Venture Capital & the Finance of Innovation

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Second Edition

CHAPTER 1

THE VC INDUSTRY

IN THIS CHAPTER, we provide a definition of **venture capital** (Section 1.1), take a preliminary look at the activities of **venture capitalists** (Section 1.2), explore the history of venture capital (Section 1.3), and review a variety of statistics on the patterns of venture capital investment (Section 1.4). Throughout this text, we use the abbreviation **VC** to refer to both the venture capital industry and to an individual venture capitalist.

1.1 WHAT IS VENTURE CAPITAL?

A VC has five main characteristics:

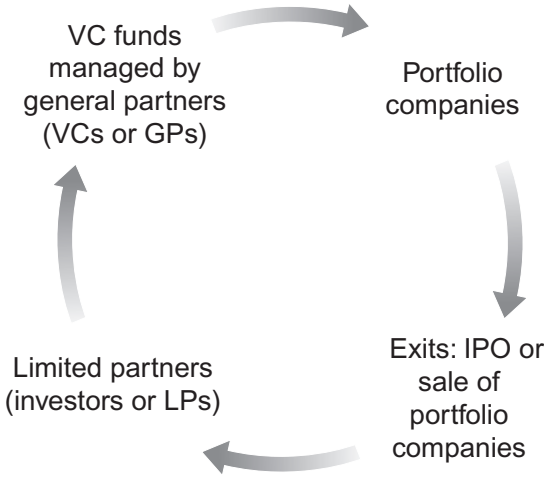
1. A VC is a **financial intermediary**, meaning that it takes the investors' capital and invests it directly in **portfolio companies**.
2. A VC invests only in private companies. This means that once the investments are made, the companies cannot be immediately traded on a public exchange.
3. A VC takes an active role in monitoring and helping the companies in its portfolio.
4. A VC's primary goal is to maximize its financial return by **exiting** investments through a sale or an **initial public offering (IPO)**.
5. A VC invests to fund the internal growth of companies.

Characteristic (1) defines VCs as financial intermediaries. This is similar to a bank, because just as a bank takes money from depositors and then loans it to businesses and individuals, a VC fund takes money from its investors and makes equity investments in portfolio companies. Typically, a VC fund is organized as a **limited partnership**, with the venture capitalist acting as the **general partner (GP)** of the fund and the investors acting as the **limited partners (LP)**.[1] If all goes

[1]The organization structure of VC funds will be discussed at length in Chapter 2.

EXHIBIT 1-1

THE FLOW OF FUNDS IN THE VENTURE CAPITAL CYCLE



well, the VC eventually sells its stake in the portfolio company, returns the money to its limited partners, and then starts the process all over again with a different company. Exhibit 1-1 illustrates the key players and the flow of funds in the VC industry.

VCs are often compared to—and confused with—**angel investors**. Angel investors, often just called **angels**, are similar to VCs in some ways but differ because angels use their own capital and, thus, do not satisfy characteristic (1). There are many types of angels. At one extreme are the wealthy individuals with no business background who are investing in the business of a friend or relative. At the other end are groups of angels with relevant business or technical backgrounds who have banded together to provide capital and advice to companies in a specific industry. In the latter case, the angel groups look very much like VCs, but the fact that they use their own capital changes the economics of their decisions: Since they can keep all the returns to on their labor, they have a correspondingly lower cost of capital and can invest in deals that would not work for a VC. Although it is difficult to get reliable figures on angel investing, the best available survey evidence for recent years suggests that total angel investments are approximately the same magnitude as total VC investments.[2] Although the total flow of capital is similar, angels tend to focus on younger companies than do VCs and make a larger number of smaller investments.

[2]The most comprehensive data on the angel market is maintained by the Center for Venture Research at the University of New Hampshire: http://wsbe.unh.edu/cvr/. Their annual reports on the state of the angel market provide the evidence cited in this paragraph.

Characteristic (2) defines VC as a type of **private equity**. Although the definitions of "private company" and "public company" have some nuances, the key distinction is that a public company's securities can be traded in a formal market, like the NYSE or the NASDAQ, whereas a private company's securities cannot. Any company that is publicly traded in the United States must also file regular reports with the Securities and Exchange Commission (SEC) detailing its financial position and material changes to its business. When combined with the activities of professional traders in public markets, this requirement to file creates significant amounts of information about public companies. In comparison, information about private companies is practically nonexistent. Private equity is considered to be a category of **alternative investing**, where "alternative" stands in contrast to "traditional" investing in stocks and bonds.

Characteristic (3) is central on our list—and central to the success of any VC. Without (3), a VC would only be providing capital, and his success (or failure) would be entirely due to his ability to choose investments. Although success can, of course, be entirely built on these choices, the comparative advantage of the VC would be greatly improved if the investor could also help the company directly.

This help takes many forms. Most notably, VCs typically take at least one position on the board of directors of their portfolio firms. Having board representation allows them to provide advice and support at the highest level of the company. (More than one VC has remarked that his job could be described as being "a professional board member".) In addition to board service, VCs often act as unofficial recruiters and matchmakers for their portfolio firms. Young companies often have a difficult time attracting high-quality talent to a fledgling operation, and VCs can significantly mitigate this problem by drawing on their reputation and industry contacts. A VC who performs these value-added services well has a sustainable form of competitive advantage over other investors.

Because VCs are financial intermediaries, they need some mechanism to give money back to their investors. Thus, a savvy VC will only make an investment if he can foresee a path to exit, with proceeds of this exit returning to the VC and his investors. Exits can occur through an IPO, with a subsequent sale of the VC stake in the open market, through a sale of the company to another investor, or through the sale of the company to a larger company. Because of the need to exit, VCs avoid investments in "lifestyle" businesses (companies that might provide a good income to the entrepreneurs, but have little opportunity for a sale or IPO).

Characteristic (4), the requirement to exit and the focus on financial return, is a key distinction between venture capital and **strategic investing** done by large corporations. As a perpetual entity, a corporation can afford to take stakes in other businesses with the intention of earning income, forming long-term alliances, and providing access to new capabilities. It is possible for the corporation to maintain this stake indefinitely.

A strategic investor may satisfy all the other characteristics, but without the need to exit, the strategic investor will choose and evaluate investments very differently from a VC. In some cases, a corporation may set up an internal venture

capital division. In the industry, this is referred to as **corporate venture capital**. This label can be confusing, as only sometimes do such divisions satisfy characteristic (4). These corporate VC efforts will often have strategic objectives other than financial returns and will have neither dedicated supplies of capital nor an expectation that capital will be returned within a set time period. When (4) is not satisfied, the investment activity can take on a very different flavor than the type studied in this book.

The requirement to exit provides a clear focus for VC investing activities. There are over 20 million businesses in the United States; more than 99 percent of these businesses would meet the government definition of a "small business".[3] In general, small businesses are difficult to exit, and only "large businesses"—those in the top 1 percent of all businesses—have a realistic chance to go public or be sold in a liquid acquisition market. It is therefore typical for VCs to invest in small businesses—but they only do so when these small companies have a realistic chance to grow enough to become a large company within five to seven years after the initial investment. Such rapid growth is difficult to attain in most industries; therefore, VCs tend to focus on high-technology industries, where new products can potentially penetrate (or even create) large markets.

Characteristic (5) refers to "internal growth", by which we mean that the investment proceeds are used to build *new* businesses, not to acquire existing businesses. Although the legendary VC investments tend to be those adventurous VCs who backed "three guys in a garage", the reality of VC investing is much more varied. As a simple classification, we divide portfolio companies into three **stages**: **early-stage, mid-stage** (also called **expansion-stage**), and **late-stage**. At one extreme, early-stage companies include everything through the initial commercialization of a product. At the other extreme, late-stage companies are businesses with a proven product and either profits or a clear path toward profitability. A late-stage VC portfolio company should be able to see a plausible exit on the horizon. This leaves mid-stage (expansion) companies, who represent the vast landscape between early-stage and late-stage. With all this territory to cover, it is not surprising that mid-stage investments make up the majority of VC investment. In Section 1.4.1 of this chapter, we give more precise definitions of these stages, along with evidence about the investment patterns by stage.

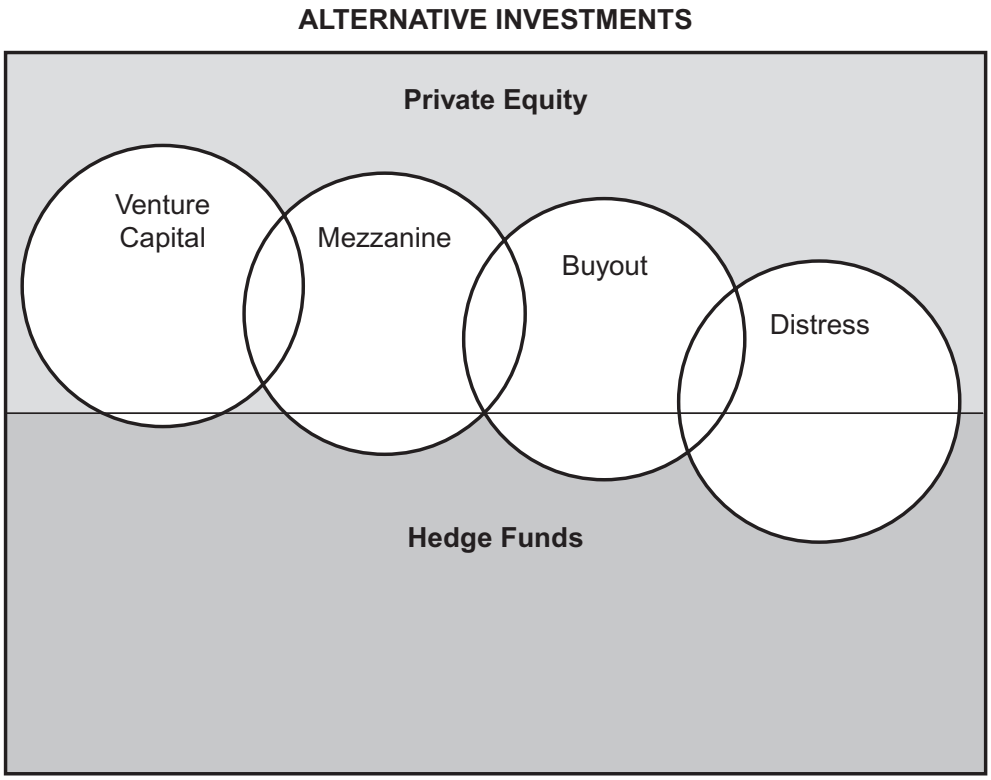
Characteristic (5) also allows us to distinguish VC from other types of private equity. Exhibit 1-2 illustrates the overlapping structure of the four main types of private equity investing and also shows the intersection of these types with **hedge funds**, another category of alternative investments. The relationship between private equity and hedge funds will be discussed below.

The largest rectangle in the exhibit contains all of alternative investing, of which private equity and hedge funds are only two of many components. These components are represented by two smaller rectangles within alternative investing.

[3]See http://www.sba.gov/size/

EXHIBIT 1-2

PRIVATE EQUITY AND HEDGE FUNDS



The different types of private equity investing are represented by the overlapping circles within private equity, with some overlap with hedge funds. The sizes of the circles and rectangles are not matched to the scale of the investing categories, but rather are intended to illustrate the relative scopes of overlap.

Venture capital sits on the far left of Exhibit 1-2 and intersects with the **mezzanine** category. The term *mezzanine* has developed two distinct meanings within the private equity industry. The first meaning is a form of late-stage (often very late-stage) venture capital. Some VC funds do this kind of investing (hence the intersection); but so do other financial intermediaries, including hedge funds, banks, insurance companies, specialty finance corporations, and non-VC private equity funds. This financing is typically in the form of subordinated debt (junior to bank loans), with some additional equity participation in the form of options (warrants) to buy common stock. Some firms refer to this kind of investing as **growth capital**. The second meaning of "mezzanine" first arose in the mid-1980s, when investors began to use the same capital structure—subordinated debt with some equity participation—to provide another layer of debt financing for highly leveraged buyout (LBO) transactions. Today, most private equity firms with "mezzanine" in their title are doing this second type of investing.

Because the subordinated debt in mezzanine investing will often be attached to some equity ownership, mezzanine investing can also intersect with the pure equity investing done in buyouts, the next category in Exhibit 1-2. Buyout investing is the largest category of private equity, with total funds under management about three times as great as for venture capital. Buyout investors pursue a variety of strategies, but a key feature of buyout investors is that they almost always take majority control of their portfolio companies. (In contrast, VCs usually take minority stakes in their portfolio companies.) Large buyouts of public companies typically garner the biggest headlines, and the most famous buyout of all time—the $25 billion purchase of RJR Nabisco by Kohlberg, Kravis, and Roberts (KKR) in 1989—was the largest transaction of its kind until 2007, when KKR, Texas Pacific Group, and Goldman Sachs bought TXU Corp. for $45 billion. In these large buyouts, the investors put up the equity stake (these days it is usually between 20 and 40 percent of the total purchase price) and then borrow the rest from banks, public markets (noninvestment grade or "junk bonds"), and mezzanine investors—hence the term **leveraged buyouts** (**LBOs**).

Despite the publicity generated by these large buyouts, most buyout firms are engaged in more everyday deals involving the purchase of "middle-market" companies. Although some of these so-called middle-market companies may qualify among the largest 1 percent, many of them still lack the growth potential to generate much interest from public markets. This is typically because the company is in an older industry that has more stable cash flows and limited potential for internal growth. In this case, private equity investors can create liquidity for the current owners through a buyout. Such buyouts do not always include leverage. A related strategy is "buy-and-build", where a buyout investor will acquire a series of firms in a fragmented industry for the purpose of taking advantage of changes in the optimal industrial scale. Although buy-and-build is a growth investment strategy, the growth comes *externally* from the purchase of existing businesses.

The final category of private equity is **distress investing**, also called **special situations**. As the name suggests, distress investors focus on troubled companies. Because many distress investments are buyouts, this category intersects with the previous one. Some private equity investors do both traditional leveraged buyouts and distress buyouts, but most investors specialize in either one or the other.

A separate category of alternative investing, hedge funds, is also included in Exhibit 1-2. Hedge funds are flexible investing vehicles that share many characteristics of private equity funds, including the limited partnership structure and the forms of GP compensation. The main difference, however, is that hedge funds tend to invest in public securities. A good example of this distinction can be seen in the area of distress investing, the area with the greatest overlap for private equity and hedge fund investors. The private equity funds that engage in distress investing usually do so with the intention of gaining control of the distressed company (or some subset of the company). These investors then operate and restructure the company before reselling it to another investor or to the public markets. Hedge funds also engage in distress investing, but their main strategy is to

trade in the public securities of distressed companies with the intention of making a trading profit by quickly reselling these securities. In recent years, the distinction between hedge funds and private equity funds has grown more blurred, with some hedge funds beginning to invade the traditional private equity territory, particularly in the buyout and distress space. For now, traditional VC investing, with its long holding periods and relatively small investments, remains relatively free of hedge fund involvement.

Although there are exceptions to this pattern, the basic distinction is that while private equity funds are long-term investors, hedge funds are short-term traders. Both strategies have the potential for outstanding returns, but the skill sets and investment approaches are different enough that it is rare that a single individual can excel at both. However, because their investments are more liquid than those for private equity investors, hedge funds can offer their investors faster access to their money, with withdrawals usually allowed on a quarterly or annual basis. This is a case of form following function: if you have an investment strategy in illiquid assets, then you need to lock up your investors for a long period of time (private equity); if you have an investment strategy in liquid assets, then you can allow for quicker withdrawals (hedge funds). Although hedge funds have occasionally crossed over to private equity, any large-scale crossover would require a change of contractual form toward a longer lockup. At that point, they would become private equity funds.

1.2 WHAT DO VENTURE CAPITALISTS DO?

VC activities can be broken into three main groups: **investing, monitoring**, and **exiting**. In later chapters, we will describe these activities in more detail. For now, we will give brief summaries of each group and use these summaries to define the scope of this book.

