Dissertation Summary:

The Specialization Choices and Performance of Venture Capital Funds

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Abstract

It is often asserted that venture capital (VC) funds specialize by industry, stage, and geography. Little research in finance, however, has empirically examined how specialized VC funds really are, and how they make their specialization choices. Using a principal-agent model, I analyze why VC funds display various degrees of specialization from a theoretical perspective. In addition, I test the predictions of my model using a sample of 1586 funds with 64168 venture investments. My study shows that there exists great heterogeneity in fund specialization. Fund size, proxies for VCs' risk aversion, and proxies for the risk associated with the excess return of the fund all have negative effects on specialization. I construct two measures distinguishing VCs' specialized talent from their general talent. I find that it is VCs' specialized talent that really matters in determining specialization. There is also evidence indicating a positive relationship between specialization and fund performance. Furthermore, specialized talent and general talent are both positively related to performance.

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All remaining errors and omissions are my own. Email: xihan@u.washington.edu.

The Specialization Choices of Venture Capital Funds and Their Performance

I. Introduction

It is often asserted that venture capital (VC) funds specialize, investing in a particular industry, at a specific stage of company development, or within a particular geographic region. Sahlman (1990) declares that "some will invest only in early-stage deals, whereas others concentrate on later-stage financings."[2] Barry (1994) states that "venture capitalists (VCs) typically specialize by emphasizing a particular industry, such as biotechnology, or by emphasizing a particular stage of company development, such as startup companies or companies in the expansion stage."[3] These assertions are based mainly on anecdotal evidence. The authors do not further examine how specialized VC funds are. Indeed, little research in finance has tried to measure the specialization patterns of VC funds using real investment data or to develop a formal model explaining the specialization choice of venture capitalists. In this study, I show that a large number of US venture funds are not specialized. There exists great heterogeneity in fund specialization. Some are narrowly focused, some are more inclusive, and others are well diversified over different industries, stages, or geographic regions.

The wide variation in specialization patterns raises the question of how venture capitalists choose a particular degree of fund specialization while selecting firms to finance. It also poses the question of how the choice of specialization affects fund performance. These questions are important in understanding the venture investment process and also the role of venture capitalists. Venture capital has been a leading source of financing for innovative young entrepreneurial firms. Although young firms account for a relatively small portion of the whole economy, they are the driving force of the technology revolution and economic growth. Over the past several decades, venture capital has backed many famous companies, including Apple Computer, Intel, Microsoft,

[2] Sahlman, William A., 1990, The structure and governance of venture-capital organizations, *Journal of Financial Economics* 27, page 489.

[3] Barry, Christopher B., 1994, New directions in research on venture capital finance, *Financial Management* 23(3), page 5.

and Google. Those companies have grown very fast and have been the job-creating engine of the society. As Gompers and Lerner (1999b) point out, exploring the incentives and factors of fund specialization can help us understand the dynamics of the VC industry and "make better recommendations about promoting new entrepreneurial firms".[4] In my study, I explore the motivation and the goal of venture capitalists when they select various firms to finance, and relate fundamental characteristics of a fund to its specialization choice. By examining how VCs' talent affects fund specialization, I further assess whether VCs' human capital plays an important role in selecting the right companies and assisting young firms to grow.

In addition, fund specialization is important because how VCs construct their portfolio will have a first-order effect on future performance of the funds. Previous research on VC investment has focused on how VCs supervise entrepreneurial firms after they have made the selection. Little attention is given to how VCs set up their portfolios in the very first place. My study fills this gap by exploring why funds display various specialization patterns and how the degree of specialization affects their performance. Furthermore, knowing the specialization preferences of venture capitalists can help entrepreneurs target the right fund while seeking VC financing.

II. Related Literature on VC fund specialization

The topic of VC fund specialization was first considered by Norton and Tenenbaum (1993), and Gupta and Sapienza (1992). Both papers use questionnaires and small samples of VC funds. Their specialization measures reflect the subjective intentions of VCs, but not the true investment patterns of the funds.

Mayer, Schoors and Yafeh (2005) compare VC fund investment focus and sources of finance across Germany, Israel, Japan, and the United Kingdom. Their empirical results show some relationship between fund specialization and VC financing. However, much of the within and cross-country variation is not mainly due to sources of funds. The authors finally conclude that the

[4] Gompers, Paul A., and Josh Lerner, 1999b, What drives venture capital fundraising? Working paper, page 31.

pronounced differences of VC investment focus in these four countries are not primarily related to either financial systems or sources of funds.

