	Just those with x > 0	% of firms w/x > 0	All firms	Just those with x > 0	% of firms w/x > 0
High tech firms						
Number of Patents	0.57	4.44	0.133	0.77	4.53	0.176
Number of Copyrights	0.88	7.91	0.119	0.86	8.4	0.112
Number of Trademarks	0.42	2.03	0.214	0.55	2.52	0.238
Employees	2.89	6.17		6.44	9.42	
Low tech firms						
Number of Patents	0.13	7.74	0.018	0.15	7.78	0.022
Number of Copyrights	0.88	12	0.077	1.45	18.99	0.083
Number of Trademarks	0.27	2.1	0.134	0.35	2.92	0.134
Employees	1.9	4.62		3.69	6.51	

firms. The average number of employees was 6.4 and 3.7 respectively. In terms of revenues, profits, and assets, the gap between high tech and low tech firms increased. High tech firms had average revenues of $258,237 and profits of $84,169 compared with $151,358 and $53,146 for low tech firms. Finally, by 2007, high tech firms had 75% more assets than low tech firms ($215,022 vs. $123,665).

Table 10.3 provides a comparison of the level of innovation and intellectual property in high tech and low tech firms. It demonstrates that a higher percentage of high tech firms had some type of intellectual property at startup; 13.3% had patents, 11.9% had copyrights, and 21.4% had trademarks compared to 1.8%, 7.7%, and 13.4% for low tech firms. Interestingly enough, however, low tech firms that had

Table 10.4 Financial capital structure in 2004

By technology strata, credit score, and conditional on getting outside equity

	All firms	High tech High CS	High tech w/outside equity	Low tech High CS	Low tech w/outside equity
Owner equity	29567.36	65228.91	52415.68	47867.59	94223.14
Informal equity	1907.16	3692.44	9708.28	4174.6	7462.68
Formal equity	7628.91	128688.36	317297.64	12581.9	146379.39
Owner debt	3509.68	3163.6	6114.33	3457.86	8284.52
Informal debt	8021.2	26087.16	33276.47	18359.19	15405.46
Formal debt	33358.9	88526.29	130886.33	71897.51	109723.67
Total financial capital	83993.21	315386.75	549698.73	158338.66	381478.85
Zero financial capital	0.1	0.06		0.12	
Owner equity	0.35	0.21	0.09	0.30	0.25
Informal equity	0.02	0.01	0.02	0.03	0.02
Formal equity	0.09	0.41	0.58	0.08	0.38
Owner debt	0.04	0.01	0.01	0.02	0.02
Informal debt	0.09	0.08	0.06	0.11	0.04
Formal debt	0.40	0.28	0.24	0.45	0.29
Total financial capital	1	1	1	1	1
N	3974	81	61	271	103

Source: Kauffman Firm Survey Microdata. Sample includes only surviving firms over the 2004–2007 period, and firms that have been verified as going out of business over the same period. The original sample size in 2004 was 4,928