Investing begins with VCs prospecting for new opportunities and does not end until a contract has been signed. For every investment made, a VC may **screen** hundreds of possibilities. Out of these hundreds, perhaps a few dozen will be worthy of detailed attention, and fewer still will merit a preliminary offer. Preliminary offers are made with a **term sheet**, which outlines the proposed valuation, type of security, and proposed control rights for the investors. If this term sheet is accepted by the company, then the VC performs extensive **due diligence** by analyzing every aspect of the company. If the VC is satisfied, then all parties negotiate the final set of terms to be included in the formal set of contracts to be signed in the final **closing**. These investing activities—especially the term sheet valuation and structure—are ideal topics for financial analysis and are the main subjects of this book.

Once an investment is made, the VC begins working with the company through board meetings, recruiting, and regular advice. Together, these activities comprise the **monitoring** group. Many VCs argue that these activities provide the best opportunity to add value and are the main source of comparative advantage for

a successful VC. This argument may indeed be correct, but monitoring activities do not lend themselves well to quantitative analysis. Thus, aside from a discussion of the academic literature in Chapter 5, we will not go into monitoring in this text.

The final group of activities is **exiting**. As discussed earlier, VCs are financial intermediaries with a contractual obligation to return capital to their investors. However, the exit process itself requires knowledge and skills that are somewhat distinct from the earlier investment and monitoring activities. VCs plan their exit strategies carefully, usually in consultation with investment bankers. A typical IPO underwritten by a top investment bank will sell at least $50 million of new stock and have a total equity value of at least $200 million. Historically, the IPO has been the source of the most lucrative exits. The main alternative to the IPO is a sale to a strategic buyer, usually a large corporation. Sometimes these sales can be very profitable for the VC, but only if there is significant competition for the deal, which often includes the possibility of an IPO. Financial analysis is crucial for the valuation of IPO firms and acquisition candidates, and this analysis is discussed at length in the rest of this book.

1.3 THE HISTORY OF VENTURE CAPITAL

Equity investments in risky new ventures are as old as commerce itself. The modern organizational form of venture capital, however, dates back only to 1946. Bank lending rules then (and now) looked for evidence that borrowers had collateral and could make timely payments of interest and principal. Most entrepreneurial firms, however, didn't meet these standards, so they required risk capital in the form of equity. There was usually no regular source of such capital, meaning that entrepreneurs without wealthy friends or family had little opportunity to fund their ventures. Along came George Doriot to solve this problem. General Doriot, so called for his rank in the U.S. Army quartermaster's office during World War II, recognized the need for risk capital and created a firm to supply it. His firm, American Research and Development Corporation (ARD), began operations in 1946 as the first true VC firm. Unlike modern funds, it was organized as a corporation and was publicly traded. In its 25-year existence as a public company, ARD earned annualized returns for its investors of 15.8 percent.[4] ARD also set a standard for generating these returns that has persisted to the present day. Excluding the $70,000 investment in their biggest "home run", the Digital Equipment Corporation, ARD's 25-year annualized performance drops to 7.4 percent. Many modern venture capitalists spend their days searching for their own home runs, now with more fanciful names like Yahoo!, eBay, and Google—all firms that started as venture capital investments and made legendary reputations for their investors.

Today, venture capital is a well-established business throughout the developed world, but remains quite geographically concentrated both across and within

[4]Fenn, Liang, and Prowse (1998).

countries, with the United States still comprising nearly half the VC activity in the world.[5] Because the United States represents so much of the worldwide VC industry, the data providers have followed the money, and we now know much more about American VCs than we do about those of the rest of the world. In this chapter, we focus on the history and statistics from the well-studied U.S. market, and most of this book will refer to U.S. data and legal structures. This focus on the United States does not limit the applicability of the analysis, because most global VCs follow U.S. practices. Most importantly for our purposes, the financial concepts of VC investing are universal, and all the quantitative analysis in this book can be applied to VC investments anywhere in the world. In Chapter 6, we provide statistics on the world distribution of VC and discuss some reasons for the observed patterns.

General Doriot's innovation in 1946 did not change the world overnight, and even ten years later the VC landscape remained barren. In recognition of this problem faced by small-growth businesses, the U.S. government began its own VC efforts as part of the Small Business Act of 1958, which was legislation that created the Small Business Administration and allowed the creation of **Small Business Investment Companies (SBICs)**. Perhaps the greatest success of the SBIC program was to provide a vehicle to train a pool of professional VCs for the later decades. SBICs still exist today and share many characteristics of modern VC firms; however, regulatory restrictions affiliated with SBICs keep it from becoming the dominant institutional form.

An important milestone for the VC industry came in the 1960s with the development of the limited partnerships for VC investments. In this arrangement, limited partners put up the capital, with a few percentage points of this capital paid every year for the **management fees** of the fund. The remaining capital is then invested by the general partner in private companies. Successful investments are exited, either through a private sale or a public offering, before the ten-year life of the partnership expires. The most common profit-sharing arrangement is an 80–20 split: after returning all the original investment to the limited partners, the general partner keeps 20 percent of everything else.

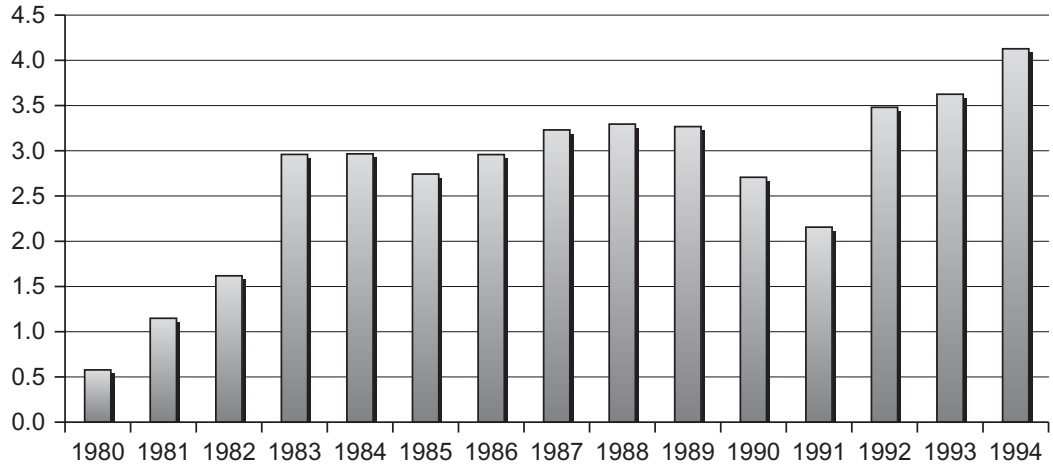
This profit sharing, known as **carried interest**, is the incentive that makes private equity investing so enticing for investment professionals. In recent years, the most successful general partners have demanded—and received—as much as 30 percent carried interest on new partnerships. Limited partnerships are by far the most common form of organization in the VC industry, and in Chapter 2 we will discuss these partnerships in detail.

Despite inroads made by SBICs and the new limited partnerships, total VC fundraising in the United States was still less than $1 billion a year throughout the 1970s. The next big change for VC came in 1979, when the relaxation of investment rules for U.S. pension funds led to historically large inflows from these investors to the asset class. To this day, pension funds continue to supply nearly half of all the money for VC in the United States.

[5]PricewaterhouseCoopers, Global Private Equity Report 2008, p. 44.

EXHIBIT 1-3

VC INVESTMENT, PREBOOM (IN $B)



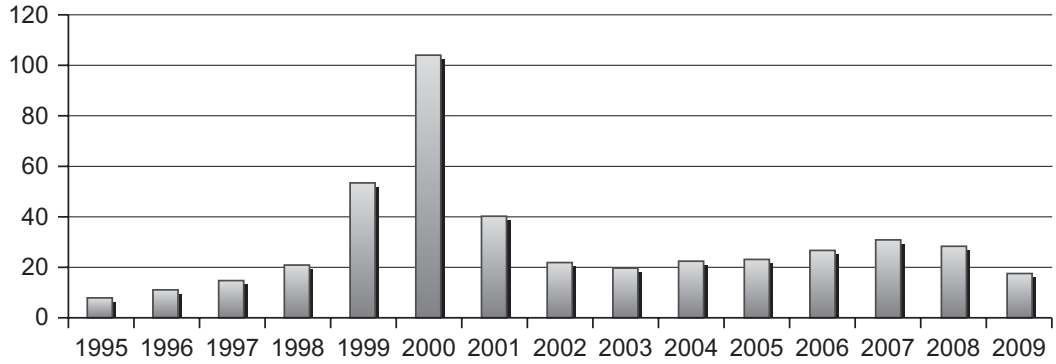
SOURCE: National Venture Capital Association Yearbooks.

The participation by pension funds hastened the participation by other institutional investors, and the modern era of venture capital began. Exhibit 1-3 displays the total amount of venture capital invested by year from 1980 to 1994.

Investing activity rose sharply to $3B in 1983 and remained remarkably stable through the 1980s. After a slight drop in 1990–1991, VC investment began a steady climb; from $2.2B in 1991, it rose gradually to $4.1B in 1994. We refer to these first 15 years of the modern VC industry as the **preboom period**. As shown in Exhibit 1-4, it was in 1995 that investment really began to grow quickly.

EXHIBIT 1-4

VC INVESTMENT, BOOM AND POSTBOOM (IN $B)



SOURCE: 2009 NVCA Yearbook, NVCA website.

Exhibit 1-4 shows investment nearly doubling to $7.9B in 1995 (from $4.1B in 1994) at the beginning of an incredible growth period. This was the dawn of the Internet era, and some of the VC investments made in 1995 and 1996 had spectacular returns. This caused institutional investors to rush for a piece of the asset class, and investments rose to $11.0B in 1996, $14.7B in 1997, and $20.9B in 1998—before exploding to the previously unimaginable levels of $53.4B in 1999 and $104.0B in 2000. For obvious reasons, we refer to 1995 to 2000 as the **boom period**.

As the euphoria faded in the early 21st century, VCs still had large commitments from their investors, and many portfolio companies—funded in the late 1990s and 2000—were hungry for follow-on investments. Still, spending fell to $40.3B in 2001 before leveling off at between $20B and $30B in the subsequent years. We refer to the years after 2000 as the **postboom period**. Indeed, the boom period ended abruptly at the end of 2000, as investment fell by nearly half from the fourth quarter of 2000 to the first quarter of 2001.

Although the postboom numbers are well below the peak of 2000, they still represent a considerable increase on investment prior to 1995. This can be seen by looking at VC investment as a fraction of GDP, where VC investment hit a new peak of 0.084 percent in 1983 and fell steadily to its modern all-time low of 0.036 percent in 1991 before rising to 0.058 percent at the end of the preboom period in 1994. The percentage jumped to 0.106 percent to mark the beginning of the boom period in 1995, then rose steadily to hit 0.571 percent in 1999 and its maximum of 1.045 percent in 2000. In the postboom period, the percentage has leveled off to about 0.2 percent in 2002–2008, well above the levels of the 1980s and approximately the same as the percentages in 1997 and 1998.

It is difficult to put these investment levels in perspective without some model of VC's place in the economy. How can we tell if the new levels of investment ($20–30B, or 0.2 percent of GDP) is too low, too high, or just right? One way to approach this question is to start with the definition of VC at the beginning of this chapter. There, we discussed how VCs invest in small companies that have the potential to become large quickly through internal growth. To qualify, a company usually needs some sort of product innovation, usually a novel item that can penetrate a large market. Sometimes the proposed innovation is high tech, such as a new drug or a new type of software. Alternatively, the innovation might be in a business process, where an early mover could erect barriers to entry by competitors. Many of the Internet startups took this route, although most of them unfortunately ignored the requirement that there be a barrier to entry.

With this framework, we can see that it is not just an innovation that is necessary, but rather an innovation that should be made by a small company. Tremendous innovation goes on all the time in large companies, and large companies are the optimal place for the majority of high-tech innovations. With large research staffs, a stockpile of trade secrets, and decades of organizational learning, companies like IBM, Microsoft, Intel, Pfizer, and Merck are factories of innovation. If a small

company proposed to develop, build, and sell a new microprocessor for personal computers, it would face almost certain failure in the face of the industry giants. If, however, a small company proposed to develop a small piece of the technology for such microprocessors—a piece that could be patented and potentially licensed across a wide range of products—then this might be (and has been) accomplished.

So how much innovation should occur in small companies? In general, this will depend on the factors that drive the optimal scale of an innovative enterprise. In the 1990s, communications technology changed radically, with development of the Internet occurring alongside large price decreases for telecommunications. This communications revolution was real, even if some potential profits from the revolution proved to be illusory. Lower costs of communication opened up new opportunities for market transactions, with lower transaction costs than traditional methods. According to the theory of the firm first introduced by Ronald Coase in 1937, a universal reduction in transaction costs should reduce the optimal scale of firms and allow for greater levels of innovation by small companies.

By this reasoning, the higher levels of VC investment that we see today—as compared to the 1980s—may indeed represent an optimal reaction to structural changes in the economy. Even the massive investments of 1999 and 2000, although clearly excessive in some respects, also appear to be at least in part a response to rapid changes in transaction costs. Prior to the Internet era, national retail brands required massive infrastructure and logistics support. With the Internet, retailers could operate from a single location, and consumers could find them from anywhere in the world.

The organizational constraints of large enterprises seemed to prevent the rapid competitive reactions that could have stifled some of these innovations. For example, large booksellers such as Barnes and Noble already possessed the brand name, the infrastructure, and the inventory to compete effectively as online booksellers. Nevertheless, Amazon.com, a venture-backed startup, managed to out-innovate and out-compete them, to the point that Amazon's business became far more valuable than that of its older competitor. Amazon, although among the most successful, is one of many examples of successful entrants that relied on the new communications technology.

1.4 PATTERNS OF VC INVESTMENT IN THE UNITED STATES

In this section, we provide evidence about VC investing by stage, industry, and region.

1.4.1 Investments by Stage

There are many steps, or stages, to building a new VC-backed business. In Section 1.1, we introduced the terminology for the three broad stages: early-stage, mid-stage, and

late-stage. A more complete description of these stages, along with some subcategories, is found in Exhibit 1-5.

EXHIBIT 1-5

STAGES OF GROWTH[6]

Seed/Startup Stage Financing

This stage is a relatively small amount of capital provided to an inventor or entrepreneur to prove a concept. If the initial steps are successful, this may involve product development, market research, building a management team, and developing a business plan. This is a pre-marketing stage.

Early Stage Financing

This stage provides financing to companies completing development where products are mostly in testing or pilot production. In some cases, products may have just been made commercially available. Companies may be in the process of organizing, or they may already be in business for three years or less. Usually such firms will have made market studies, assembled the key management, developed a business plan, and are ready to or have already started conducting business. This involves the first round of financing following startup, which includes an institutional venture capital fund. Seed and startup financing tend to involve angel investors more than institutional investors. The networking capabilities of the venture capitalists are used more here than in more advanced stages.

Expansion (Mid) Stage Financing

This stage involves applying working capital to the initial expansion of a company. The company is now producing and shipping and has growing accounts receivable and inventories. It may or may not be showing a profit. Some of the uses of capital may include further plant expansion, marketing, or development of an improved product. More institutional investors are likely to be included along with initial investors from previous rounds. The VC's role in this stage involves a switch from a support role to a more strategic role.

Later Stage

Capital in this stage is provided for companies that have reached a fairly stable growth rate—that is, companies that are not growing as fast as the rates attained in the expansion stages. Again, these companies may or may not be profitable, but are more likely to be profitable than in previous stages of development. Other financial characteristics of these companies include positive cash flow. This also includes companies considering IPOs.

[6]These descriptions are nearly verbatim from the 2009 National Venture Capital Association Yearbook, p. 87.

The main theme of next exhibit is the steady trend toward later-stage investing. In the early 1980s, the three categories of "seed/startup", "early", and "expansion" were approximately equal, and "later stage" was the smallest. This pattern reflects VC's focus on true startups in the early years of the industry. Gradually, new VC firms were created to focus on later stages, and some of the original firms grew so large from their successes that they needed to find larger investments to put all their capital to work. By the mid-1990s, expansion stage investments were larger than all early-stage investments (seed/startup plus other early-stage), and later-stage investments exceeded those in seed/startup. By the late 1990s, angel investors had largely replaced VCs at the seed/startup stage, and expansion investments comprised more than half of all VC investments. More recently, there are modest reversals in this trend, with the share of startup/seed investments exceeding 5 percent of total for the first time since 1999, while the share of expansion investments declined to less than 40 percent in 2008.