A very recent paper by Gompers, Kovner, Lerner and Scharfstein examines how organizational structure of VC firms, especially the degree of specialization, affects the performance of venture capital firms. They find a strong positive relationship between the degree of specialization by individual VCs at a firm and its success. However, Gompers, Kovner, Lerner and Scharfstein only study the effect of industry specialization on VC firm success. How specialization by stage and geography affects fund performance is still unclear. Furthermore, they take the specialization choices of VC firms as given. How VCs choose different degree of specialization in the first place is not addressed.

The existing literature indicates that the degree of specialization is an interesting aspect of the venture investment process and that it may affect fund performance. Therefore, it is important to examine what drives the specialization choices of VC funds. Mayer, Schoors and Yafeh (2005) suggest that there are important factors other than the sources of funds affecting VC investment focus, but what those factors are remains unknown. Little previous research has focused on analyzing the specialization choices of VCs from a theoretical perspective, or examining the specialization patterns of a large sample of US venture funds. My study adds to the literature by developing an economic model and proposing fundamental factors underlying fund specialization. In addition, I draw a complete picture of VC specialization patterns in the U.S. by empirically analyzing the three dimensions of fund focus: by industry, by stage and by geography.

III. Model Motivation and Predictions

From a venture capitalist's perspective, there are costs and benefits to fund specialization. The idea of gain from specialization was pioneered by the Scottish philosopher Adam Smith. In his seminal book, The Wealth of Nations (1776), Smith argues that workers should concentrate on what they do best. As workers specialize, they become skilled and proficient at their tasks, hence increasing productivity and output. When a venture capitalist displays talents well suited to a

particular industry, stage, or geographic region, he will most likely do a good job managing VC funds by focusing on that specific area. Sahlman (1990) observes that specialization can reduce marginal operating costs when VCs learn things and develop skills over time. By specializing, the VCs can accumulate area-specific experience in a fast and efficient fashion. They can establish long-term relationships with suppliers, customers, lawyers, and investment bankers. This network of contacts cultivates a flow of profitable deals for VC firms. The ultimate effect is that the marginal cost of selecting and supervising a portfolio company declines over time, and the VC firm becomes more productive. Gompers and Lerner (2004) also indicate that VCs have highly specialized skills. These skills are very difficult to develop. It would be costly and time-consuming for VCs to switch to new product or business areas.

Fund specialization, however, entails costs as well as benefits. People have long been aware of the importance of diversification. Markowitz (1952, 1958) was the first to demonstrate rigorously how diversification can reduce portfolio risk without affecting expected returns. This result is the foundation of modern portfolio theory (MPT). On the basis of MPT, William Sharpe (1961, 1964) and John Lintner (1965) developed the Capital Asset Pricing Model (CAPM). They classify risk into two types, systematic risk and idiosyncratic risk. Diversification reduces idiosyncratic risk. By spreading investments over different industries, stages, or geographic regions, VCs can reduce idiosyncratic risk and improve the Sharpe ratio (the ratio of excess return to risk) of their funds.

Furthermore, venture capital is a very risky business. Gompers and Lerner (2004) characterize VC investments by four critical factors: uncertainty, information asymmetry, asset intangibility, and unpredictable market conditions. Cochrane (2003) states that venture capital is very illiquid and hence involves more risk than traditional assets. Barry (1994) notes that more than one-third of VC portfolio investments result in losses, and "a sizable fraction results in loss of the entire original investment."[5]

In sum, there is a tradeoff between generating return and controlling risk when venture capitalists make portfolio selections. By specializing, VCs can fully utilize their expertise and

[5] Barry, Christopher B., 1994, New directions in research on venture capital finance, *Financial Management*, 23, page 3.

generate superior expected return. By diversifying, VCs can reduce return variance and better control portfolio risk. Exploring how VCs balance the costs and benefits by choosing a particular degree of specialization helps us better understand the VC fund construction and investment process.