Table 10.5 Detailed financial capital structure in 2004

By technology strata, credit score, and conditional on getting outside equity

	All firms	High tech High CS	High tech w/out.equity	Low tech High CS	Low tech w/out.equity
Owner equity	29567.36	65228.91	52415.68	47867.59	94223.14
Informal equity	1907.16	3692.44	9708.28	4174.6	7462.68
Spouse equity	544.22	871.16	690.88	249.26	1364.07
Parent equity	1362.94	2821.28	9017.4	3925.34	6098.61
Formal equity	7628.91	128688.36	317297.64	12581.9	146379.39
Other informal investors	3004.85	37395.45	82960.02	5695.9	64037.65
Other business equity	2058.04	16558.18	65486.75	0	41634.42
Government equity	501.63	14062.45	31982.31	1086.8	8667.3
Venture capital equity	1686.16	60672.28	136017.96	5575.63	22656.63
Other equity	378.23	0	850.59	223.57	9383.39
Owner debt	3509.68	3163.6	6114.33	3457.86	8284.52
Personal credit card –owner	3182.36	2997.14	5891.34	3296.44	7277.35
Personal credit card-other owners	301.77	166.46	222.98	161.42	418.02
Other personal owner loan	25.55	0	0	0	589.14
Informal debt	8021.2	26087.16	33276.47	18359.19	15405.46
Personal family loan	2844.57	2504.61	3199.05	3977.04	6167.71
Personal family loan-other owners	303.6	0	0	0	1109.6
Business loan from family					
Business loan from owner					
Business loan FROM employee(s)	62.99	0	0	30.13	18.6
Other personal loan	578.56	15551.81	22743.28	1088.79	1349.39
Other personal funding	831.87	0	1773.05	1271.93	1819.4
Formal debt	33358.9	88526.29	130886.33	71897.51	109723.67
Personal bank loan	10647.69	14318.69	27701.75	20917.22	30832.99
Business credit card	1394.45	2250.87	1179.09	1638.85	2642.02
Other bank loan	1502.98	2835.18	3024.48	1635.72	5971.72
Business credit card-other owners	171.2	3.19	1090.01	145.25	405.34
Business credit cards	882.61	1337.27	4001.7	1283.75	1827.91
Bank business loan	10725.26	25059.47	33489.96	18094.84	38926.18
Credit line	3889.46	7998.63	5299.11	16884.33	2706.73
Other non-bank loan	2254.1	17940.34	27560.3	5477.01	13648.86
Government business loan	793.91	0	5582.89	796.8	1750.33
Other business loan	188.2	432.33	820.03	707.91	0
Other individual loan	263.07	15551.81	21132.94	663.08	1205.33
Other business debt	645.97	798.51	4.07	3652.76	9806.26
Total financial capital	83993.21	315386.75	549698.73	158338.66	381478.85
N	3974	81	61	271	103

Source: Kauffman Firm Survey Microdata. Sample includes only surviving firms over the 2004–2007 period, and firms that have been verified as going out of business over the same period. The original sample size in 2004 was 4,928

Table 10.6 Capital structure for high performing firms (2004 financing and 2007 outcomes)

	All firms	High tech > 100 K Rev	Low tech > 100 K Rev	High tech Employment > 5	Low tech Employment > 5
Owner equity	29567.36	64669.58	45200.86	92303.47	60959.2
Informal equity	1907.16	2834.91	1663.62	3382.84	2707.13
Formal equity	7628.91	34578.1	16425.04	75482.11	26929.49
Owner debt	3509.68	5053.35	3748.6	6598.7	4894.8
Informal debt	8021.2	9088.39	13092.03	10097.62	21275.48
Formal debt	33358.9	52902.68	59178.86	72780.53	87052.94
Total financial capital	83993.21	169127.02	139309.01	260645.27	203819.04
Owner equity	0.35	0.38	0.32	0.35	0.30
Informal equity	0.02	0.02	0.01	0.01	0.01
Formal equity	0.09	0.20	0.12	0.29	0.13
Owner debt	0.04	0.03	0.03	0.02	0.02
Informal debt	0.09	0.05	0.10	0.04	0.10
Formal debt	0.40	0.31	0.42	0.28	0.43
Total financial capital	1	1	1	1	1

Source: Kauffman Firm Survey Microdata. Sample includes only surviving firms over the 2004–2007 period, and firms that have been verified as going out of business over the same period. The original sample size in 2004 was 4,928

either patents or copyrights had a higher number on average, than high tech firms. Both high tech and low tech firms with intellectual property also had a higher number of employees on average than all firms in the data set. The same pattern held for firms surviving into 2007. Although a higher percentage of high tech firms had patents, copyrights, or trademarks, low tech firms had a greater number of patents and copyrights on average. As in 2004, firms with intellectual property had more employees than all firms suggesting a link between intellectual property, which can serve as a competitive advantage, and job creation.

Table 10.4 provides insights into the financing sources and strategies of technology-based firms. Consistent with prior research, the dominant sources of capital at startup for all firms in the Kauffman Survey were owner provided equity (35.2%) and external debt (39.7%). Alternatively, less than 10% of total financing came in the form of external equity (9.1%). Ten percent of firms in the total sample actually reported that they started with no financial capital.