The definition of the company stage should not be confused with the definition of the **financing round**. The negotiation of a VC investment is a time-consuming and economically costly process for all parties. Because of these costs, neither the VCs nor the portfolio firms want to repeat the process very often. Typically, a VC will try to provide sufficient financing for a company to reach some natural milestone, such as the development of a prototype product, the acquisition of a major customer, or a cash-flow breakeven point. Each financing event is known as a **round**, so the first time a company receives financing is known as the **first round** (or **Series A**), the next time is the **second round** (or **Series B**), and so on. With each well-defined milestone, the parties can return to the negotiating table with some new information. These milestones differ across industries and depend on market conditions; a company might receive several rounds of investment at any stage, or it might receive sufficient investment in one round to bypass multiple stages.

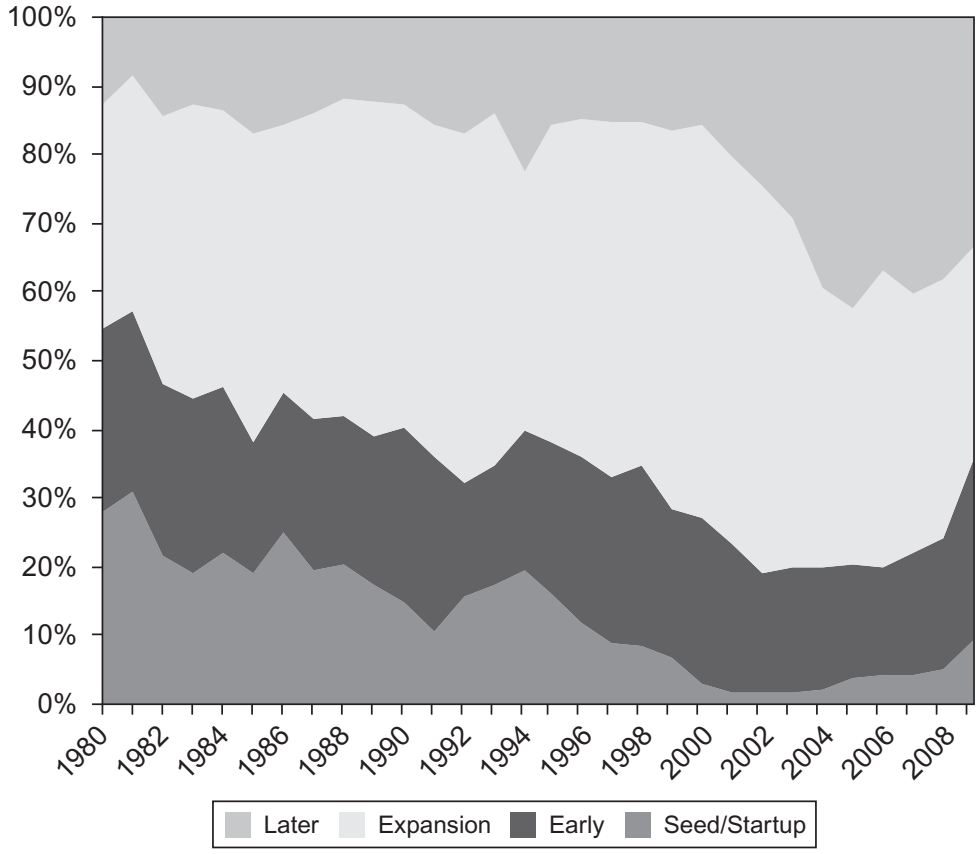
With these definitions in hand, we are now ready to examine the investment patterns by stage. Exhibit 1-6 illustrates these patterns by plotting the percentage of investment each year by stage.

1.4.2 Investments by Industry

Traditionally, VC investments have been concentrated in two broad sectors: health care and information technology (IT), where the latter sector is defined to include the communications, semiconductor, software, and hardware industries. This concentration is no accident: because VCs invest in small companies with the potential to quickly grow large, they need to look for businesses with large, addressable markets. To make headway in such markets, a business usually needs a technological advantage of some kind—hence the VC focus on the high-tech industries of health care and IT. Of course, other industries can also provide these opportunities,

EXHIBIT 1-6

VC INVESTMENT BY STAGE



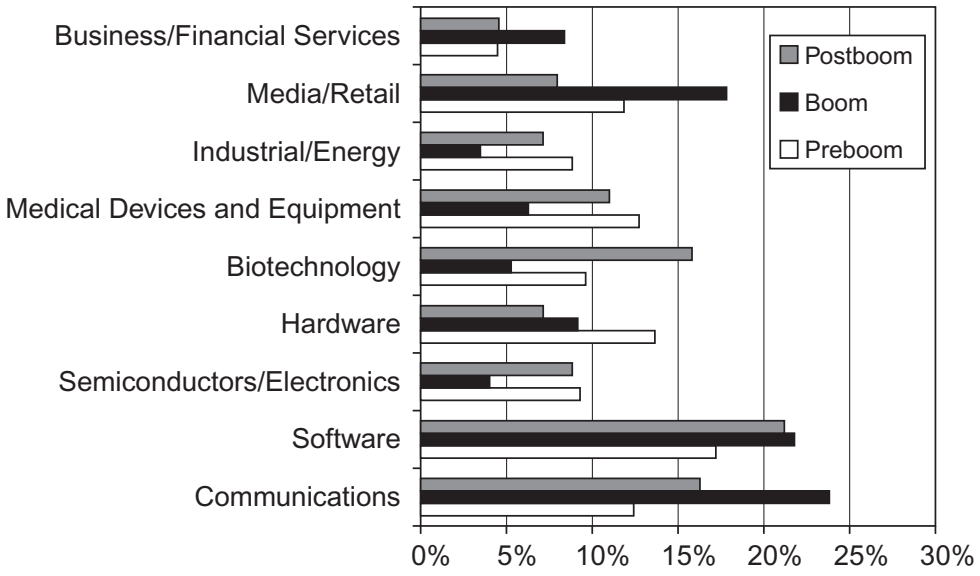
SOURCE: 2009 NVCA Yearbook, NVCA website.

particularly during times of disruptive economic change. The communications revolution of the late 1990s provided such an opportunity for Internet-based retail businesses, and periodic oil shocks have provided the impetus for energy investments.

Exhibit 1-7 illustrates the industry concentration of VC investment for three periods: the preboom period of 1980–1994, the boom period of 1995–2000, and the postboom period of 2001–2009. The data show the dominance of IT (including communications, software, hardware, and semiconductors/electronics) and health care (including biotech and medical devices) for VC investment; together, these two sectors comprise about 75 and 80 percent of all investments in the preboom and postboom period, respectively. During the boom, media/retail investment had a brief (and expensive) rise, but even then the main story was the enormous increase in IT relative to health care. Within the

EXHIBIT 1-7

VC INVESTMENT BY INDUSTRY



SOURCE: Various years, NVCA Yearbooks.

broad IT sector, the two most important industries in the boom and post-boom periods were communications and software, followed by semiconductors/electronics and hardware. Within health care, the story has been a gradual emergence of biotechnology as the dominant industry, receiving almost 60 percent of total health care investment in recent years.

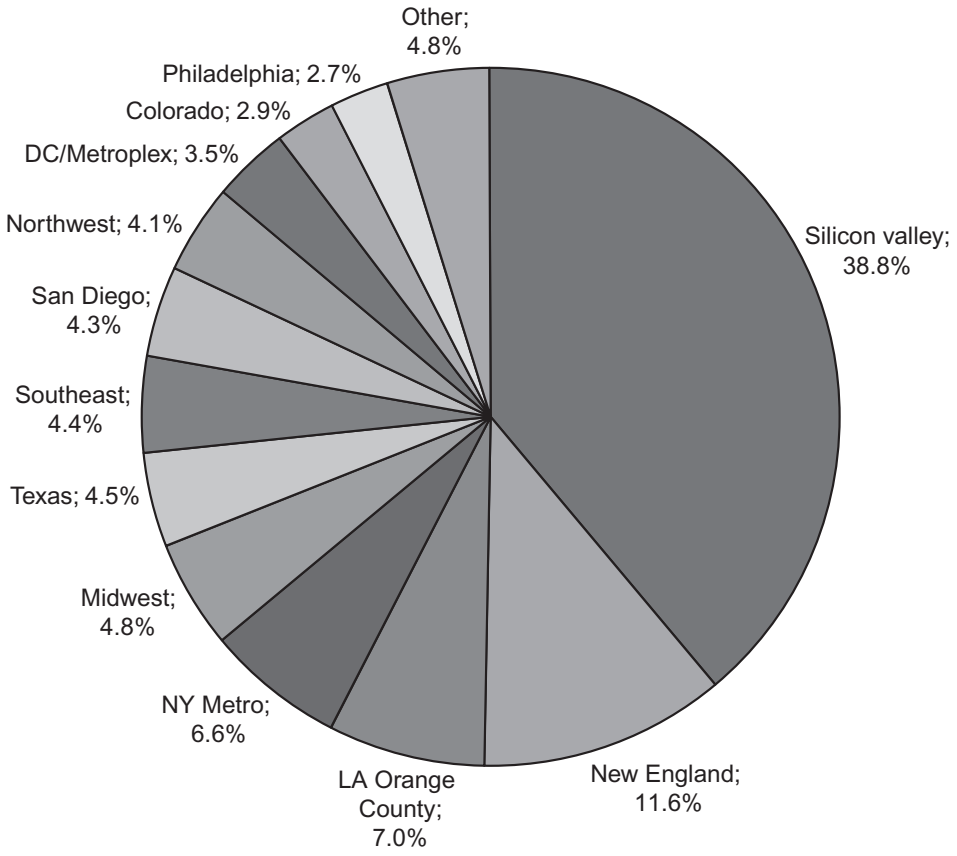
1.4.3 Investments by U.S. Region

With all the evidence of globalization in manufacturing and IT services, the U.S. regional concentration of VC investment is particularly striking. Since the beginnings of the industry, the Silicon Valley area of northern California has remained the epicenter of VC activity, with a consistent share of about one-third of total U.S. VC investments per year. The area surrounding Boston has remained a secondary center for most of this time, with between 10 and 15 percent share of the total. Exhibit 1-8 illustrates the distribution of VC investment for these centers and other U.S. regions for 2008.

The dominance of Silicon Valley and New England (mainly Boston) hides some important globalizing forces. Although companies headquartered in these two regions receive almost half of all VC dollars, much of these funds are then reinvested in foreign operations, particularly in India, by IT companies. This is a 21st-century phenomenon that has taken the industry by storm. Although it is

EXHIBIT 1-8

REGIONAL DISTRIBUTION OF VC INVESTMENT



SOURCE: 2009 NVCA Yearbook.

difficult to find hard numbers to document this trend, such outsourcing is a common topic of conversation among VCs.

SUMMARY

Venture capitalists (VCs) primarily invest in young, high-technology companies that have a capacity for rapid growth. VCs are a type of financial intermediary that perform three main functions, which are (1) screening potential investments and deciding on companies to invest in, (2) monitoring these companies and providing value-added services for them, and (3) exiting their investments in these companies by selling their stake to public markets or to another buyer. Venture capital is a form of private equity, which is an investment that cannot be traded in public markets. Without the information flow and liquidity of public markets, VC investing offers greater opportunities for both huge gains and terrible losses.

The modern VC industry effectively began in 1946 and grew slowly for its first 35 years. Beginning in the early 1980s, new sources of capital from pension funds led to

rapid growth. This period of rapid growth leveled off in the mid-1980s and resumed in the mid-1990s, culminating in a boom and crash at the turn of the century. The United States is the world leader in VC, with about 40 percent of the worldwide investment and industry-leading practices. Within the United States, information technology and health care are the dominant sectors for VC investment, and Silicon Valley and the area around Boston, Massachusetts, garner roughly half of all the domestic venture capital.

KEY TERMS

Venture capital (VC) and venture capitalists (VCs)
Screen
Monitor
Exit
Financial intermediary
Limited partnership, limited partner, general partner
Portfolio companies
Small Business Investment Companies (SBICs)
Initial public offering (IPO)
Angel investors = angels
Alternative investments
Private equity
Strategic investing
Corporate venture capital
Preboom, boom, postboom periods
Early-stage, mid-stage (expansion), late-stage
Mezzanine
Growth capital
Leveraged buyouts (LBOs)
Distress investing = special situations
Hedge funds
Term sheet
Due diligence
Management fees
Carried interest
Seed stage, Startup stage
Financing Round, First round (Series A), Second round (Series B)

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CHAPTER 2

VC PLAYERS

THIS CHAPTER introduces the key players in the VC industry. In Section 2.1, we discuss the relationships among VC firms, VC funds, and the VCs who work at them. In Section 2.2, we provide statistics on the investors in VC funds and discuss the importance of various investor types. Section 2.3 analyzes the contractual structure and compensation arrangements between VCs and their investors.

2.1 FIRMS AND FUNDS

About 80 percent of the organized VC market is controlled by independent **VC firms**. VC firms are small organizations, averaging about 10 professionals, who serve as the **general partner (GP)** for **VC funds**. A VC fund is a limited partnership with a finite lifetime (usually 10 years plus optional extensions of a few years). The **limited partners (LPs)** of VC funds are mostly institutional investors, such as pension funds, university endowments, and large corporations. When a fund is first **raised**, the LPs promise to provide a certain amount of capital, which will be provided either on a set schedule or at the discretion of the GP. These periodic capital provisions are known as **capital calls, drawdowns**, or **takedowns**. The total amount of capital promised by the LPs over the lifetime of the fund is called the **committed capital** of the fund.[1] Once the GP has raised the full amount of committed capital and is ready to start investing, we say that the fund has been **closed**. The typical fund will invest in portfolio companies and draw down capital over its first five years. These years are known as the **investment period** or **commitment period**. After the investment period is over, the VC can only make **follow-on investments** in current portfolio companies. A successful VC firm will raise a new fund every few years so that there is always at least one fund in the investment period at all times.

Most VC firms specialize their funds by stage, industry, and/or geography. For example, an **early-stage fund** would make initial investments in early-stage companies, with some capital reserved to make follow-on investments in these companies in their later stages. A **late-stage fund** would typically avoid all early-stage companies,

[1]Typically, about 1% of the committed capital is provided by the GP itself. Throughout this textbook, we will ignore this small GP contribution and pretend as if all committed capital is coming from the LPs.

focusing on expansion and later-stage investments. Most VC firms keep the same stage focus for all their funds, but some will change focus over time or mix the two strategies at once in a **multistage fund**. A few firms raise separate early-stage and late-stage funds for overlapping periods and assign different professionals to each fund.

There is a wide dispersion in the levels of industry focus, with many generalists (a fund that is willing to invest in both IT and health care is effectively a generalist) and others with a relatively narrow focus on sectors like energy or financial services. As for geographic focus, it is important to recognize that much of the activity experienced by VCs is local, and as a result the location of the VC's office will usually be highly correlated with the location of most of their portfolio companies. Not surprisingly, the geography of VC offices is very similar to the geography of VC investment shown in Exhibit 1-8. Because funds tend to be geographically focused wherever their offices are, the main way to attain reliable geographic diversity is to have multiple offices.

Throughout this book, we will use a few prototype VC funds as example investors. Because the compensation structures and partnership agreements of VCs are an important driver of their investment incentives, it is useful to write down some key terms from these agreements for our prototype funds. We do this in the appendices to this chapter: Appendix 2.A shows some key terms for EarlyBird Ventures Fund I, which is a $100M initial fund raised for an early-stage investor; Appendix 2.B shows some key terms for Talltree Ventures IV, the $250M fourth fund raised by a multistage firm; and Appendix 2.C shows some key terms for Owl Ventures IX, a $500M ninth fund raised by a late-stage firm with a stellar reputation and excellent track record. We will refer to these appendices several times in this chapter and later on in the text.