Based on the intuition discussed above, I develop an economic model of fund specialization choice within the basic principal-agent framework. Venture investors are the principals. They seek to maximize the risk-adjusted expected return from venture funds. VCs are risk-averse agents and differ in specialized skills. They have the potential to generate superior expected return by actively managing the venture portfolio. However, VCs care about not only the expected return from the fund, but also the risk incurred. The choice of fund specialization is modeled through the tradeoff between generating superior expected return and controlling risk for venture capitalists. As the principal, venture investors design the compensation scheme to align their interests with VCs and affect the degree of specialization.

In the model, fund specialization and VCs' compensation are simultaneously determined by fundamental characteristics of the fund. These characteristics include fund size, VCs' talent, VCs' degree of risk aversion, and the risk associated with the excess return of the fund. More specifically, the model predicts a positive relationship between fund specialization and the amount of VCs' specialized talent. In addition, the degree of specialization is negatively related to fund size, VCs' risk aversion, and the riskiness of the area where VCs have specialized talent. The model also suggests a positive link between degree of specialization and fund performance.

IV. Empirical Analysis

Using a sample from the Securities Data Company (SDC) VentureXpert database, I examine the specialization patterns of U.S. VC funds and test the predictions of my model empirically. The final sample has 1586 funds (64168 financing rounds) with detailed fund investment information about their portfolio companies.

Two alternative proxies are constructed to measure fund specialization. The first one is the Herfindahl-Hirschman Index (HHI), calculated as the sum of the squares of the fraction of portfolio companies in each area (industry, stage, or state). The second one is the focus area concentration ratio (CRT), measured as the number of portfolio companies in the focus area divided by the total number of portfolio companies in a fund. The focus area refers to the particular industry, stage or state with the highest number of portfolio companies in a fund. In my final dataset with the specialization measures, each VC fund has one observation.

The empirical results strongly support my model's predictions. In particular, I construct two measures distinguishing VCs' specialized talent from general talent. I find that it is VCs' specialized talent that really matters in determining fund specialization. This implies that VCs' human capital plays an important role in determining portfolio construction. If VCs have no specialized talent, they will choose a diversified portfolio. If VCs have talent, they will emphasize firms in their specialty area. That is to say, the VCs are selecting portfolio companies matching with their talent and experience. By choosing the right companies to finance, the VCs may give valuable advice to entrepreneurs on product development and business strategy, and help young firms to grow. There is also strong evidence that specialization is negatively related to fund size, to proxies for VCs' degree of risk aversion, and to proxies for VCs' expertise-area risk. Figures 1 and 2 present the cross-sectional variations in fund specialization. Tables 1 to 3 report some regression results on VCs' specialization choices.

The evidence, moreover, shows that specialization affects fund performance. I use two proxies to measure fund performance. One is the fraction of firms that went public or were in registration for an offering in a venture portfolio, and the other is the fraction of firms that were acquired, merged, went public, or were in registration for an offering in a VC fund. I find that the degree of specialization is positively related to fund performance. This reinforces the argument that by utilizing their talent and expertise for a particular area, VCs can add value to portfolio firms. However, industry and stage specialization appear to improve performance more than geographic specialization. The result also shows that both specialized talent and general talent are positively

related to fund performance. Table 4 presents the regression results of industry specialization on fund performance. The results of stage and geographic specialization are similar and not reported.

Finally, I examine the behavior of Small Business Investment Companies (SBICs). SBICS are a part of the VC industry and have played an important role in financing small firms. However, because SBICs are backed and regulated by the Federal Government, their specialization choices may differ from those of regular VC funds. I find that SBICs display a lower degree of industry and stage specialization, but a higher degree of geographic specialization than other VC funds. In terms of fund performance, the SBICs tend to under-perform regular VC funds.

V. Conclusions

As a leading source of financing for young innovative firms, venture capital has spawned the growth of U.S. economy. One important aspect of VC funds is their specialization patterns by industry, stage, and geography. Whether a VC fund has an area focus will determine the type of entrepreneurial firms receiving financing. How a venture capitalist choose a particular degree of specialization will directly affect portfolio construction and hence fund performance. My study adds to the literature by developing an economic model and proposing fundamental factors underlying fund specialization. In addition, I draw a complete picture of VC specialization patterns in the U.S. by empirically analyzing the three dimensions of fund focus: by industry, by stage and by geography. Contrary to the general wisdom that funds are mostly specialized, VC funds indeed display various degrees of specialization. Fund size, VCs' risk aversion, VCs' expertise area risk all have negative and significant impact on fund specialization. I also find that VCs' specialized talent, not general talent, helps explain specialization. There is also evidence indicating a positive relationship between specialization and fund performance. In addition, both specialized talent and general talent are positively related to performance. This reflects the fact that VCs' human capital has played an important role in bringing good fund performance.