For purposes of analysis, we divided technology-based firms into four different categories; high tech firms with high credit scores, low tech firms with high credit scores, high tech firms that used external equity, and low tech firms that used external equity. Our reasoning was that technology-based firms with high credit scores should be in a better position to attract external sources of debt. Because of the rigorous screening process typically associated with securing external sources of equity, we also reasoned that technology-based firms able to secure external equity would be those with the best prospects for success. Thus, these firms should be in a position to attract larger amounts of capital, both internal and external.

Our findings reveal that the financing sources used by low tech firms with high credit scores were roughly the same as for all firms in the sample as reported above. The dominant sources of capital were owner-provided equity (30.2%) and formal or external debt (45.4%). External equity represented only 7.9% of total financing. The finding is consistent with prior research on small firms and would seem to provide support for the Pecking Order theory. In the case of high tech firms, however, external equity played a much larger role. High tech firms with high credit scores obtained 40.8% of total financing from external equity. Conversely, they used much smaller percentages of both owner equity (20.7%) and external debt (28.1%). High tech firms that actually used external equity, used it satisfy over half of their financing needs (57.7% vs. 38.4% for low tech firms).

Table 10.4 also reveals that high tech firms were able to raise substantially larger amounts of both external equity and external debt at startup. High tech firms with high credit scores raised an average of $128,688 in external equity and $88,526 in external debt compared to $12,582 and $71,898 for low tech firms with high credit scores. High tech firms that used external equity raised an average of $317,298 in external equity and $130,886 in external debt, while low tech firms using external equity raised $146,397 and $109,724 respectively. It would seem obvious from these comparisons that starting a business in a high tech field enhances the firm's ability to attract external sources of capital, even at startup, when external sources tend to be limited. It is also noteworthy that technology-based firms in general, both high tech and low tech, raised substantially larger amounts of capital on average than all firms included in the Kauffman data set.

A more detailed breakdown of financing sources and amounts at startup is provided in Table 10.5. As in the case of Table 10.4, Table 10.5 reveals that high tech firms were much more successful in raising capital and, in particular, external sources of capital than all firms in the Kauffman data set. Although low tech firms with high credit scores raised twice as much capital as all firms ($158,339 vs. $83,993), high tech firms with high credit scores raised more than three times as much ($315,387 vs. $83,993). Correspondingly, high tech firms that raised external equity raised substantially more total financial capital on average than low tech firms that raised external equity ($549,699 vs. $381,479).

Table 10.6 provides insights into the initial capital structures of firms that (a) survived until 2007 and, (b) achieved a certain size level in terms of revenues and number of employees. For purposes of analysis, separate categories were created for high tech firms that achieved revenues in excess of $100,000 by 2007, low tech firms that achieved the same level of revenues, high tech firms with more than 5 employees by 2007, and low tech firms with more than 5 employees by 2007. Table 10.6 reveals that high tech firms with revenues in excess of $100,000 started with higher levels of owner equity (38.2%) and external equity (20.4%) and lower levels of external debt (31.3%) than either low tech firms with sales in excess of $100,000 or all firms in the sample. High tech firms with more than 5 employees by 2007 also started with higher levels of owner equity (35.4% vs. 29.9%), and external equity (29.0% vs. 13.2%), and lower levels of external debt (27.9% vs. 42.7%) than low tech firms. These results suggest a link between the firm's ability to attract external equity and

its subsequent performance as measured by revenues and employment. As noted earlier, the screening process for obtaining external sources of equity is a rigorous one. Thus, it stands to reason that those firms that attract external equity are the firms most likely to succeed. It is also possible that firms having high levels of owner provided equity send a positive signal to external equity providers. Owners, as insiders, are in the best position to see the firm's longer term potential. If they are optimistic, they can signal their optimism by investing larger amounts of personal equity.