Exhibit 2-1 gives a timeline for several funds for one of our prototype VC firms, EarlyBird Ventures (EBV).[2] A firm will usually number its successive funds, so EarlyBird Ventures I is known to be the first fund raised by EBV, EarlyBird Ventures II was the second fund, and so on. In this example, EBV raises its first fund, EBV I, in 1994 with $100M in committed capital. (Think of EBV I as the fund described in Appendix 2.A.) In future years, the performance of EBV I will be compared to other funds raised in 1994; in industry parlance, all such funds will have 1994 as their **vintage year**. This borrowed terminology from the wine industry is appropriate: just as the weather conditions of certain years are better for growing grapes, the economic conditions of certain years are better for growing companies. By comparing the performance of EBV I with other funds of the same vintage year, future investors can make a fair evaluation of EBV's performance as a GP.[3]

[2]All of our prototype funds are fictitious. Any resemblance to real funds, living or dead, are purely coincidental. In case some readers are wondering, we were not aware at the time of writing this textbook that there exists an actual early technology investment firm called Earlybird in Germany.

[3]However, please note that some firms keep us on our toes by giving their funds a completely different name from their firm name.

EXHIBIT 2-1

EARLYBIRD VENTURES TIMELINE

Fund Name	Vintage Year	Committed Capital
Early Bird Ventures I	1994	$100 M
Early Bird Ventures II	1998	$250 M
Early Bird Ventures III	2000	$1B
Early Bird Ventures IV	2005	$300 M
Early Bird Ventures V	2009	$300 M

By 1998, most of EBV I has been invested. We assume here that EBV I look good relative to other funds with a 1994 vintage year, so it is able to raise a larger fund, EBV II, in 1998. It invests this fund rapidly in the boom years of 1999 and 2000 and returns to raise an even larger fund, EBV III, of $1 billion in 2000. By 2000, in addition to EBV III, it has two funds, EBV I and II, which are no longer making any new investments but still have some investments outstanding. When the market loses steam, it invests this fund slowly and with much less success than its earlier funds. Nevertheless, its earlier reputation allows the firm to return to the market, somewhat chastened, and raise a $300M fund, EBV IV, in 2005. By this point, it has closed out all its investments from EBV I and is still trying to exit a few investments from EBV II. As for EBV III, most of the portfolio companies have gone out of business, but it still has modest hopes for some of the survivors. Four years later, in 2009, EBV raises another $300M fund, EBV V, which is a respectable size given the generally difficult fundraising conditions in the market. EBV I and II are fully liquidated by then; EBV III is almost mature, but many of its portfolio companies are still illiquid.

The experience of EBV is typical for top VC firms since the mid-1990s. Great success for investments at the beginning of the boom, combined with seemingly endless opportunities, led many firms to raise "megafunds" in 1999 and 2000. Whereas billion dollar funds were unheard of before, they became almost commonplace during this time period. With few exceptions, these funds performed terribly, and the surviving firms have returned to raise much smaller funds in recent years.

We can gain a more detailed picture of these trends by looking at some data from the National Venture Capital Association. Exhibit 2-2 gives its estimates on the total number of firms, funds, and VC professionals since 1980.

This data echoes the industry cycles discussed in Chapter 1. Between 1997 and 2001, there was a doubling or near doubling of the total number of VC funds, the total number of VC firms, and the size (capital divided by funds or firms) of these VC funds and VC firms. The size of the industry hit a plateau in 2001 and stayed steady between 2002 and 2006. The industry size started to decline in 2007, and between

EXHIBIT 2-2

VC INDUSTRY SIZE SINCE 1980

Year	New Funds	New Committed Capital ($B)	Total Funds	Total Firms	Total Committed Capital ($B)	Total Principals (Estimate)	Principals Per Firm
1980	52	2.0	129	92	4.1	1,435	15.6
1981	75	1.5	188	127	6.1	1,805	14.2
1982	87	1.7	248	162	7.8	2,138	13.2
1983	143	3.9	355	208	11.4	2,600	12.5
1984	116	3.0	459	260	14.6	3,224	12.4
1985	121	4.0	541	297	17.9	3,641	12.3
1986	103	3.8	603	332	21.5	4,038	12.2
1987	116	4.4	681	362	24.2	4,368	12.1
1988	104	4.4	715	377	25.5	4,550	12.1
1989	105	4.9	746	392	28.6	4,770	12.2
1990	87	3.2	734	393	29.2	4,834	12.3
1991	42	2.0	660	373	27.8	4,588	12.3
1992	80	5.2	620	365	28.4	4,563	12.5
1993	88	3.9	625	376	29.8	4,675	12.4
1994	140	8.9	651	389	34.7	4,824	12.4
1995	172	9.9	707	429	40.6	5,320	12.4
1996	162	11.8	773	469	48.9	5,769	12.3
1997	244	19.8	903	548	63.7	6,753	12.3
1998	288	29.7	1,085	624	92	7,550	12.1
1999	451	55.8	1,394	752	145.3	9,123	12.1
2000	653	105.0	1,737	881	225.2	10,684	12.1
2001	321	39.1	1,883	943	253.1	11,340	12.0
2002	206	9.3	1,852	938	253.1	11,186	11.9
2003	163	11.6	1,800	968	254.2	11,112	11.5
2004	219	19.8	1,823	1,003	262.9	10,896	10.9
2005	235	28.7	1,778	1,024	271.4	10,680	10.4
2006	241	31.8	1,722	1,027	278.1	10,260	10.0
2007	247	35.4	1,593	1,019	258.3	8,892	8.7
2008	210	27.9	1,366	882	197.3	7,497	8.5

SOURCE: 2008 and 2009 NVCA Yearbooks.

2007 and 2008 the capital under management fell 24 percent, while the number of firms and the number of principals declined by 13 percent and 16 percent, respectively. The contraction occurred because large funds raised in 2000 were largely rolled out of the industry's managed capital and were replaced by much smaller funds

raised in more recent years. Many firms that raised funds at the height of the bubble are winding down their portfolios and exiting the industry, which also contributes to the decline in the number of firms and principals. This trend is likely to continue for some time to come. Note also that, even with two years of sharp declines, the capital under management is still higher than the 1999 level.

In most years, the total number of funds is about twice as large as the number of firms, indicating that the average firm has two funds alive at any given time. Because of differences in the data collection methods and sample selection, the committed-capital amounts in Exhibit 2-2 are not directly comparable to the investment totals given in Exhibits 1-3 and 1-4. Nevertheless, the general trends are very similar.

One striking aspect of these numbers is that there has been a steady rise in the size of the capital managed per firm and per principal up until 2006−2007, while the number of principals per firm itself held steady at around 12 between the mid 1980s and 2002 and even declined to 8.5 by 2008. Thus, the main trend has been a gradual scaling up of the dollar amount managed per personnel, while the VC firms themselves stayed relatively lean as organizations.

Relative to other investment and professional service firms, VC firms are quite top-heavy and rarely show much of a pyramid structure. Although some VCs entered the industry directly out of school, most came to VC as a second career and entered the profession at a fairly senior level, so there are not as many junior people floating around. Although many people would like to know the best way to prepare for a VC career, there is no "typical" path. Nevertheless, the analysis of hand-collected data on 125 partners from 15 VC firms in Wieland (2009) offers some interesting insights.

In this sample, 60 percent of VC partners hold a bachelor's, master's, or doctorate degree in science or engineering. Particularly common is a bachelor's degree in engineering, which 44 percent of the VCs hold. While 25 percent of VCs hold a master's degree and 9 percent hold a Ph.D. in engineering or science, the most common postgraduate degree held by VCs are MBA degrees—62 percent hold them. A significant minority—16 percent—also hold a bachelor's degree in business or economics. As for their professional experience, most of the work experience of individual VCs comes in the form of having worked in the IT or health care sector (78%), having startup experience as either entrepreneur (37%) or managing executive at a startup firm (32%), holding experience as line manager at a listed firm (38%), having worked as industrial engineer (31%) or professional scientist (5%), having worked for another VC firm as investment professional (32%), and holding experience working as strategy consultant (23%) or in finance (14%).[4] Although an advanced degree is not a necessary requirement, the most notable exceptions are second-career VCs whose first career was as a successful entrepreneur. Indeed, most VCs are in their second career because few jobs are available to new graduates. These first careers might be decades long and consist of top management experience, or they might be

[4]Zarutskie (2009) studies educational and professional backgrounds of first-time VC funds and report similar educational backgrounds: 39% of individual VCs hold a degree in either engineering or science and 58% hold an MBA.

just a few years long, consisting of a few years of experience at a consulting firm or at an investment bank. Consulting and investment banking are not particularly good ways to prepare for a VC career; it is just that many top MBA graduates start there, so that is where the talent is. Many VCs will say that the best preparation for a VC career is to combine technical expertise with industry experience, particularly if that experience is at a startup firm. Many VC hopefuls are understandably reluctant to follow this advice, because the VC industry has cyclical and somewhat fickle preferences about exactly what kind of technical experience is useful, and an unlucky choice of specialization can render a candidate's expertise to be superfluous.

As for the career progression, it does not have many levels. The top level is "partner", with modifiers in front of that title to indicate experience, past success, and compensation level (e.g., "Managing General Partner" or "Senior Partner"). Although some professionals begin their VC careers as partners—either by raising their own fund or by joining another fund after a very successful first career—most VCs have to work their way up. There are essentially two tracks to make partner. One track, typically followed by younger professionals with a few years of pre-VC experience, is to start as a junior VC with a title like associate, senior associate, or principal. These professionals are not expected to lead transactions or sit on boards in their first few years, but rather spend most of their time screening investments, performing due diligence, and generally helping out the partners. They are expected to learn the business as apprentices, and if they are successful, their responsibilities will be gradually increased. Depending on their past experience, the time path to partnership can vary tremendously. With good timing and good performance, some junior professionals can make partner in as little as two years. At the other extreme, some firms do not treat these junior positions as being on the partner track, sending even their most talented associates back out into the world to gain more experience. Similarly, some firms employ recent college graduates as analysts, with tasks similar to other junior VCs. Although these positions are generally not considered to be on the partner track, analysts who go on to get advanced degrees have great positioning to land a partner-track job in the future.

The second track, typically followed by successful entrepreneurs or senior managers with many years of experience, is to enter with the title of venture partner. This title does not mean that the new VC is a partner in the sense of sharing the profits, but rather it is a way to bring in someone trying out VC as a second career without subjecting them to the same grind or title as a junior professional. Venture partners would typically be expected to take a lead role on investments and to use their industry contacts to bring in new business right from the beginning. In this respect, venture partner is very much a provisional position, with many candidates finding out that the business is not really for them. With one or two successful investments, a venture partner can expect to be admitted into a true partner role. Indeed, venture partners are often paid only small salaries—the idea being that if they are successful, they will quickly earn a partnership.

GPs receive their income from two sources—management fees and carried interest—and these sources must supply all the compensation for the VCs. Base salaries

EXHIBIT 2-3

VC COMPENSATION (IN $ THOUSANDS)

	2008				2009			
Title	**Salary**	**Bonus**	**Carry**	**Total**	**Salary**	**Bonus**	**Carry**	**Total**
Managing GP	688	633	192	1,513	700	350	101	1,151
Senior Partner	595	350	155	1,100	600	200	50	850
Partner	375	150	35	560	350	130	20	500
Principal/VP	240	78	2	320	206	75	6	287
Senior Associate	155	46	0	201	156	44	1	201
Associate	105	33	0	138	105	35	0	140
Analyst	101	15	0	116	100	10	0	110
Venture Partner	250	0	43	293	185	40	12	237

NOTE: 2008 data are April 1, 2008, salaries and bonus and carry earned in 2007. 2009 data are April 1, 2009, salaries and bonus and carry earned in 2008. The figures are based on annual compensaton surveys of VC professionals and samples are not matched across years.

SOURCE: Mike Holt, Founder and Managing Director of Holt Private Equity Consultants and coauthor of *Private Equity Analyst—Holt Compensation Survey*.

can be paid from management fees, and the biggest slice of variable pay comes from the carry. In most funds, the total carry percentage will be divided in advance, with partners knowing what share of the overall carry they are due to receive. Exhibit 2-3 shows compensation levels for salary, bonus, and carried interest for several different job titles. These figures are from the annual *Private Equity Analyst-Holt Compensation Survey,* which in 2008 received data from 46 independent venture capital firms for 16 job titles. Note that salaries are as of April 1st of the survey year, and bonus and carry are earned the year before. Thus, these compensation levels reflect fund performance in the year prior to payment.

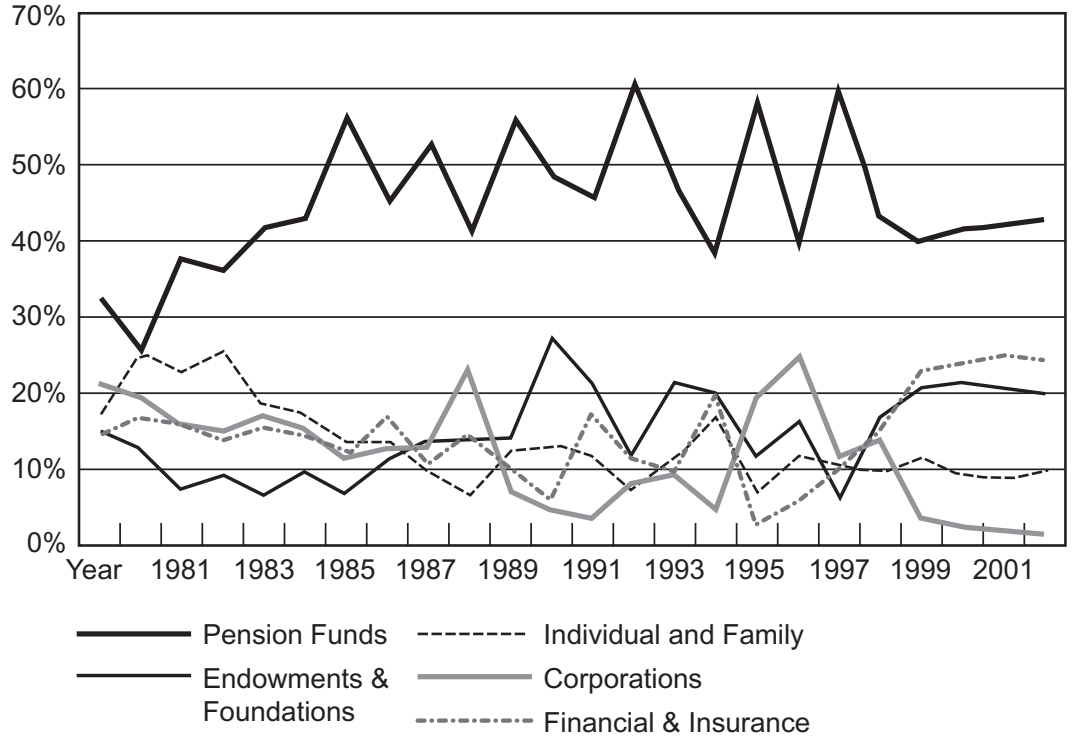
The levels are shown for 2008 and for 2009, so one can see the large role played by market conditions. While the bonus levels are largely unchanged, bonus and carry declined in 2009 due to difficult economic times and tough exit conditions for VC-backed companies.

2.2 THE LIMITED PARTNERS

As mentioned in Chapter 1, the first major burst of VC activity was driven by the entry of pension funds as limited partners. Since 1980, pension plans—including those of government entities, private companies, and nonprofit organizations—have provided 44 percent of the committed capital in the VC industry. In addition to pension funds, several other investor groups have played an important role in the

EXHIBIT 2-4

COMMITTED CAPITAL BY LIMITED PARTNER TYPE



SOURCE: National Venture Capital Association Yearbooks.

development of VC. Exhibit 2-4 shows the fraction of newly committed capital from these groups.[5]

After pension funds, the next largest investor class is financial institutions, which includes commercial banks, investment banks, and insurance companies. Taken together, this group has provided about 18 percent of the committed capital since 1980. Endowments and foundations are next with 17 percent of the total. This group is dominated by large private universities and charitable foundations. In addition to their large supply of capital, these organizations are also the most successful of the investor classes, with returns that far exceed those of the other investors.[6] Part of the reason for their success is that they have been active and consistent investors since the earliest partnerships were formed in the late 1960s and early 1970s. However, evidence also shows that access to these older funds

[5]NVCA stopped reporting this type of data in recent years, but it appears that the fractions among the groups have not changed significantly. In 2004, the last year the data is publicly available, the breakdown was pension funds (42%), financial and insurance (25%), Endowments and foundations (21%), Individual and family (10%), and Corporations (2%).