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Table 1: The Effect of Size, Age, and Talent on Fund Specialization

The table reports the ordinary least squares regression results for two specialization measures. The VentureXpert classifications of 9 minor industry groups, Stage Level Three, and 50 states are used in calculating industry, stage and geography specialization, respectively. Fund specilaization is measured using Herfindahl-Hirschman Index. The explanatory variables include fund size, VC management firm age, the amount of specialized talent, the amount of general talent, and the total managed capital of the VC firm, focus area (industry, stage, geography) dummies, and fund year dummies. Fund SIZE is the total amount of capital committed by limited and general partners of a fund, in $1000 millions. AGE is the difference between the date of a fund's last distributed investment and the time of a VC management firm's first investment. The amount of specialized talent is measured as the number of company investments the VC management firm has made in the focus area before this fund. The amount of general talent is measured as the total number of company investments the VC management firm has ever made before this fund. CAPITAL is the total amount of capital under management by a VC management firm. Focus year dummies are a set of dummies variables denoting the intitial closing date of a fund. The T-statistics are in parenthesis under parameter estimates.

	Industry HHI			Stage HHI			Geography HHI		
SIZE	-0.1491	-0.1365	-0.1494	-0.1758	-0.1616	-0.1767	-0.2759	-0.2651	-0.2571
	(-4.48)	(-4.16)	(-4.49)	(-5.18)	(-4.84)	(-5.20)	(-6.78)	(-6.42)	(-6.29)
AGE	-0.0045	-0.0045	-0.0045	-0.0042	-0.0040	-0.0041	-0.0051	-0.0048	-0.0042
	(-7.28)	(-6.83)	(-6.92)	(-6.38)	(-5.98)	(-6.15)	(-6.50)	(-5.78)	(-5.09)
SPECIAL TALENT	0.0006		0.0005	0.0008		0.0011	0.0004		0.0010
	(2.99)		(2.12)	(3.51)		(2.36)	(6.55)		(6.10)
GENERAL TALENT		0.0001	0.0000		0.0001	0.0000		0.0002	-0.0004
		(2.11)	(0.15)		(2.69)	(-0.69)		(4.41)	(-3.72)
CAPITAL	-0.0026	-0.0028	-0.0027	-0.0018	-0.0018	-0.0016	-0.0090	-0.0104	-0.0050
	(-0.90)	(-0.95)	(-0.91)	(-0.62)	(-0.59)	(-0.53)	(-2.52)	(-2.82)	(-1.33)
Focus Area Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.14	0.14	0.14	0.11	0.11	0.11	0.11	0.09	0.12
Number of Funds	1525	1525	1525	1525	1525	1525	1525	1525	1525

Table 2: The Effect of Specialized Area Risk on Industry Specialization

The table shows how focus industry risk affects fund specialization. The focus industry is defined as the particular industry with the highest number of companies in a venture portfolio. The VentureXpert classification of 9 minor industry groups is used. Two measures of industry specialization are considered: the Herfindahl-Hirschman Index (HHI), and the focus industry concentration ratio (CTR) measured as the fraction of portfolio companies in the focus industry. There are two proxies for focus industry risk: the return standard deviation of publicly traded stocks matched by the SIC codes with VentureXpert industry classifications, and the return residual volatility from the Fama-French three-factor model of matched publicly traded stocks. Other explanatory variables include fund size, VC management firm age, the amount of specialized talent, the amount of general talent, and the total managed capital of the VC firm, focus industry dummies, and fund year dummies. Fund SIZE is the total amount of capital committed by limited and general partners of a fund, in $1000 millions. AGE is the difference between the date of a fund's last distributed investment and the time of a VC management firm's first investment. The amount of specialized talent is measured as the number of company investments the VC management firm has made in the focus area before this fund. The amount of general talent is measured as the total number of company investments the VC management firm has ever made before this fund. CAPITAL is the total amount of capital under management by a VC management firm. Focus year dummies are a set of dummies variables denoting the intitial closing date of a fund. The T-statistics are in parenthesis under parameter estimates.