The comparisons presented in Tables 10.4 through 10.6 indicate that high tech firms have an advantage in terms of their ability to attract external equity in particular, and larger amounts of financial capital in general. It also appears that the owners of those firms are willing to seek out and use external sources of equity, even if it involves sharing ownership and control. The Pecking Order theory suggests that firms will choose to use internal sources of capital, followed by external debt, and then external equity. Further, prior research has suggested that the Pecking Order theory does a good job of explaining the financing choices of small and entrepreneurial firms (Coleman and Cohn, 2000; Guidici and Paleari, 2000). Our results suggest, however, that the Pecking Order theory may not do such a good job of explaining the financing behavior of new high tech firms, particularly higher quality firms. These results imply that those firms are able to attract larger amounts of external equity, and that their owners are actually more willing to use external equity rather than external debt. The Life Cycle theory of financing (Berger and Udell, 1998) contends that newer firms are informationally opaque and have a difficult time attracting external sources of financing. In contrast, our findings reveal that technology-based firms, particularly high quality firms and high tech firms, are adept at attracting substantial amounts of both debt and equity capital. We will explore these findings regarding capital sources and structure more thoroughly through the use of multivariate analysis.

10.6 Multivariate Analysis

Table 10.7 provides a probit analysis based on 2004 (startup) data in which various sources of debt and equity are used as the dependent variables. Thus, each probit model indicates the probability that firms in the sample will use the type of financing represented by the dependent variable. Dependent variables include (1) outside debt, (2) bank loans, (3) insider financing, and (4) outsider equity. Outside debt includes bank loans used for the business (both business and personal), lines of credit, business credit cards, government business loans, and other loans for the business. Bank loans include only personal and business bank loans used for the business. Insider financing includes both debt and equity provided by a parent, spouse, other family members, or employees. Finally, outsider equity includes angel, venture capital, or government equity financing. In total, these four different categories of financing provide an indication of the probability that firm owners are able to generate non-owner sources of financing. Independent variables include measures of firm

Table 10.7 Probit analysis: probability of financing

	Outside debt	Bank loans	Insider financing	Outsider equity
hightech	0.117***	0.0225*	0.155***	0.0458*
	(0.0307)	*(0.0135)*	*(0.0329)*	*(0.0262)*
lowtech	0.0885***	–0.00164	0.118***	0.0376***
	(0.0201)	(0.00755)	(0.0148)	(0.0143)
hours_own	0.00248***	0.000240*	0.00139***	0.00236***
	(0.000419)	*(0.000134)*	*(0.000345)*	*(0.000290)*
age_own	0.0117**	0.00396*	0.0107**	–0.00800**
	(0.00593)	*(0.00231)*	*(0.00503)*	*(0.00404)*
agesq	–0.000113*	–0.0000400*	–0.0000931*	0.0000609
	(0.0000629)	*(0.0000238)*	*(0.0000534)*	*(0.0000433)*
hsgrad	0.00872	0.0149	0.0519	–0.0968***
	(0.0726)	*(0.0412)*	*(0.0685)*	*(0.0258)*
somecoll	0.0354	0.0487	0.0560	–0.108***
	(0.0690)	*(0.0422)*	*(0.0617)*	*(0.0343)*
colldeg	0.0329	0.0401	0.0579	–0.130***
	(0.0696)	*(0.0428)*	*(0.0630)*	*(0.0308)*
graddeg	0.0444	0.0560	0.0934	–0.0928***
	(0.0722)	*(0.0571)*	*(0.0698)*	*(0.0289)*
work_exp	–0.00432***	–0.000403	–0.00336***	–0.00249***
	(0.000971)	*(0.000325)*	*(0.000808)*	*(0.000737)*
startup	0.00419	0.00323	0.0190	0.0105
	(0.0196)	*(0.00657)*	*(0.0164)*	*(0.0139)*
multiown	0.0599***	0.0320***	0.0486***	–0.0138
	(0.0203)	*(0.00818)*	*(0.0173)*	*(0.0143)*
dbscore	0.00206***	0.000143	0.00156***	0.0000556
	(0.000420)	*(0.000135)*	*(0.000350)*	*(0.000297)*
homebase_04	–0.0798***	–0.0335***	–0.0704***	–0.0608***
	(0.0199)	*(0.00722)*	*(0.0165)*	*(0.0145)*
intprop_04	–0.0106	0.0238**	–0.00200	0.0472**
	(0.0241)	*(0.00958)*	*(0.0198)*	*(0.0192)*
compadv_04	0.0432**	–0.00706	–0.000586	0.0133
	(0.0200)	*(0.00728)*	*(0.0168)*	*(0.0145)*
product_04	0.0449	0.00932	0.0346	–0.000510
	(0.0298)	*(0.00893)*	*(0.0239)*	*(0.0214)*
both_04	–0.0121	–0.0131	–0.00983	–0.00349
	(0.0299)	*(0.00835)*	*(0.0239)*	*(0.0214)*
black	–0.0560*	0.000388	–0.0421	0.0719**
	(0.0339)	*(0.0133)*	*(0.0281)*	*(0.0284)*
asian	–0.0161	–0.00786	–0.0298	0.0712*
	(0.0479)	*(0.0124)*	*(0.0363)*	*(0.0408)*
other	–0.0341	–0.0149	–0.0520	0.0750
	(0.0591)	*(0.0174)*	*(0.0444)*	*(0.0555)*
hispanic	–0.00972	–0.0186**	–0.0112	0.0771**
	(0.0430)	*(0.00946)*	*(0.0349)*	*(0.0354)*
female	–0.0283	–0.0175***	–0.0212	0.00877
	(0.0215)	*(0.00639)*	*(0.0176)*	*(0.0157)*
Observations	3751	3751	3751	3751