[6]Lerner, Schoar, and Wongsunwai (2007) document this performance.

explains only part of their superior returns, and that the endowments have in fact also done very well with their recent partnerships.

Since 1980, individuals and families have contributed about 11 percent of total committed capital, with this fraction falling slightly in recent years. As compared to other investment classes, this participation by individuals is low. Part of the reason for this low participation is that the long horizon of VC investment is comparatively more palatable to institutions than it is to individuals.

Finally, with only 9 percent of the total commitments since 1980, corporations have played a relatively small role as limited partners as compared to the important role of their corporate pension plans. Note also that corporate participation is more variable than it is for other investors, and the importance of corporate LPs has fallen dramatically in recent years. This type of indirect corporate investment as an LP should not be confused with direct corporate investment in portfolio companies, a practice that is known as corporate venture capital. Direct corporate investment is not included in Exhibit 2-4, unless the corporation is included as an LP in its own finite-life corporate VC fund. Because most corporate VC funds are not organized as finite-life limited partnerships, the majority of direct corporate investment is not included in this exhibit.

Exhibit 2-4 defines the fund flow by the ultimate source of capital, but in some cases additional intermediaries stand between the capital provider and the VC. One group of intermediaries deserves special mention: the **fund-of-funds (FOF)**. An FOF is typically organized as a limited partnership, with many of the same rules as other private equity funds, except that, instead of investing directly in companies, the FOF invests in other private-equity funds. For example, FLAG Venture Management is a firm that invests exclusively in other VC firms through FOFs. These FOFs can be quite large: the 2000 Flag Venture Partners Fund IV has committed capital of $650M; other boom-time FOFs raised multibillion dollar funds. FOFs appeal mostly to wealthy individuals and small institutions that are not large enough to support a diversified portfolio of LP commitments. By pooling their resources in a FOF, a group of smaller investors can gain access to a diversified portfolio of funds and take advantage of the contacts and skills of the specialized FOF intermediary. During the boom period, FOFs intermediated about 5 percent of all commitments to VC funds. FOF firms act as both a GP (to their investors) and an LP (to the funds they invest in). As a GP, they also charge management fees and (sometimes) carried interest, although these charges are always considerably lower than those charged by direct investment firms.

It is important to note that LPs are not just investors, but also really are partners in the fund. Although the day-to-day involvement of LPs is limited by law (otherwise they can lose their limited-liability status), certain LPs are prized as long-run partners, because they have the industry experience and patience to ride out industry cycles and stick with their GPs. Such LPs make the fundraising task much easier for GPs, yielding time savings that can be used to help portfolio companies and to find new investments.

For this reason, it is no accident that endowments and foundations held their positions in the top VC funds even as other LPs were beating down the door. It is

true that during the boom many top GPs did raise their compensation; but it should be noted that they did not raise it to market-clearing levels, instead choosing to keep the same long-term LPs and exclude some newer money. In particular, families and corporations are seen—perhaps justly—as fickle investors and are often shunned by top GPs. In recent years, there has also been pressure on public pension funds and public universities to reveal information about the performance of VCs in their portfolio. A few of these LPs have been forced to reveal performance information, and this disclosure is the source of some of the data analyzed in later chapters. For a variety of reasons, most VCs abhor any kind of public disclosure, so a few of the top GPs have started to bar public LPs from their funds.

2.3 VC PARTNERSHIP AGREEMENTS

Before we are able to understand VC investment decisions, we must first have a working knowledge of VC partnerships. The VC firm serves as the GP of the partnership and is compensated by management fees (discussed in Section 2.3.1) and carried interest (discussed in Section 2.3.2). This compensation structure creates some differences between the incentives of the GP and the LPs, and many partnership agreements include several restrictive covenants to mitigate these differences (discussed in Section 2.3.3). Metrick and Yasuda (2010) analyze terms of fund partnership agreements for 94 VC funds and 144 buyout funds, which they obtained from a large, anonymous LP (the "Investor"); all statistics in Sections 2.3.1 and 2.3.2 are derived from this paper, and we will refer to this data as the "Investor" data.

2.3.1 Management Fees

VC investing is a long-run business, and investors must often wait many years before enjoying any return of capital. Nevertheless, the expenses of VC investing start immediately: salaries must be paid, the lights must stay on, and due diligence must be performed. Thus, a baseline **management fee** is necessary. The typical arrangement is for limited partners to start paying a set percentage of committed capital every year, most commonly 2.0 percent. Sometimes this fee remains constant for the full 10-year life of the fund, but in most cases the fee drops somewhat after the five-year investment period is over.

For any given VC fund, we define the ***lifetime fees*** as the sum of the annual management fees for the life of that fund. We define the ***investment capital*** of the fund as being equal to the committed capital of the fund minus the lifetime fees. For example, Appendix 2.A shows that EBV is a \$100M fund with a 10-year life and an annual management fee of 2 percent for all 10 years. Thus, the fund has lifetime fees of \$20M ($= 2\% * \$100\text{M} * 10$ years) and investment capital of \$80M ($= \$100\text{M} - \$20\text{M}$). As is typical, in this case the lifetime fees are a nontrivial fraction of committed capital. EBV will need to earn a 25 percent lifetime return on its investments (\$20M on \$80M investment capital) just to earn back the fees and get to breakeven for its investors.

Our next example uses a more complex fee schedule.

EXAMPLE 2.1

Owl Ventures has raised their \$500 M fund, Owl Ventures IX, with terms as given in Appendix 2.C. The management fees given in this appendix are as follows.

Management Fees All management fees are computed based on committed capital. These fees are 2 percent in years 1 and 2, 2.25 percent in years 3 and 4, 2 percent in year 5, 1.75 percent in year 6, 1.50 percent in year 7, 1.25 percent in year 8, 1 percent in year 9, and 0.75 percent in year 10. These fees will be paid quarterly, with equal installments within each year.

Problem Given this description, what are the lifetime fees and investment capital for this fund?

Solution This example uses a fee schedule that starts at 2 percent, and then increases to 2.25 percent in years 3 and 4 before falling by 0.25 percent in each subsequent year. Such "increasing then decreasing" schedules are not unusual, with the logic that fund expenses often reach their maximum in the middle years of the investment period. To compute the lifetime fees, we just add up the fees in each year. Thus,

$$\begin{aligned}\text{Lifetime fees} &= \text{committed capital} * (0.02 + 0.02 + 0.0225 + 0.0225 + 0.02 + 0.0175 \\ &\quad + 0.015 + 0.0125 + 0.01 + 0.0075) \\ &= \text{committed capital} * 0.1675 = \$500\text{M} * 0.1675 = \$83.75\text{M}\end{aligned} \tag{2.1}$$

Then,

$$\begin{aligned}\text{Investment capital} &= \text{committed capital} - \text{lifetime fees} = \$500\text{M} - \$83.75\text{M} \\ &= \$416.25\text{M}\end{aligned} \tag{2.2}$$

■

This example follows the industry's standard practice of computing management fees on committed capital. At first glance, this method might seem strange, because other parts of the money management industry have management fees that are computed based on the market value of the portfolio. Why are VC funds different?

There are several reasons. First, if management fees were to be based on portfolio values, then these fees would be low in the first few years (before all the capital was invested), and the VCs might be unable to cover their fixed costs. Second, management fees based on portfolio value would create an incentive for VCs to invest quickly—and this would result in an inevitable sacrifice in quality. Third, because "market" values for the portfolio are hard to calculate for nontraded companies, the level of fees would be somewhat arbitrary.

Although the computation of management fees on committed capital is the most standard arrangement, there are other methods. To understand these other

methods, we introduce a few new definitions. First, **realized investments** are those investments that have been exited or those in companies that have been shut down, and **unrealized investments** are those investments that have not yet been exited in companies that still exist. Next, we define the **cost basis** of an investment as being equal to the dollar amount of the original investment. Finally, we define **invested capital** as the cost basis for the investment capital of the fund that has already been deployed, and **net invested capital** is equal to invested capital minus the cost basis of realized and written-off investments. It is this final definition that is most important for alternative fee structures, for it is common (about 43% of VC funds in the Investor data employ this rule) to see the management fee base change from committed to net invested capital *after* the five-year investment period is over. This hybrid system minimizes the incentive for firms to overinvest in early years, because the fee is still fixed for that time period. Also, because it relies on the cost basis of the investments, it does not require the estimation of market values. In Exercise 2.2, at the end of this chapter, you are asked to solve for the lifetime fees for a fund that uses this hybrid system.

There are two other points worth mentioning. First, although management fees cover most operating expenses, they do not usually cover all of them, and the LPs will still find that some of their investment capital is going to uses other than investments. These other operating expenses charged to the fund might include the organizational costs of setting up the fund, costs of unconsummated transactions, and certain kinds of professional service expenses. Second, our calculations assumed that exit proceeds cannot be reinvested into new portfolio companies. In theory, however, most contracts allow GPs limited reinvestment rights, subject to certain requirements being met. (The most common requirement would be that the original investment was exited quickly, such as within one year.) In practice, these requirements are stringent enough that significant reinvestment is rare. When reinvestment does occur, the sum of investment capital and lifetime fees would be greater than committed capital. However, because reinvestment does not incur any additional management fees, the economics of the reinvestment decision are a bit different from the economics of the original investment. We will address this possibility in Exercise 10.1 in Chapter 10.

2.3.2 Carried Interest

The other form of VC compensation is the **carried interest**, often referred to simply as the **carry**. Carried interest enables GPs to participate in the profits of the fund, and historically it has provided the largest portion of GP compensation. The basic idea is simple: if the investors commit \$100 million to the fund, and total exit proceeds are \$200 million, then the total profit is \$200M − \$100M = \$100M. If such is the case, then a GP with 20 percent carried interest would receive \$20 million of this profit. Indeed, this simple example tells a lot of what we need to know about carried interest. Nevertheless, there are many variations of this basic story, and these variations are often important and contentious points of

negotiation. Variations occur in the percentage level of the carried interest, the **carried interest basis (= carry basis),** the timing of the carried interest, **priority returns**, and **clawbacks**. These terms are defined in the following paragraphs.

The most important variation concerns the percentage level of carried interest. The vast majority of all VC firms receive a 20 percent carry. The Investor data indicates that 95 percent of VC funds had a 20 percent carry, and this percentage was equally high if not higher in the past.[7] Indeed, 20 percent is the focal point for the entire private equity industry and for many other partnership structures in the investment industry. There is no consensus on the origins of 20 percent as the focal point for risk-capital profit sharing; some industry analysts point to practices in the oil and gas industry earlier in the 20th century, and others trace the roots back to Venetian merchants in the late Middle Ages.[8] An 80−20 split even appears in the book of Genesis.[9]

Despite these historical ties, a few successful VCs have managed to buck the trend, particularly for partnerships raised during the boom period. The *Private Equity Analyst* reports that over two dozen GPs of VC funds receive carried interest of 25 or 30 percent.[10] Some of these high-charging VCs will be discussed in Chapter 5, along with some of their famous investments and the astronomical returns they have earned. The remainder of the non-20 percent crowd earns a carry between 20 and 25 percent, or receives carry on a sliding scale, with 20 percent earned at first, and some higher number (typically 25%) if certain performance targets are met.

There is also variation in the carried interest basis, which is the threshold that must be exceeded before the GPs can claim a profit. The majority of firms compute profits as the difference between exit proceeds and committed capital. Committed capital is used as the basis by 94 percent of VC funds (and 83% of the buyout funds) in the Investor data, and this has become more of an industry standard over time. The other 6 percent of funds have the more GP-friendly basis of investment capital, which enables profits to be defined without consideration for fees. For a profitable fund with 20 percent carried interest, $100M in committed capital, $20M in lifetime fees, and $80 million in investment capital, the $20M basis difference between committed and investment capital would yield a difference in $20M $*$ 0.20 = $4M in carried interest over the life of the fund.

[7]See Metrick and Yasuda (2010) and Gompers and Lerner (1999). Most commentators believe that the percentage will be heading up again as terms become more LP friendly in the postboom period.

[8]See Metrick and Yasuda (2010) and also Kaplan (1999).

[9]Gen. 47:23-24: "Joseph said to the people, 'Now that I have bought you and your land today for Pharaoh, here is seed for you so you can plant the ground. But when the crop comes in, give a fifth of it to Pharaoh. The other four-fifths you may keep as seed for the fields and as food for yourselves and your households and your children.'" If you read the rest of this Genesis chapter, you will see that Joseph was acting more as a distress investor than as a VC.

[10]*Private Equity Analyst*, September 1999.

EXAMPLE 2.2

A VC firm is considering two different structures for its new \$100 M fund. Both structures would have management fees of 2.5 percent per year (on committed capital) for all 10 years. Under Structure I, the fund would receive a 25 percent carry with a basis of all committed capital. Under Structure II, the fund would receive a 20 percent carry with a basis of all investment capital.

Problems

(a) Suppose that total exit proceeds from all investments are \$150M over the entire life of the fund. How much carried interest would be earned under each of these two structures?
(b) For what amount of exit proceeds would these two structures yield the same amount of carried interest?

Solutions

(a) Under Structure I, the GPs would receive 25 percent of the profits, where profits are defined as the proceeds above committed capital. Therefore, the carried interest under Structure I would be $0.25 * (150 - 100) = \$12.5$ M. Under Structure II, the GPs would receive 20 percent of the profits, where profits are defined as the proceeds above investment capital. Given a 2.5 percent management fee for all 10 years, the lifetime fees are $2.5\% * 100\,\text{M} * 10$ years $= \$25$ M, so investment capital is $\$100\,\text{M} - \$25\,\text{M} = \$75$ M. Therefore, the carried interest under Structure II would be $0.20 * (150 - 75) = \$15$ M.
(b) Let Z be defined as the total proceeds from all investments. Then, using the solution to part (a), we can see that the formulas for carried interest under Structures I and II are

$$\text{Total carried interest under Structure I} = 0.25 * (Z - 100) \tag{2.3}$$

and

$$\text{Total carried interest under Structure II} = 0.20 * (Z - 75) \tag{2.4}$$

We next solve for the Z that equates the carried interest under both structures:

$$0.25 * (Z - 100) = 0.20 * (Z - 75) \rightarrow 0.05 * Z = 10 \rightarrow Z = 200 \tag{2.5}$$

When total exit proceeds $= Z = 200$, then both structures would provide $0.25 * (200 - 100) = 0.20 * (200 - 75) = \$25$ M in carried interest.

■

The level and basis of carried interest are the main determinants for the total dollar amount of GP carried interest. These terms determine how the "pie" of proceeds is split between the GPs and the LPs. In addition, there are also several possible methods for the *timing* of carried interest. Although these methods do not usually affect the share of the total pie earned by the GP, they do affect how quickly that pie can be eaten. Because a basic tenet of finance is that money now is worth more than money later, GPs prefer methods that enable them to receive their carried interest portion as soon as possible.

The most LP-friendly method is to require that the whole basis be returned to LPs before any carried interest is paid. This method is used by about 25 percent of the funds in the Investor data. To see how timing matters, imagine that this method was in place for Example 2.2. In that example, we considered two possible structures for carried interest: Structure I with 25 percent carry and a basis of committed capital, and Structure II with 20 percent carry and a basis of investment capital. In part (b) of that example, we found that total exit proceeds of $200M would lead to $25M of carried interest under both of the proposed structures, with the remaining $175M going to LPs. Although the $200M pie is shared the same in both cases, the timing is not. Under structure I, the LPs receive their whole basis of $100M before all proceeds above $100M are split 75/25. Under structure II, the LPs also receive their whole basis (only $75M in this case) before all proceeds above $75M are split 80/20. Thus, GPs get their first dollar more quickly under structure II, and at any time in the distribution of $200M of total proceeds, structure II will always have paid at least as much carried interest as structure I.

To understand the alternative methods of carry timing, we make use of the definition of invested capital (introduced in Section 2.3.1) and the related concept of **contributed capital**, with the latter being defined as the portion of committed capital that has already been transferred from the LPs to the GPs. Thus, contributed capital is equal to invested capital plus any management fees paid to date. Analogous to net invested capital, **net contributed capital** is equal to contributed capital minus the cost basis of any realized and written-off investments. According to the Investor data, another 75 percent of VC funds allow some form of early carry distribution. One such method only requires the return of either invested capital or contributed capital before any carried interest can be earned. Clearly, this timing method is more GP-friendly than requiring the return of the whole basis. Another method, which lies somewhere between the "return the whole basis" and "return only the invested/contributed capital" methods, requires the return of invested or contributed capital plus priority returns. This is fairly common and is found in about 45 percent of VC funds in the Investor data.