	Industry HHI				Focus Industry CTR			
RETURN VOLATILITY	-0.9513 (-5.22)	-0.9648 (-5.29)			-0.8434 (-4.85)	-0.8659 (-5.00)		
RESIDUAL VOLATILITY			-1.1111 (-5.03)	-1.1283 (-5.11)			-0.9620 (-4.56)	-0.9905 (-4.71)
SIZE	-0.1587 (-3.79)	-0.1574 (-3.76)	-0.1585 (-3.78)	-0.1572 (-3.75)	-0.1392 (-3.48)	-0.1370 (-3.44)	-0.1387 (-3.47)	-0.1366 (-3.43)
AGE	-0.0052 (-7.43)	-0.0048 (-6.56)	-0.0052 (-7.42)	-0.0048 (-6.55)	-0.0047 (-6.95)	-0.0040 (-5.71)	-0.0047 (-6.94)	-0.0040 (-5.70)
SPECIAL TALENT	0.0006 (2.99)	0.0011 (3.30)	0.0006 (3.00)	0.0011 (3.31)	0.0006 (3.04)	0.0015 (4.52)	0.0006 (3.04)	0.0015 (4.51)
GENERAL TALENT		-0.0001 (-1.93)		-0.0001 (-1.93)		-0.0002 (-3.38)		-0.0002 (-3.37)
CAPITAL	-0.0026 (-0.78)	-0.0016 (-0.46)	-0.0028 (-0.83)	-0.0018 (-0.51)	-0.0031 (-0.96)	-0.0013 (-0.41)	-0.0033 (-1.02)	-0.0015 (-0.46)
Focus Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.15	0.16	0.15	0.16	0.14	0.15	0.14	0.15
Number of Funds	1230	1230	1230	1230	1230	1230	1230	1230

Table 3: The Effect of Specialized Area Risk on Stage Specialization

The table shows how focus stage risk affects fund specialization. The focus stage is defined as the particular stage with the highest number of companies in a venture portfolio. The VentureXpert classification of Stage Level Three is used. Two measures of industry specialization are considered: the Herfindahl-Hirschman Index (HHI), and the focus stage concentration ratio (CTR) measured as the fraction of portfolio companies in the focus stage. The stage risk rank is an ordered number denoting the degree of riskiness for each stage, ranging from 1 to 8. Other explanatory variables include fund size, VC management firm age, the amount of specialized talent, the amount of general talent, and the total managed capital of the VC firm, focus stage dummies, and fund year dummies. Fund SIZE is the total amount of capital committed by limited and general partners of a fund, in $1000 millions. AGE is the difference between the date of a fund's last distributed investment and the time of a VC management firm's first investment. The amount of specialized talent is measured as the number of company investments the VC management firm has made in the focus area before this fund. The amount of general talent is measured as the total number of company investments the VC management firm has ever made before this fund. CAPITAL is the total amount of capital under management by a VC management firm. Focus year dummies are a set of dummies variables denoting the intitial closing date of a fund. The T-statistics are in parenthesis under parameter estimates.

	Stage HHI			Focus Stage CTR		
STAGE RISK RANK	-0.0092	-0.0090	-0.0092	-0.0044	-0.0041	-0.0044
	(-3.68)	(-3.60)	(-3.68)	(-1.88)	(-1.77)	(-1.88)
SIZE	-0.1803	-0.1699	-0.1796	-0.1482	-0.1362	-0.1488
	(-5.30)	(-5.09)	(-5.27)	(-4.68)	(-4.38)	(-4.69)
AGE	-0.0043	-0.0042	-0.0043	-0.0039	-0.0038	-0.0039
	(-6.50)	(-6.36)	(-6.47)	(-6.44)	(-6.11)	(-6.27)
SPECIAL TALENT	0.0008		0.0006	0.0007		0.0008
	(3.29)		(1.39)	(3.07)		(1.92)
GENERAL TALENT		0.0001	0.0000		0.0001	0.0000
		(3.01)	(0.40)		(2.42)	(-0.37)
CAPITAL	-0.0017	-0.0019	-0.0018	-0.0011	-0.0011	-0.0010
	(-0.57)	(-0.65)	(-0.61)	(-0.40)	(-0.40)	(-0.35)
Focus Stage Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Fund Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.10	0.10	0.10	0.09	0.09	0.09
Number of Funds	1525	1525	1525	1525	1525	1525