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

and owner characteristics revealed by prior research to have an impact on capital structure. These include measures of owner characteristics such as age, education, experience, hours devoted to the business, gender, race, and ethnicity, and firm characteristics such as organizational structure and credit quality. Independent variables are also included to indicate whether or not the firm had some type of intellectual property or competitive advantage. Finally, there are dichotomous variables designating high tech and low tech firms. The excluded category is medium tech firms.

Table 10.7 reveals that both high tech and low tech firms had a significantly higher probability of using outside debt, insider financing, and outsider equity than medium tech firms. High tech firms also had a significantly higher probability of using bank loans. These findings suggest that high tech firms have an advantage over medium tech firms in terms of generating both internal and external non-owner sources of financing. Consistent with this, firms with some type of intellectual property also had a significantly higher probability of securing external financing in the form of bank loans and outsider equity. Our findings regarding the financing sources of high tech firms seem to contradict the Life Cycle theory which states that new firms have a difficult time attracting external sources of capital.

Other firm characteristics that had an impact on financing include measures of ownership structure and credit quality. Firms with multiple owners had a significantly higher probability of using outside debt, bank loans, and insider financing. Multiple owners may have more assets than can be used as collateral, and they also have a larger network of family members willing to provide internal equity. Conversely, home-based businesses had a significantly lower probability of using any of the four types of financing, possibly due to their smaller size and limited financing requirements. Not surprisingly, firms with higher credit scores had a greater probability of using outside debt. Firms with higher credit scores also had a significantly higher probability of using insider financing. This finding is consistent with the Pecking Order theory which states that firm owners prefer to use both internal equity and debt before turning to external equity. By doing so they are able to maintain control and avoid diluting their ownership position. High credit scores enable them to attract sources of external debt thus minimizing the amount of capital needed from external equity providers.

Table 10.7 reveals that a number of owner characteristics were associated with the probability of using various sources of financing. Firm owners who worked more hours had a significantly higher probability of using all four types of financing. This stands to reason, since the process of searching for and obtaining capital is a labor intensive and time consuming one. Older owners had a higher probability of using outside debt, bank loans, and insider financing. Conversely they had a significantly lower probability of using outsider equity. It is possible that older owners have had more time to develop contacts with providers of debt capital and potential sources of insider financing. Thus, consistent with the Pecking Order theory again, they prefer to use insider financing and outside debt rather than outsider equity. Similarly, Table 10.7 indicates that more highly educated owners were significantly less likely to use outsider equity as a source of financing, possibly because they are more aware

of the risks associated with giving up control and diluting their ownership position. More educated owners may also feel that they have sufficient human capital to be able to manage the firm without the help of external providers of equity.