Priority returns—also called **preferred returns** or **hurdle returns**—are another factor affecting the timing of carried interest. With a priority return, the GP promises some preset rate of return to the LPs before the GPs can collect any carry. The Investor data indicates that 45 percent of VCs promise some kind of priority return. Among these funds, 8 percent (per year) return is the most common, with 71 percent of all funds with priority returns choosing 8 percent; others range from 5 percent to 10 percent. Priority returns are relatively rare in funds that focus on early-stage investing, and relatively common in funds that focus on late-stage investing. It is important to note, however, that the priority return usually affects the timing and not the total amount of carried interest. Most priority returns also have a **catch-up provision**, which provides the GPs with a greater share of the profits once the priority return has been paid. With a catch-up, the GP receives this greater share until the preset carry percentage has been reached.

As an illustration of priority returns with a catch-up, consider a $100M fund with a carry percentage of 20 percent, a carry basis of all committed capital, a priority return of 8 percent, and a 100 percent catch-up. We'll keep things simple and imagine that all committed capital is drawn down on the first day of the fund, and that there are total exit proceeds of $120M, with $108M of these proceeds coming exactly one year after the first investment, $2M coming one year later, and $10M coming the year after that. Under these rules, all $108M of the original proceeds would go to the LPs. This distribution satisfies the 8 percent hurdle rate requirement for the $100M in committed capital. One year later, the catch-up provision implies that the whole $2M would go to the GPs; after that distribution they would have received 20 percent ($2M) out of the total $10M in profits. For the final distribution, the $10M would be split $8M for the LPs and $2M for the GPs.

Beyond this simple example, the calculations quickly become unwieldy to handle without a spreadsheet. The key takeaway is that even with a priority return, the GPs still receive the same fraction of the profits as long as the fund is sufficiently profitable. In this example, the fund made $20M of profits ($120M of proceeds on $100M of committed capital), and the GPs received 20 percent ($4M) of these profits. If, however, the fund had only earned $8M or less of profits over this time period, then all these profits would have gone to the LPs.

In all but two of all funds with a priority return, there is some catch-up provision for the GPs. In the two exceptions, there is no catch-up, and thus the GP only earns carried interest on the portion of profits *above* the priority return. The absence of a catch-up affects the share of the pie for the GP, not just the timing of that share. In the preceding example, having no catch-up would have meant that the GP would have received only $0.20 * (\$120M - \$108M) = \$2.4M$ of total carried interest.

Finally, some funds require the return of only a portion of contributed (or invested) capital. For example, one common method is to require the return of the cost basis of all realized investments, plus all management fees to date and any **write downs** (partial losses) known to exist among the unrealized investments. In most cases, this method is combined with a so-called fair-value test. This test requires that the estimated values of remaining portfolio investments exceed a preset percent (e.g., 120%) of the cost basis of these investments. The fair-value test is found in 14 percent of the Investor data.

The early payment of carried interest can cause complications if the fund starts off strong but weakens later in life. For example, suppose that a $100M fund has a 20 percent carried interest with a basis of all committed capital, but allows carried interest to be paid as long as contributed capital has been returned. Then, consider what happens if the fund is three years into its life, contributed capital is $50M, and it receives $60M as the proceeds from its first exit. Given the carried interest rules, the fund would return the first $50M to its LPs, and the remaining $10M would be split as $8M for the LPs and $2M for the GPs. Now, fast forward ahead to the end of the fund seven years later, and assume that there were no more exits. Contributed capital is now the full $100M of committed capital, but the LPs have only received back the $58M from the first and only exit. According to the rules of carried interest basis,

the LPs are entitled to all the exit proceeds up to $100M. This means they need some way to get the carried interest back from the GPs.

This refund of carried interest is accomplished with a contractual provision evocatively known as a clawback. There are a variety of ways that clawbacks can be designed. In practice, however, this implementation can be complicated by many factors—for example, what if the GPs do not have the money when it comes time to pay?—so LPs often insist (and receive) contractual guarantees to be paid back from the individual GPs. The contract also needs to specify whether the clawback will be net or gross of taxes that the GPs have already paid. Clawbacks become even more of an issue when there is a priority return—it is easy to imagine how the priority return might be exceeded in early years but missed in later years. The details here are too messy for a simple numerical example, so we will use a spreadsheet example to demonstrate. This exercise also allows us to see how management fees and carried interest are computed in a more realistic setup.

EXAMPLE 2.3

Owl Ventures has raised their $500 M fund, Owl Ventures III, with terms as given in Appendix C of this chapter. The terms for carried interest and for the general partner clawback are

Distributions Distributions in respect of any partnership investment will be made in the following order of priority:

(i) 100% to the limited partners until they have received an amount equal to their contributed capital:
(ii) 75% to the limited partners and 25% to the general partners.

General Partner Clawback Obligation Upon the liquidation of the fund, the general partner will be required to restore funds to the partnership to the extent that it has received cumulative distributions in excess of amounts otherwise distributable pursuant to the distribution formula set forth above, applied on an aggregate basis covering all partnership investments, but in no event more than the cumulative distributions received by the general partner solely in respect of its carried interest.

Problem Construct an example of fund performance where the clawback provision would be triggered. In this example, compute the carried interest paid in each year and show the total amount that must be paid back by the GPs on the liquidation of the firm.

Solution Cutting through the legal language, these terms mean that Owl is getting 25 percent carried interest, the carry basis is committed capital, the timing method uses contributed capital, and there is a clawback at the end of the fund if too much carry has been paid. Exhibit 2-5 shows the spreadsheet output for an example with the clawback provision triggered. ■

In this example, we assume that the investment capital is distributed evenly in each of the first five years. The returns in year 1 are fantastic, with investments tripling in value and exited at the end of year 2. These realizations can be seen in the

EXHIBIT 2-5

HYPOTHETICAL CLAWBACK EXAMPLE FOR OWL VENTURES

Year	1	2	3	4	5	6	7	8	9	10	close
Investments	83.3	83.3	83.3	83.3	83.3	0.0	0.0	0.0	0.0	0.0	0.0
Estimated portfolio value	83.3	333.3	124.9	139.4	146.0	43.8	13.1	3.9	1.2	0.4	0.1
Distributions	0.0	250.0	12.5	13.9	58.4	17.5	5.3	1.6	0.5	0.1	0.1
Cumulative distributions	0.0	250.0	262.5	276.4	334.8	352.4	357.6	359.2	359.7	359.8	359.9
Distributions to GPs	0.0	15.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cumulative distributions to GPs	0.0	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Distributions to LPs	0.0	234.1	12.5	13.9	58.4	17.5	5.3	1.6	0.5	0.1	0.1
Cumulative distributions to LPs	0.0	234.1	246.6	260.6	319	336.5	341.7	343.3	343.8	343.9	344
Port value after capital returned	83.3	83.3	112.4	125.5	87.6	26.3	7.9	2.4	0.7	0.2	0.0
Management fee	10.0	10.0	11.3	11.3	10.0	8.8	7.5	6.3	5.0	3.8	0.0
Contributed capital	93.3	186.5	281.0	375.5	468.8	477.5	485.0	491.3	496.3	500.0	500.0
Invested capital	83.3	166.5	249.8	333.0	416.3	416.3	416.3	416.3	416.3	416.3	416.3
Clawback											15.9

row labeled "distributions" in Exhibit 2-5 and are equal to $250M in year 2. Because only $186.5M has been contributed by this time (see the "contributed capital" row for year 2), the GPs are entitled to 25 percent carried interest on the "profits" of $250M less $186.5M. This carried interest, shown in the "distributions to GPs" row, is equal to $15.9M.

Following this great year, the investments perform terribly. The spreadsheet assumes that all investments lose half their value each year, and later distributions are low to reflect this poor performance. The formula in the spreadsheet has 10 percent of portfolio value being distributed in years 3 and 4, with 40 percent (of whatever remains in each year) being distributed in the remaining years. There are no further distributions to GPs during the remaining life of the fund.

Upon liquidation of the fund after year 10, we see that contributed capital has reached the committed capital level of $500M, but that the cumulative distribution to the LPs is only $344.0M. The clawback provision is thus triggered, and the GPs are obligated to return all $20.9M of carried interest. In practice, it probably would have been clear much earlier to all parties that the clawback would be necessary—and to

EXHIBIT 2-6

RESTRICTIVE COVENANTS FOR VC FUNDS

Description	% of Contracts
Covenants relating to the management of the fund:	
Restrictions on size of investment in any one firm	77.8
Restrictions on use of debt by partnership	95.6
Restrictions on coinvestment by organization's earlier or later funds	62.2
Restrictions on reinvestment of partnership's capital gains	35.6
Covenants relating to the activities of the general partners:	
Restrictions on coinvestment by general partners	77.8
Restrictions on sale of partnership interests by general partners	51.1
Restrictions on fund-raising by general partners	84.4
Restrictions on other actions by general partners	13.3
Restrictions on addition of general partners	26.7
Covenants relating to the types of investment:	
Restrictions on investments in other venture funds	62.2
Restrictions on investment in public securities	66.7
Restrictions on investments in leveraged buyouts	60.0
Restrictions on investments in foreign securities	44.4
Restrictions on investments in other asset classes	31.1
Total number of partnership agreements in sample	**45**
Average number of covenant classes	**7.9**
Average number of covenant classes (weighted by fund size)	**8.4**

SOURCE: Gompers and Lerner (1996).

solve this problem, the GPs could give the money back earlier or just reduce the management fees to zero for the last few years.

2.3.3 Restrictive Covenants

A VC fund is a long-term commitment. LPs tie up capital with no promise of a return and little control over the investment activities of the GP. Although the compensation of the GPs does go some distance toward aligning the incentives of all parties, several potential problems still exist. Over time, LPs have used a variety of **restrictive covenants** in an attempt to mitigate these problems.

Gompers and Lerner (1996) wrote the only academic study of restrictive covenants. Exhibit 2-6 reproduces part of a table from their analysis. They divide covenants into three broad categories: (1) restrictions on management of the fund, (2) restrictions on the activities of the GP, and (3) restrictions on the types of investment.

Examples from the first broad category can be seen in each of the sample agreements in the appendices to this chapter. For example, EBV and Talltree both have

restrictions for the maximum percentage of the fund to be invested in any one company. Exhibit 2-6 shows that similar restrictions were in place in 78 percent of all sample funds. Why would LPs insist on this restriction? An obvious answer to this question is "to put a limit on risk", but this answer is unsatisfying. The typical investor in VC funds is a large institutional investor who is allocating only a small portfolio fraction to any particular VC fund; the difference between 25 percent or 50 percent of that allocation going to one specific company would barely affect the risk exposure for their broad portfolio. Instead, the main justification for investment limits is related to the incentives of the GPs, specifically the incentives induced by carried interest.

To illustrate the incentive problem, consider the fictitious case of Derby Ventures. The GP of Derby Ventures makes "investments" by placing bets on horses at a racetrack. This GP has an excellent track record from past bets, and his LPs expect him to make dozens of small bets so that the law of large numbers allows his superior skill to show through. The LPs expect this behavior, but it is not written into the partnership agreement. Now assume that besides being very knowledgeable about horses, this GP is also a savvy gambler. He realizes that his superior knowledge would probably be able to produce 20 percent returns on capital over the next year, giving him a few percentage points in carried interest, but perhaps not enough to make it worth his while to quit his regular job as a professor. Alternatively, he can put all his money on one horse, perhaps a ten-to-one "long shot". If the horse wins, then the carried interest earned in one day would be enormous. If the horse loses—well, he can just go back to teaching his classes.

This example captures the main incentive problem for carried interest: it provides an upside to the GP without the corresponding downside. In option-pricing language, the GPs effectively hold a **call option** on the fund portfolio. Readers familiar with options will know that call options are more valuable when the underlying security has higher volatility. Thus GPs, as holder of the carried interest "call option", have an incentive to increase volatility by betting a lot on one horse, or investing a lot in one company. (For readers unfamiliar with options, fear not: we will beat that horse to death starting in Chapter 13.)

The same insight can help us understand the common restriction against funds taking on debt (96 percent of sample funds). By taking on debt, a fund can amplify the returns on its portfolio, an amplification that increases risk and, correspondingly, increases the value of the carried-interest call option. LPs can rein in these adverse incentives through the use of covenants, but a formal restriction is not always necessary. An alternative approach is to rely on the GPs' unwillingness to risk their "reputational capital". For GPs with a long history and lucrative future—as we assume exists for Owl Ventures, now on their ninth fund—it may no longer be necessary to formally restrict their risk-taking behavior. If Derby Ventures fails, its GP can just go back to teaching. If Owl Ventures fails, then a valuable franchise has been lost.

With 62 percent of sample funds, restrictions on coinvestment with earlier or later funds by the same partnership are also common. LPs may decide to restrict such coinvestment to avoid one fund propping up the performance of another. This can be

of particular concern around the time that a GP is fundraising for a new fund. For example, suppose that EBV is trying to raise EBV III, and it is three years into its investment period on Fund II and seven years into the life of Fund I. Now, when it goes on the fund-raising trail, potential LPs will scrutinize the performance of Fund I, but not expect much of the still young Fund II. If Fund II can help Fund I by giving some new money to an otherwise failing company, then the interim returns of Fund I would be helped, at the expense of Fund II's investors.

Our second category of covenants is one that involves restrictions on the activities of the GP. In general, the covenants in this class are designed to ensure that the GP's attention stays focused on the whole portfolio of fund investments. For example, restrictions on coinvestment by general partners (78 percent of sample funds) might seem to be counterproductive—shouldn't LPs be happy to see GPs with their own money at stake? The problem here is that GPs may focus excessively on the few investments with a personal stake while ignoring the other investments. In this case, the GPs may use the fund simply as an opportunity to cherry-pick a few great investments for themselves. One way to restrict this practice is for LPs to insist that any personal investments by GPs be proportional across all fund investments.

Another way to keep the GPs' attention is to restrict them from raising another fund before they have invested the present one (84 percent of sample funds). This is of particular concern for debut funds like EBV, where the GPs may want to make a quick return to the market to raise larger funds and achieve critical mass for the management fee.

The third category of covenants includes restrictions designed to keep GPs focused on the type of investing that they have been hired to do. LPs do not like to see a GP who was hired to be a VC suddenly turn into an investor in LBOs, public equities, distressed debt, or other VC funds. This motivation to switch focus can be surprisingly strong during times of market upheaval. For example, venture performance was poor and LBOs were hot in the mid-1980s. Many VCs wanted to try their hand at this new activity, but the skill set was quite different, and anecdotal evidence suggests that VCs' performance in LBOs was terrible. A similar motivation occurred in the postboom period. As with the other categories of covenants, a strong reputation and franchise value can reduce the need for formal covenants. However, here even some of the most famous names in private equity can be tempted to lose their focus, as was seen many times during the boom and postboom periods.

SUMMARY

The VC fund, organized as a limited partnership, is the main vehicle for VC investing. The general partner (GP) of a VC fund is a VC firm, and the limited partners (LPs) are usually institutional investors, with pension funds supplying just under half of the total committed capital in the industry. In the postboom period, there were about 900 active VC firms and 1,800 active VC funds.

GPs are compensated with management fees and carried interest. Management fees are usually about 2.0 percent per year, calculated on the basis of committed capital. Carried interest—the profit participation—is most commonly set at 20 percent of all fund profits. This compensation structure is designed to help align the incentives of GPs and LPs. To get a better alignment of incentives, LPs often restrict GP behavior with covenants written into the partnership agreement.

KEY TERMS

VC firm
General partner (GP)
VC fund
Limited partner (LP)
Capital call
= Drawdown
= Takedown
Committed capital
Investment period
= Commitment period
Follow-on investments
Early-stage fund, late-stage fund, multistage fund
Raised, closed
Vintage year
Fund-of-funds (FOF)
Management fees
Lifetime fees
Investment capital
Invested capital, net invested capital
Carried interest
= Carry
Carried interest basis
= Carry basis
Contributed capital, net contributed capital
Priority returns
= Preferred returns
= Hurdle returns
Realized returns, unrealized returns
Catch-up provision
Clawback
Restrictive covenants
Call option

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EXERCISES

2.1 Suppose that a $200M VC fund has a management fee of 2.5 percent per year for the first five years, with a reduction of 0.25 percent (25 basis points) in each year thereafter. All fees are paid on committed capital, and the fund has a 10-year life. What are the lifetime fees and investment capital for this fund?