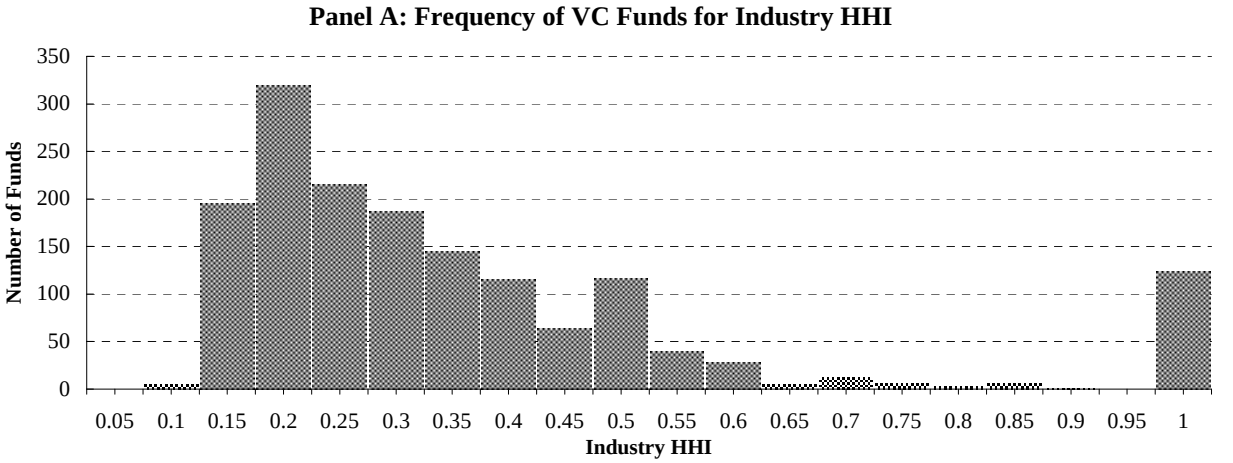
Table 4: The Effect of Industry Specialization on Fund Performance

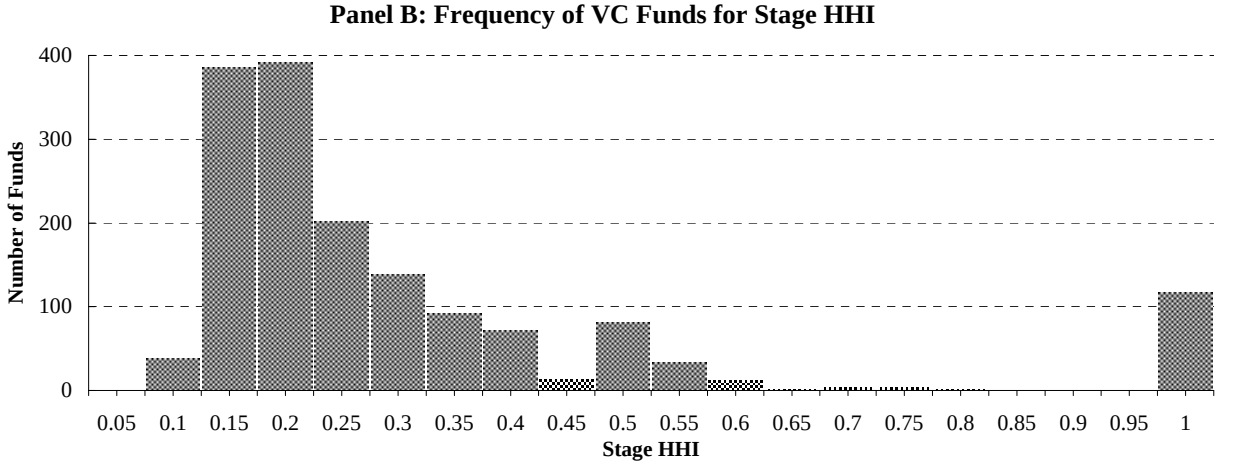
The table reports the OLS regression results regarding the effect of industry specialization on fund performance. The dependent variable is the proxy for fund performance. Two proxies are used. One is the fraction of firms that went public or in registration for an IPO in a VC fund, and the other is the fraction of firms that were acquired, merged, went public or in registration for an IPO in a VC fund. The industry specialization is measured using Herfindahl-Hirschman Index, for the VentureXpert classification of 9 minor industry groups. Other explanatory variables include fund size, VC management firm age, the amount of specialized talent, the amount of general talent, and the total managed capital of the VC firm, focus industry dummies, and fund year dummies. Fund SIZE is the total amount of capital committed by limited and general partners of a fund, in $1000 millions. AGE is the difference between the date of a fund's last distributed investment and the time of a VC management firm's first investment. The amount of specialized talent is measured as the number of company investments the VC management firm has made in the focus area before this fund. The amount of general talent is measured as the total number of company investments the VC management firm has ever made before this fund. CAPITAL is the total amount of capital under management by a VC management firm. Focus industry denotes the particular industry with the highest number of portfolio companies in a venture fund. Fund year dummies are a set of dummies variables denoting the intitial closing date of a fund. The T-statistics are in parenthesis under parameter estimates.