Table 10.8 provides the results of a regression analysis in which the ratios of outside debt, bank loans, insider financing, and outsider equity to total financial capital were used as the dependent variables. Whereas Table 10.7 provided an analysis of the probability that firms would use each type of financing, Table 10.8 provides an indication of the level of each type of financing used. As in the case of Table 10.7, the analyses provided in Table 10.8 is based on 2004 (startup year) data, and medium tech firms are the excluded category.

Table 10.8 reveals that high tech firms used a significantly higher ratio of outside debt, bank loans, and outsider equity than medium tech firms in the sample. Low tech firms also had a significantly higher ratio of outside debt and bank loans than medium tech firms. Although low tech firms had a significantly lower ratio of outside equity to total financial capital, the difference was not significant. These findings suggest that high tech startups have an advantage over other types of firms in attracting external sources of debt and equity. Consistent with this finding, firms with some type of intellectual property also financed with a higher percentage of outsider equity. These findings, again, would seem to contradict the Life Cycle theory of financing.

Other significant variables included measures of hours worked and organizational structure. Owners who worked longer hours used significantly higher ratios of bank debt and insider capital. Owners who work longer hours may be those who are most committed to the success of the firm. Thus, they are willing to commit not only human capital but also the financial capital of other family members. Firms with multiple owners were able to secure higher ratios of outsider debt, bank loans, and outsider equity, possibly because multiple owners have access to a wider network of external funding sources. Home-based businesses raised significantly lower ratios of all four types of capital, perhaps due to the limited nature of their needs as well as their limited prospects for growth and profits.

Measures of owner age, educational attainment, and industry experience were also significant. Older owners used significantly higher ratios of outside capital (outside debt, bank loans, and outsider equity) than the owners of all firms. It is possible that older owners, like multiple owners, have developed a network of external funding contacts and sources over time. Over the course of their careers, older owners may also have developed credibility with external funding sources. Table 10.8 reveals that educational attainment was associated with a lower ratio of insider financing. In this sense, education may serve as a signal of high human capital, making it easier to attract external rather than internal sources of financing. In keeping with this, firm owners that were more highly educated used a higher ratio of both bank loans and outsider equity although these differences were not significant. Interestingly, firm owners with more years of industry experience, another form of human capital, used significantly smaller ratios of both outside debt and bank loans, possibly due to prior bad experiences with debt. Not surprisingly, firms with higher credit scores used higher ratios of outside debt and bank loans.