2.2 (This is a little bit tricky.) Suppose that a $1B VC fund has fees of 2.0 percent per year in all years, with these fees paid on committed capital in the first five years and on *net invested* capital for years 6 through 10. You can assume the fund is fully invested by the beginning of year 6, then realizes 20 percent of its investment capital in each of the following five years. What are the lifetime fees and investment capital for this fund? (Make assumptions for any information that you think is still missing from the problem.)

2.3 A VC firm is considering two different structures for its new $250M fund. Both structures would have management fees of 2 percent per year (on committed capital) for all 10 years. Under Structure I, the fund would receive an X percent carry with a basis of all committed capital. Under Structure II, the fund would receive a Y percent carry with a basis of all investment capital. For a given amount of (total) exit proceeds = $Z, solve for the amount of carried interest under both structures.

2.4 Talltree Ventures has raised their $250M fund, Talltree Ventures IV, with terms as given in Appendix 2.B of this chapter. Construct an example of fund performance where the clawback provision would be triggered. In this example, compute the carried interest paid in each year, and show the total amount that must be paid back by the GPs upon the liquidation of the fund.

APPENDICES: KEY TERMS AND CONDITIONS FOR THREE VC FUNDS

These appendices give excerpts from the private placement memoranda for three (fictional) VC funds: EarlyBird Ventures I (EBV I) [Appendix 2.A], Talltree Ventures IV [Appendix 2.B], and Owl Ventures IX [Appendix 2.C]. We will refer to these appendices throughout the book. All these excerpts are derived from a more complete memorandum given in Kaplan (1999).

Appendix 2.A: EarlyBird Ventures I

Fund Size $100 million

Term Following the tenth anniversary of the initial closing, the term of the partnership will expire on December 31st unless extended for up to two consecutive one-year periods at the discretion of the general partner. This is to permit orderly dissolution, and no management fees will be charged during any such extension.

Commitment Period Following the fifth anniversary of the initial closing, all partners will be released from any further obligation with respect to their unfunded commitments on December 31st, except to the extent necessary to cover expenses and obligations of the partnership (including management fees) in an aggregate amount not to exceed unfunded commitments.

Management Fees The annual contributions will equal 2 percent of committed capital for the first 10 years of the fund. These contributions will be paid quarterly.

Distributions Distributions in respect of any partnership investment will be made in the following order of priority:

(i) 100 percent to the limited partners until they have received an amount equal to their contributed capital.
(ii) 80 percent to the limited partners and 20 percent to the general partners.

Diversification and Investment Limits The Fund may not invest more than 25 percent of aggregate commitments in any single portfolio company.

Appendix 2.B: Talltree Ventures IV

Fund Size $250 million

Term Following the tenth anniversary of the initial closing, the term of the partnership will expire on December 31st, unless it is extended for up to two consecutive one-year periods at the discretion of the general partner. This is to permit orderly dissolution, and no management fees will be charged during any such extension.

Commitment Period Following the fifth anniversary of the initial closing, all partners will be released from any further obligation with respect to their unfunded commitments on December 31st except to the extent necessary to cover expenses and obligations of the partnership (including management fees) in an aggregate amount not to exceed unfunded commitments.

Management Fees The annual contributions will equal 2 percent of committed capital for the first 10 years of the fund. These contributions will be paid quarterly.

Distributions Distributions in respect of any partnership investment will be made in the following order of priority:

(i) 100 percent to the limited partners until they have received an amount equal to their contributed capital, plus a priority return equal to 8 percent (compounded annually).
(ii) 100 percent to the general partner until the general partner has received catch-up distributions equal to 20 percent of the sum of such distributions and the preference distributions in part (i).
(iii) 80 percent to the limited partners and 20 percent to the general partner.

General Partner Clawback Obligation Upon liquidation of the fund, the general partner will be required to restore funds to the partnership to the extent that it has received cumulative distributions in excess of amounts otherwise distributable

pursuant to the distribution formula set forth above, applied on an aggregate basis covering all partnership investments, but in no event more than the cumulative distributions received by the general partner solely in respect of its carried interest.

Diversification and Investment Limits The fund may not invest more than 20 percent of aggregate commitments in any single portfolio company.

Appendix 2.C: Owl Ventures IX

Fund Size $500 million

Term Following the 10th anniversary of the initial closing, the term of the partnership will expire on December 31st unless extended for up to two consecutive one-year periods at the discretion of the general partner. This is to permit orderly dissolution, and no management fees will be charged during any such extension.

Commitment Period Following the fifth anniversary of the initial closing, all partners will be released from any further obligation with respect to their unfunded commitments on December 31st except to the extent necessary to cover expenses and obligations of the partnership (including management fees) in an aggregate amount not to exceed unfunded commitments.

Management Fees All management fees are computed based on committed capital. These fees are 2 percent in years 1 and 2, 2.25 percent in years 3 and 4, 2 percent in year 5, 1.75 percent in year 6, 1.50 percent in year 7, 1.25 percent in year 8, 1 percent in year 9, and 0.75 percent in year 10. These fees will be paid quarterly, with equal installments within each year.

Distributions Distributions in respect of any partnership investment will be made in the following order of priority:

(i) 100 percent to the limited partners until they have received an amount equal to their contributed capital.
(ii) 75 percent to the limited partners and 25 percent to the general partners.

General Partner Clawback Obligation Upon the liquidation of the fund, the general partner will be required to restore funds to the partnership to the extent that it has received cumulative distributions in excess of amounts otherwise distributable pursuant to the distribution formula set forth above, applied on an aggregate basis covering all partnership investments, but in no event more than the cumulative distributions received by the general partner solely in respect of its carried interest.

CHAPTER 3

VC RETURNS

VCS SPEND their time very differently from mutual-fund managers, but ultimately both groups are measured by their investment returns. If you open the business section of the newspaper, you can readily see information about mutual-fund returns, but one must search hard to find any information about VC returns. Even when such returns are revealed, they are often reported in ways that are not comparable to standard benchmarks.

In this chapter, we learn how VC returns are measured and take our first glimpse into the returns data. In Section 3.1, we analyze two main sources of industry level returns and compare these returns with public market benchmarks. In Section 3.2, we show how to compute returns at the fund level and discuss several new sources of fund level data.

3.1 INDUSTRY RETURNS

In this section, we analyze the returns for the entire VC industry. We begin with some definitions.

3.1.1 Definitions

A **periodic return** is defined as

$$\text{Periodic return} = R_t = (P_t + D_t)/P_{t-1} - 1 \tag{3.1}$$

where R_t is the return for period t, P_t is the value (price) of the portfolio at the end of period t, D_t is the dividends (distributions) earned by the portfolio during period t, and P_{t-1} is the value (price) of the portfolio at the end of period $t - 1$. The time period t can be any length, and the return would correspondingly be a "monthly return", "quarterly return", "annual return", or likewise. For multi-period returns, we multiply the periodic returns to arrive at the **compound return:**

$$\text{Compound return} = (1 + R_1) * (1 + R_2) * \ldots * (1 + R_N) - 1 \tag{3.2}$$

Because we will often be interested in returns at the annual time horizon, we can translate T years of multi-period returns into **annualized returns** as follows:

$$\text{Annualized return} = (1 + \text{compound return})^{(1/T)} - 1 \tag{3.3}$$

For managed portfolios, returns can be expressed either as **gross returns** (before subtracting fees and carried interest) or as **net returns** (after subtracting fees and carried interest).

EXAMPLE 3.1

The Largeco pension plan has invested in dozens of VC funds. The director of the pension plan is preparing his annual report to the Largeco board of directors. Summary information for Largeco's VC portfolio is given in Exhibit 3-1:

EXHIBIT 3-1

LARGECO PENSION PLAN, VC PORTFOLIO

Year	2004	2005	2006	2007	2008
Beginning Value	4,000	5,950	7,090	9,267	3,884
New Investments	2,000	1,000	1,000	1,000	1,000
Ending Value (before distributions)	7,200	8,340	10,517	5,134	7,814
Distributions to LPs	1,000	1,000	1,000	1,000	1,000
Distributions to GPs	250	250	250	250	250
Management Fees	100	100	100	100	100

Problem The board has asked for a five-year report of net returns and gross returns by year, plus the compound returns and annualized returns for all five years. You can assume that all new investments and management fees are paid at the beginning of the year, and all distributions were paid at the end of the year.

Solution The gross returns are calculated by comparing the value at the beginning of each year with the value at the end of each year. (Note that the beginning value in year t is equal to the ending value in year $t - 1$ minus distributions to LPs and GPs. The management fee is paid separately by the LPs.) Thus, gross returns are 7,200/(4,000 + 2,000) − 1 = 20 percent for 2004, 8,340/(5,950 + 1,000) − 1 = 20 percent for 2005, and so on. For net returns, we must subtract the distributions to GPs (carried interest) from the numerator and add the management fees to the denominator: (7,200 − 250)/(4,000 + 2,000 + 100) − 1 = 13.9 percent for 2004, (8,340 − 250)/(5,950 + 1,000 + 100) − 1 = 14.8 percent for 2005, and so on. The answers for all years are given in Exhibit 3-2.

EXHIBIT 3-2

LARGECO PENSION PLAN, VC PORTFOLIO

Year	2004	2005	2006	2007	2008
Net Return	13.9%	14.8%	25.4%	−52.9%	51.8%
Gross Return	20.0%	20.0%	30.0%	−50.0%	60.0%

The compound returns are as follows:

$$\text{Gross compound return} = 1.20^{*}\,1.20^{*}\,1.30^{*}\,0.50^{*}\,1.60 - 1 = 49.8\% \tag{3.4}$$

and

$$\text{Net compound return} = 1.139^{*}\,1.148^{*}\,1.254^{*}\,0.471^{*}\,1.518 - 1 = 17.2\% \tag{3.5}$$

The gross annualized return is $1.498^{(1/5)} - 1 = 8.4$ percent, and the net annualized return is $1.172^{(1/5)} - 1 = 3.2$ percent. ■

It will prove useful to give one final set of return definitions. Returns that have been earned in the past are known as **realized returns** or **historical returns**. Returns that are forecast for the future are known as **expected returns**. We could use the modifier of "realized" or "expected" in front of any of the other return definitions in this chapter. In a well-behaved universe, we would find that average realized returns would be equal to expected returns for all assets. Our universe is not so well behaved, which is why so many advertisements tell us that "past performance is no guarantee of future returns".

3.1.2 A Gross-Return Index

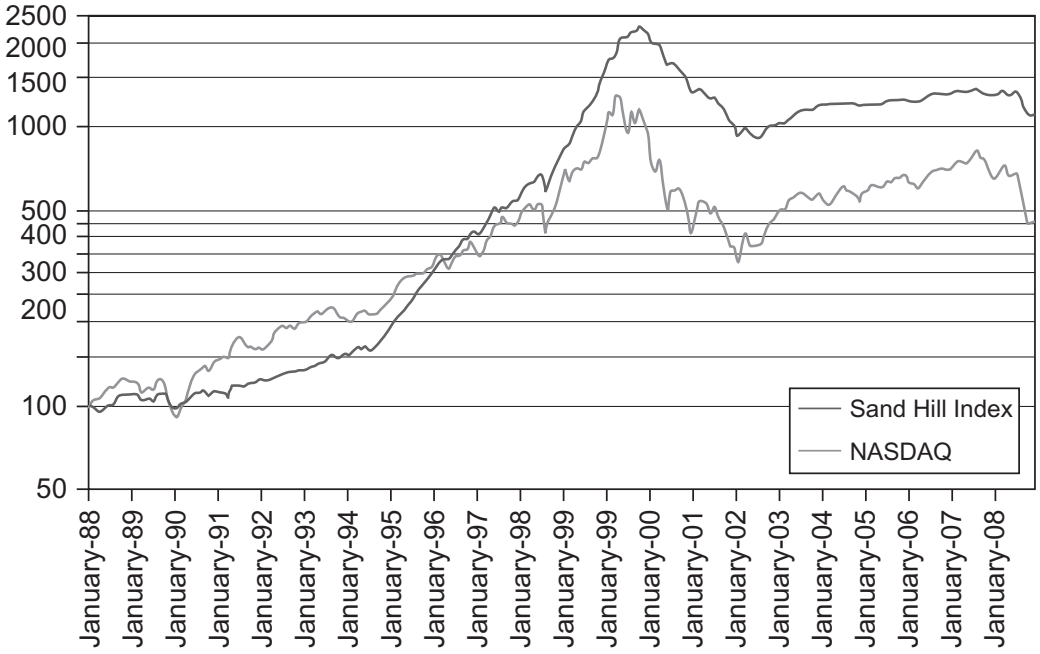
Given current data limitations, a gross-return index is best created from the bottom up. To construct a bottom-up index, we build a database of all VC investments, do our best to update the values of these investments over time (including distributions), and then track the value of the whole set of investments, thus creating a rolling portfolio for the whole VC industry. This is a herculean task, but luckily all the work has already been done by Susan Woodward and her company, Sand Hill Econometrics (SHE).[1]

SHE began by combining the databases of the two main industry trackers, VentureSource (a division of Dow Jones) and Venture Economics (a division of Thomson Financial). From here, SHE added information from other industry

[1]Construction of the Sand Hill Index is described in Hall and Woodward (2003).

EXHIBIT 3-3

SAND HILL INDEX® VERSUS NASDAQ



NOTE: The two indices are both normalized to be 100 in December 1988. The normalized indices are presented in log scale.

SOURCES: Sand Hill Econometrics (SHE), the Center for Research in Security Prices (CRSP).

sources, from its own base of consulting clients (LPs in VC funds), and from exhaustive searching of Web resources. The final database includes over 17,000 companies and more than 60,000 financing rounds. It also allows for monthly updating. The resulting Sand Hill Index® is plotted in Exhibit 3-3, using the available sample period through December 2008.[2] For comparison, we have also plotted an index for the NASDAQ stock market. The two indices are both normalized to be 100 in December 1988, the month the Sand Hill Econometrics Venture Index started. The normalized indices are presented in log scale.

Since the inception of the SHE index, the index reached a peak of 2,302 in August 2000, fell to a postboom low of 915 in February 2003, and recovered to 1,364 by October 2007. Meanwhile, the NASDAQ index peaked at its all-time high at 1,306 in February 2000, fell to a postboom low of 328 in September 2002, and reached its post-bubble high at 827 in October 2007. Since October 2007, the SHE index slid, largely in tandem with the NASDAQ, amid the financial crisis that

[2]Sand Hill Econometrics discontinued the index in December 2008 after it reached a licensing agreement with Dow Jones. A new index called the DowJones Index of Venture Capital (comprising VentureSource and Sand Hill Econometrics' proprietary data) will be launched in 2010.

unfolded in 2008. In December 2008 (the last month the index was calculated), it stood at 1,110, while the NASDAQ was at 456. The annualized return over the 20-year life of the index is 12.8 percent. In comparison, the NASDAQ index—a value-weighted index of all NASDAQ stocks, including dividends—had the annualized return over the same 20-year time period of 7.9 percent. Although the Sand Hill Index® is more than double the NASDAQ index by the end of the sample period, the former only passes the latter in June 1996, close to the beginning of the boom period.

3.1.3 A Net-Return Index

The Sand Hill Index® is built from a database of portfolio companies. An alternative approach is to build a database of funds and combine the returns of these funds to form an overall industry index. This has been attempted by several groups, the most comprehensive of which is the Cambridge Associates U.S. Venture Capital Index®, which includes more than 75 percent of the dollars raised by VC funds since 1981.[3] Cambridge Associates (CA), an investment consultant to endowments, foundations, and wealthy families, serves as a **gatekeeper** for potential LPs. It essentially acts as a paid service that puts CA between the LP and GP for both the initiation and management of the partnership relationship. This function gives CA access to information, which it has astutely chosen to aggregate and analyze.