	Performance (IPO)				Performance (IPO&Acquisition)			
INDUSTRY HHI	0.0765	0.1182	0.1188	0.1180	0.3351	0.3636	0.3636	0.3637
	(3.69)	(5.43)	(5.48)	(5.43)	(13.75)	(14.29)	(14.34)	(14.33)
SIZE		0.0372	0.0371	0.0337		0.0042	-0.0012	-0.0004
		(1.32)	(1.34)	(1.20)		(0.15)	(-0.04)	(-0.01)
AGE		0.0010	0.0005	0.0005		0.0006	0.0001	0.0001
		(1.83)	(0.98)	(0.94)		(1.13)	(0.12)	(0.13)
SPECIAL TALENT		0.0005		0.0001		0.0004		0.0000
		(3.05)		(0.66)		(2.46)		(-0.13)
GENERAL TALENT			0.0001	0.0001			0.0001	0.0001
			(3.84)	(2.42)			(3.88)	(2.99)
CAPITAL		0.0054	0.0045	0.0045		0.0046	0.0035	0.0035
		(2.25)	(1.82)	(1.83)		(1.93)	(1.45)	(1.45)
Focus Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.35	0.39	0.39	0.39	0.52	0.54	0.54	0.54
Number of Funds	1586	1525	1525	1525	1420	1371	1371	1371

Figure 1: Frequency of VC Funds (Measuring Specialization by Herfindahl-Hirschman Index)

The following figure plots the frequency of VC funds for different levels of specialization, measured using Herfindahl-Hirschman Index, for VentureXpert classifications of 9 industry minor groups (Panel A), Stage Level Three (Panel B), and 50 states (Panel C), respectively. The sample has 1586 VC funds from 1978 to 2000, collected from VentureXpert database.