Table 10.8 OLS Regressions of ratios of source of financing to total financing

	Outside debt	Bank loans	Insider financing	Outsider equity
hightech	0.0676***	0.0599***	0.00572	0.0240**
	(0.0186)	*(0.0150)*	*(0.0120)*	*(0.0107)*
lowtech	0.0589***	0.0652***	0.0153*	–0.00965
	(0.0125)	*(0.00929)*	*(0.00838)*	*(0.00607)*
hours_own	0.000523*	0.000348	0.000727***	0.00000210
	(0.000272)	*(0.000228)*	*(0.000178)*	*(0.0000820)*
age_own	0.00947***	0.00645**	–0.00740***	0.00340***
	(0.00351)	*(0.00298)*	*(0.00277)*	*(0.000947)*
agesq	–0.0000966***	–0.0000628**	0.0000622**	–0.0000338***
	(0.0000368)	*(0.0000317)*	*(0.0000279)*	*(0.00000987)*
hsgrad	–0.0119	0.0347	–0.152***	0.00198
	(0.0552)	*(0.0398)*	*(0.0483)*	*(0.0113)*
somecoll	–0.0237	0.0357	–0.148***	0.00918
	(0.0526)	*(0.0377)*	*(0.0471)*	*(0.0105)*
colldeg	–0.0346	0.0207	–0.160***	0.00757
	(0.0527)	*(0.0376)*	*(0.0472)*	*(0.0109)*
graddeg	–0.0209	0.0405	–0.156***	0.0125
	(0.0538)	*(0.0386)*	*(0.0476)*	*(0.0118)*
work_exp	–0.00131**	–0.00150***	–0.000479	–0.0000979
	(0.000650)	*(0.000526)*	*(0.000394)*	*(0.000224)*
startup	0.000781	0.00814	0.000368	0.00494
	(0.0129)	*(0.0106)*	*(0.00840)*	*(0.00418)*
multiown	0.0375***	0.0353***	–0.00174	0.0174***
	(0.0139)	*(0.0117)*	*(0.00922)*	*(0.00505)*
dbscore	0.00108***	0.000719***	0.0000362	–0.0000248
	(0.000292)	*(0.000243)*	*(0.000192)*	*(0.0000979)*
homebase_04	–0.0455***	–0.0296***	–0.0379***	–0.0171***
	(0.0131)	*(0.0109)*	*(0.00931)*	*(0.00445)*
intprop_04	–0.0261*	–0.0265**	0.0127	0.0127**
	(0.0150)	*(0.0117)*	*(0.0111)*	*(0.00568)*
compadv_04	–0.00972	–0.0104	–0.000125	–0.00190
	(0.0135)	*(0.0110)*	*(0.00910)*	*(0.00452)*
product_04	0.0141	0.0182	–0.00673	0.00611
	(0.0200)	*(0.0168)*	*(0.0132)*	*(0.00712)*
both_04	–0.00147	–0.00718	–0.00173	–0.0116*
	(0.0200)	*(0.0170)*	*(0.0133)*	*(0.00695)*
black	–0.0476**	–0.0385**	0.00166	–0.00823*
	(0.0211)	*(0.0162)*	*(0.0144)*	*(0.00499)*
asian	–0.0234	–0.00938	0.0673**	0.00701
	(0.0330)	*(0.0279)*	*(0.0284)*	*(0.0145)*
other	0.000789	–0.0000353	0.0210	–0.0111
	(0.0405)	*(0.0366)*	*(0.0280)*	*(0.00790)*
hispanic	–0.0299	–0.0146	0.0312	–0.0159***
	(0.0279)	*(0.0232)*	*(0.0226)*	*(0.00479)*
female	–0.0130	–0.00745	–0.000900	–0.0153***
	(0.0144)	*(0.0117)*	*(0.00941)*	*(0.00389)*
Constant	–0.0714	–0.136*	0.409***	–0.0523**
	(0.0993)	*(0.0803)*	*(0.0802)*	*(0.0244)*
Observations	3385	3385	3385	3385
R-squared	0.038	0.039	0.052	0.032

Standard errors in parentheses
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

In terms of differences by gender, women-owned firms used a significantly lower ratio of outsider equity than men. They also used lower ratios of outside debt, bank loans, and insider financing, although these differences were not significant. These findings suggest that, consistent with prior research, women-owned firms are more reliant of owner-provided sources of financing (Coleman and Robb, 2009). Possible reasons for the differences between women- and men-owned firms could be that women tend to start smaller firms, they may be more risk averse, or they may not have access to networks that could provide external sources of debt and equity.

Black-owned firms used a significantly lower ratio of outside debt, bank loans, and outside equity than all firms, while Hispanic-owned firms used a significantly lower ratio of outsider equity. It is noteworthy that Black-, Hispanic-, and Asian-owned firms all used a higher ratio of insider financing than all firms in the sample. This suggests that minority-owned firms, in general, are more dependent on financing from family members and other insiders rather than external sources of either debt or equity. These findings are also consistent with prior research indicating that minority-owned firms are less likely to use external sources of capital possibly due to the types of businesses they start, lack of access to formal providers of capital, and intentional or unintentional forms of discrimination (Coleman, 2002; Coleman, 2003; Robb et al. 2009b).

10.7 Summary and Conclusions

This research examines the sources and amounts of financing used by startup firms included in the Kauffman Firm Survey data. In particular, it was our intent to focus on the financing strategies of new technology-based firms. Our findings revealed that technology-based firms raised larger amounts of capital than all firms included in the sample. Further, both high tech and low tech firms raised larger amounts of non-owner financing than all firms. In the case of high tech firms, they were much more reliant on outsider equity than either low tech firms or all firms. Conversely, low tech firms were much more similar to all firms in their financing strategy in the sense that they relied primarily on owner-provided equity and external debt.