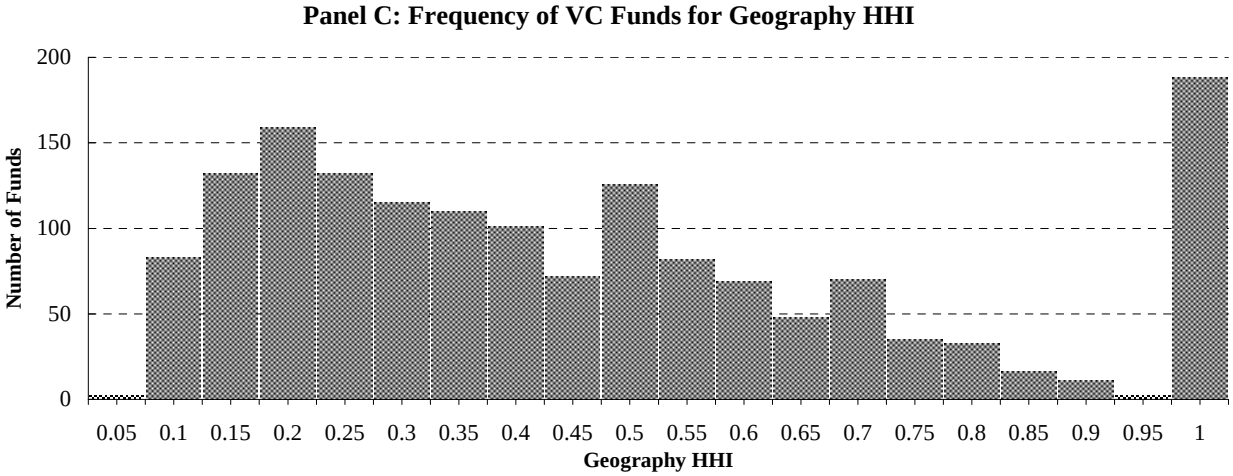
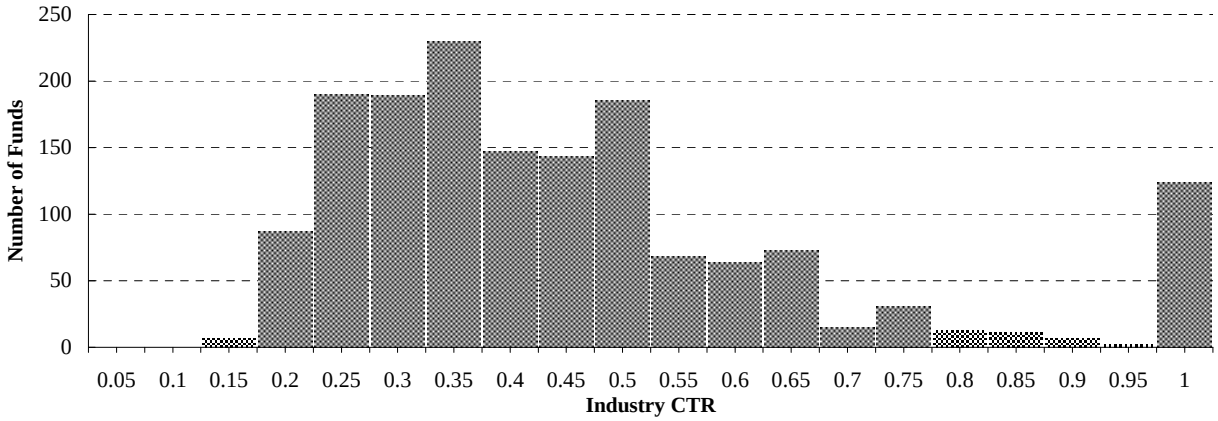


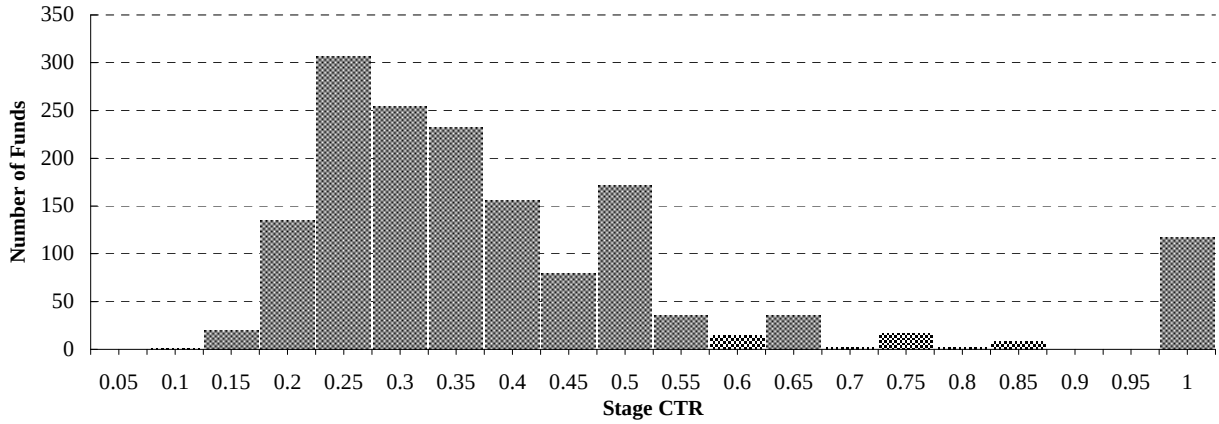
Figure 2: Frequency of VC Funds (Measuring Specialization by Focus Area Concentration Ratio)

The following figure plots the frequency of VC funds for different levels of specialization, measured as the fraction of portfolio compaines in the focus area, called Focus Area Concentration Ratio (CTR), for VentureXpert classifications of 9 industry minor groups (Panel A), Stage Level Three (Panel B), and 50 states (Panel C), respectively. The sample has 1586 VC funds from 1978 to 2000, collected from VentureXpert database.

Panel A: Frequency of VC Funds for Industry CTR



Panel B: Frequency of VC Funds for Stage CTR



Panel C: Frequency of VC Funds for Geography CTR