Multivariate analysis broadened our understanding of these discrepancies. We found that both high tech and low tech firms had a greater probability of using outside debt, insider financing, and outsider equity than medium tech firms. High tech firms also had a significantly higher probability of using bank loans than medium tech firms. These findings suggest that high tech firms, in particular, have an advantage in terms of their ability to seek out and attract non-owner sources of financing which can be used to fund operations, research and development, new products and services, and growth.

We also found that high tech and low tech firms were able to attract not only more sources of financing but higher levels of financing at startup. High tech firms used significantly higher ratios of outside debt, bank loans, and outside equity than medium tech firms, while low tech firms used significantly higher ratios of outside debt, bank loans, and insider financing. These are sources of non-owner financing

that can be decisive in helping new firms survive and grow during the critical startup period.

Our findings seem to disprove the Pecking Order and Life Cycle theories, at least in the case of high tech firms. The Pecking Order theory states that firm owners prefer to use inside equity and outside debt to avoid diluting their ownership position and giving up control. Our results reveal, however, that high tech firms had a significantly higher probability of using both outside debt and outsider equity than medium tech firms. These results suggest that the owners of high tech firms are more open to using a number of different sources of financing to ensure firm survival, development, and growth. It appears that the owners of high tech firms are willing to trade off their concerns regarding dilution and control in return for larger amounts of external capital that will help them to achieve firm goals. By the same token, these results seem to refute the Life Cycle theory which states that newer firms are forced to rely on internal rather than external sources of capital. Our findings reveal that technology based firms raised substantial amounts of both external debt and equity, even in their startup year. To prove a point, high tech firm owners who used outside equity raised over five times as much capital in the startup year as all firms ($549,699 vs. $83,993). It would seem that external providers of capital are attracted by technology-based firms' prospects for growth and profits, even during the early stages of their existence.

Our results also revealed differences in the financing patterns of women and minority firm owners. Women were significantly less likely to use outside debt, bank loans, or insider financing than all firms. This finding is consistent with prior research indicating that women are more reliant on personal or owner-provided sources of financing than on external sources. Not surprisingly, women also had lower ratios of non-owner financing in the form of outside debt, bank loans, insider financing, and outsider equity. This pattern suggests the possibility of both demand and supply side constraints on women-owned startups. Prior research reveals that women start smaller firms than men and may have more limited financing requirements (Carter and Allen, 1997; Fairlie and Robb, 2009). Women may also be more reluctant to use external sources of financing, because they do not want to increase the riskiness of the firm, or alternatively, because they do not want to give up control. From a supply side perspective, however, some research contends that women use smaller amounts of external capital because they are excluded from the types of male-dominated angel investor and venture capital networks that typically provide it (Greene et al., 2001). These questions provide opportunities for further research on the financing strategies of women launching technology-based firms.

Finally, our findings revealed that, for the most part, minority firm owners were less likely to use external sources of financing. Further, when they did use external financing, they used significantly lower ratios of external sources of financing than all firms. Black-owned, Asian-owned, and Hispanic-owned firms did, however, use a higher ratio of insider provided financing revealing that family and other insiders play a greater role in starting minority-owned firms. Minority owners may develop these networks of insider financing because they are reluctant to approach

external sources, or alternatively, because they have approached them and have been declined. Like women, minority firm owners may lack access to key networks that could provide them with links to external funding sources.

10.8 So What?

Our findings suggest that new technology-based firms demonstrate a different demand and supply pattern for sources of capital than firms in general. These results indicate that technology-based firms, and high tech firms in particular, are able to attract larger amounts of both external debt and external equity. This suggests that there is a potential supply of external capital if the firm can make a compelling case for growth or competitive advantage in the form of intellectual property. It also appears that the owners of high tech firms are more open to external sources of capital that will allow their firms to develop and grow. As noted above, they are willing to trade off their concerns for dilution and control in return for what they hope will be a smaller piece of a much bigger pie.

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