To construct its index, CA starts with the quarterly reports that GPs provide to LPs. These reports give "current" valuations for the unrealized portfolio companies and also summarize the cash flows in and out of the fund.[4] CA then aggregates the total value (realized and unrealized) from each fund in each quarter. By combining these totals across quarters, it is able to compute an aggregate return and build an index. Note that CA is using cash flows to LPs as the basic unit. Because these cash flows include management fees (as negative cash flows) and carried interest (as a reduction of the positive cash flows from realized investments), the CA index is based on net returns and, in principle, should be lower than the corresponding gross return index constructed by SHE.

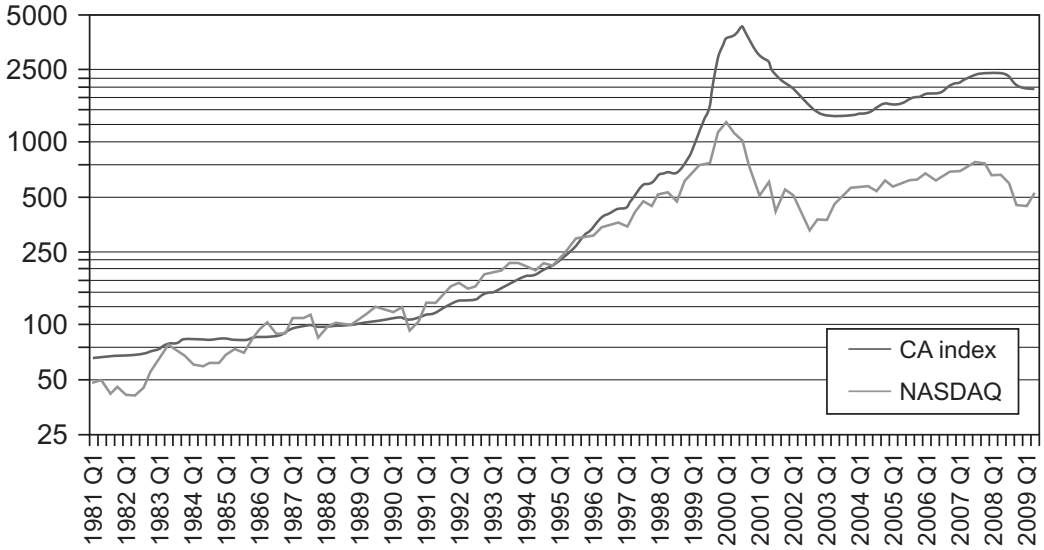
The quarterly CA index is available from the first quarter of 1981 through the last quarter of 2008. To facilitate comparisons with the Sand Hill Index®, we set the CA index value to 100 for the fourth quarter of 1988. Exhibit 3-4 plots the CA Index versus the NASDAQ index (also normalized to be 100 in the fourth quarter of 1988) in log scale.

[3]The Cambridge Associates data can be freely downloaded from https://www.cambridgeassociates.com/pdf/Venture%20Capital%20Index.pdf.

[4]We put "current" between quotes because the valuations are often quite old. In Chapter 4, we discuss this valuation practice and its implications for performance measurement and for the estimation of the cost of venture capital.

EXHIBIT 3-4

CA INDEX® VERSUS NASDAQ



NOTE: The two indices are both normalized to be 100 in the fourth quarter of 1988, to make it comparable to the Sand Hill Econometrics Venture Index, which started in December 1988. The normalized indices are presented in log scale.

SOURCES: Cambridge Associates (CA), the Center for Research in Security Prices (CRSP).

The exhibit demonstrates that the CA index has the highest amplitude of all three series, reaching a maximum of 4,300 in the third quarter of 2000, a postboom low of 1,386 in the first quarter of 2003, and recovering to its postbubble high of 2,412 in the fourth quarter of 2007. Since then it went down, as expected, and stood at 2,022 in the fourth quarter of 2008. For the complete, nearly 28-year sample period of 1981 to 2008, the CA index earned an annualized return of 13.0 percent versus a 9.0 percent return for the NASDAQ. During the 20-year subperiod from 1988 to 2008—when we also have data for the Sand Hill Index®—the CA index earned annualized returns of 16.2 percent versus 12.8 percent for the Sand Hill Index® and 7.9 percent for the NASDAQ.

The relationship between the Sand Hill Index® and the CA Index seems backward: the net-return index (CA)—which is computed after fees and carried interest are subtracted out—should be lower than the gross-return index (SHE). However, here the opposite is true, with the CA index exceeding the Sand Hill Index® by 3.4 percentage points over the common subperiod.

Clearly, something is wrong with at least one of these indices. In fact, both indices have some weaknesses; but when taken together, they can provide us with upper and lower bounds for VC performance. First, consider the CA index. CA adds to its database in several ways. One way is by tracking funds for which a CA client is a current LP. This form of adding data does not induce any bias. However, CA does not have clients in every first-time fund. Suppose that ABC Fund I does not include any

CA clients as LPs. If ABC Fund I performs poorly, it is unlikely there will ever be an ABC Fund II, and CA will never get to see the returns from Fund I. On the other hand, if Fund I is successful, then it is more likely that ABC will be able to raise Fund II. If ABC solicits a CA client for Fund II, then CA will request information on the performance of Fund I, and then add it to its database. This method of data collection induces a **survivor bias**—"survivors" have a better chance of showing up in the data, and this bias causes an overestimate of industry returns. Thus, we think of the CA index as representing an *upper bound on the net returns to VC.*

Next, consider the Sand Hill Index®. In principle, this index could also suffer from survivor bias, because we might think that SHE is more likely to learn of the existence of companies only if they have been successful. Furthermore, additional biases are possible because valuation information might be missing for nonrandom reasons (e.g., if the portfolio companies performed poorly). In practice, SHE has been able to significantly limit these biases through the combination of several databases and the use of sophisticated statistical techniques designed to handle missing data. It also has made arduous efforts to track down the exit status of companies which existing databases list as "private" long after they were first funded, thus tackling the "zombie company" problem. It is, however, likely that this index is a bit conservative (bias would be too strong a word here) in the way it computes VC returns. To understand how conservatism could occur, we must go a little deeper into the SHE methodology.

Each month, SHE takes a snapshot of all portfolio companies for all VCs. As discussed earlier, there are several challenges in estimating the value of nontraded companies, and SHE handles these problems with several careful methods. Because VCs do not own 100 percent of these companies, the next step is to estimate the value of the VCs' portion of each company. This is tricky—indeed, the calculations to do this estimation will take up the six chapters of Part III in this book—and the task is made more difficult because SHE does not have access to the details of each transaction. Thus, it is necessary to make an assumption about the form of VC ownership, and SHE assumes that VCs have proportional (common-stock) ownership of these firms. This assumption is conservative, because virtually all VCs own some form of preferred stock, which has valuation advantages over common stock. A discussion of these advantages will be introduced in Chapter 9 and extensively analyzed in Part III. For now, it will suffice to say that if SHE were to have assumed some form of preferred stock, then the returns on the Sand Hill Index® would have been a little bit higher. Thus, the Sand Hill Index® provides us with a *lower bound on the gross returns to VC.*

Taken together, the returns data gives us an upper bound for net returns (the CA index), and a lower bound for gross returns (the Sand Hill Index®). How far apart are these bounds? The CA Index had an annualized return of 16.2 percent from the end of 1988 to the end of 2008; the Sand Hill Index® had a return of 12.8 percent over the same time period. If we make a back-of-the-envelope estimate of management fees costs of about 2 percent and carried-interest costs of about 2 percent, then we get a total of 4 percent for fees and carry, yielding an estimated

net return of 12.8 − 4.0 = 8.8 percent for the Sand Hill Index®. This means that the difference between the upper and lower bounds for VC net returns from 1989 to 2008 is 16.2 − 8.8 = 7.4 percent.

At first glance, these returns demonstrate some advantage for VC over the most comparable index. Of course, this is not the end of the story, because we have not said anything about the relative *risk* of VC versus the NASDAQ; but at this point, a detailed discussion of risk would take us too far off topic. In Chapter 4, we analyze the risk of VC in the context of estimating the cost of capital for VC investments. With that background, we will then be able to analyze the risk-adjusted performance of VC based on the CA and SHE indices. For now, it will suffice to say that this analysis finds that both the net risk-adjusted return (upper bound, from CA) and gross risk-adjusted return (lower bound, from SHE) are very close to zero.

3.2 FUND RETURNS

In Chapter 4, we will show that the upper bound is zero for the net risk-adjusted returns to the VC industry. If this is true, then investment in VC only makes sense if one can identify managers that consistently outperform the rest of the industry. Luckily for LPs, there is some evidence that such consistent outperformance does exist. To understand the sources of such performance, we must first learn how fund level returns are measured.

3.2.1 Definitions

The industry returns calculated in Section 3.1 started with periodic returns for each month (Sand Hill) or quarter (CA), and then multiplied these returns to arrive at a compound return for the whole time period. This is a standard procedure for computing asset returns. It is used for stocks, bonds, and bank deposits, as well as for the return measurements of mutual funds, hedge funds, and other portfolio managers. Although this calculation is reasonable for the whole VC industry, it does not seem reasonable when applied to a single VC fund. The main problem is that VC funds may have vastly different amounts of capital invested in different years of the fund, and it can be misleading to treat all these years equally when computing returns.

To illustrate this problem, imagine that you are an LP in the ABC fund. Suppose that you have committed $11M to the fund. For simplicity, assume fees and carry are both zero (so gross returns are equal to net returns). On January 1, 2007, ABC calls $1M of your investment. On December 31, 2007, it exits this investment and returns $2M to you. On January 1, 2008, it calls the remaining $10M for another investment. On December 31, 2008, it exits this second investment for $6M. Given these facts, what is your annualized return from investing in ABC?

If we follow the same steps as in Section 3.1, then we would calculate the return for 2007 as (2/1) − 1 = 100 percent, and for 2008 as (6/10) − 1 = −40 percent. The compound returns would then be (1 + 1)∗ (1 − 0.4) − 1 = 20 percent,

and the annualized returns would be $(1.2)^{(1/2)} - 1 = 9.5$ percent. Although this is mathematically correct, it is economically misleading. After all, if we ignore the timing of these cash flows, we can see that you gave ABC a total of \$11M when it really only returned \$2M + \$6M = \$8M to you. It just does not seem right to credit them with a positive return of 9.5 percent.

The problem is that annualized returns weigh each year equally in the calculation. To get an answer consistent with our intuition, we need to compute an **internal rate of return (IRR)**, which effectively weighs each *dollar* equally. To compute the IRR, we start with the whole stream of cash flows. In this case, we have a negative cash flow of \$1M on January 1, 2007 (the original investment); a positive cash flow of \$2M on December 31, 2007; a negative cash flow of \$10M on January 1, 2008; and then a positive cash flow of \$6M on December 31, 2008 (the final value of the portfolio). To simplify our calculations, we combine the cash flows on December 31, 2007 and January 1, 2008 to obtain a single negative cash flow of \$8M for the end of 2007.

We are now ready to move on and answer the following question. Suppose that the negative cash flows were the deposits in a bank, and the positive cash flow was the final bank balance. If such is the case, then what interest rate must this bank be paying on deposits?

Under this logic, a bank paying an interest rate equal to the IRR would give us $1M * (1 + IRR)^2$ for a two-year deposit of \$1M, and $8M * (1 + IRR)$ for a one-year deposit of \$8M. If we have \$6M total from these deposits, then the IRR is the solution to

$$6M = 1M * (1+IRR)^2 + 8M * (1+IRR) \tag{3.6}$$

We can solve this quadratic equation to obtain a feasible annual IRR $= -31$ percent. This negative return seems more consistent with the idea that ABC lost money overall than the answer given by our previous procedure.

For cash flow streams more complex than this example, we would use a computer to calculate the IRR. The IRR plays an important role in VC performance reporting, but it is not a panacea—and careful observers must be aware of several weaknesses in the IRR measure. First, one should never forget that the IRR cannot be directly compared to periodic returns. In the example we just solved, the annualized returns were about 9.5 percent, whereas the IRR was negative 31 percent. Although not all differences will be this extreme, such differences are not uncommon. Because most of the investment world speaks in terms of annualized returns, it is tempting to compare these returns to IRRs. This temptation should be avoided.

Second, some standard practices of IRR calculation can lead to confusion. Typically, VC funds will compute a monthly or quarterly IRR from all its cash flows, and then annualize this periodic IRR using Equation (3.3). However, in times of high returns, an annualized version of a monthly or quarterly IRR will be misleading, because this exercise implicitly assumes reinvestment even when such reinvestment has explicitly *not* occurred. For example, consider a \$1M investment that returns \$80,000 every month for one year and then returns \$1M at the end of the year. This cash flow stream has a monthly IRR of 8 percent. So far, so good—the investment has

clearly returned 8 percent in every month. However, if we annualize this IRR to $(1.08)^{12} - 1$, we get an annualized IRR of 151 percent, which is similar to assuming that all the distributions were reinvested (none were!) and also earned 8 percent per month. A true "annual IRR" of 151 percent should be leaving the investor with $\$1M * (1 + 1.51) = \$2.51M$ at the end of the year, but the investment strategy followed here would not do that without some extra help from excellent outside investments.

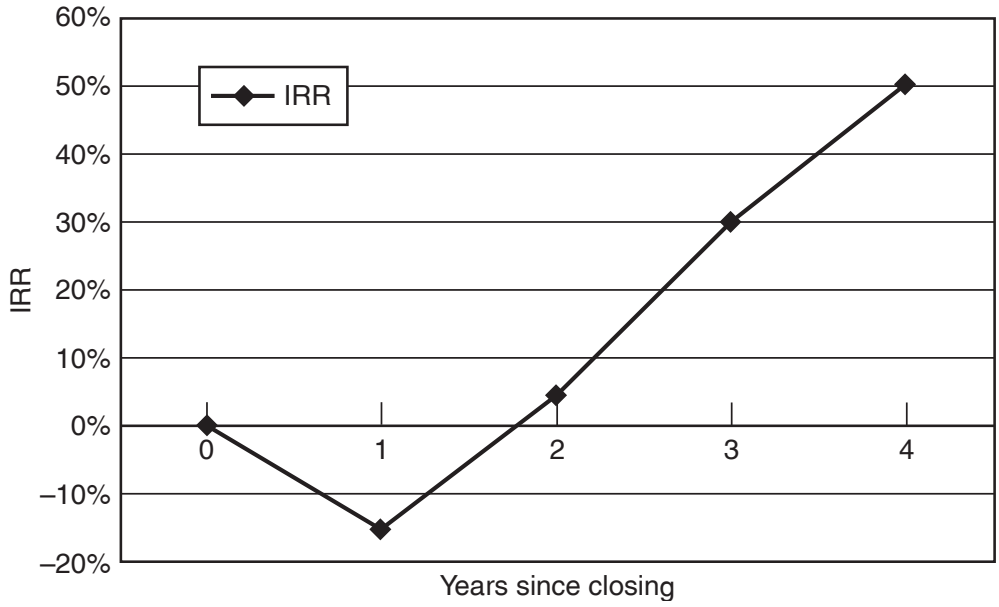
A third weakness of standard IRR reporting is that it does not usually make a distinction between realized and unrealized investments. For VC funds that still have unrealized investments, the IRR takes the value of these unrealized investments and treats them as a positive cash flow in the final period. If a significant component of the portfolio is unrealized, then the IRR calculation will essentially just reflect the subjective valuation of these unrealized investments. In general, the IRR becomes more informative as the fund realizes more investments.

For this last reason, the IRR is particularly misleading in the first few years of a fund. Remember that management fees are usually based on committed capital; so LPs of a \$100M fund with 2 percent annual fees would be paying out \$2M in fees each year and would have \$80M left for investment capital. Suppose the fund invests \$20M of this investment capital in the first year. Because one year is rarely long enough to have any exits, it is possible that all this investment capital would still be kept on the books at cost. The fund would then appear to have earned no gross returns while still collecting \$2M in fees. An IRR calculation from these cash flows is going to give a negative return. If these investments turn out well in the long run, then the fund will look fine by the time of these exits. In the early years, however, it will appear to charge very high fees compared to invested capital (\$2M on \$20M of investments = 10 percent in this case) and with little appreciation of the assets. Even for funds that eventually have high IRRs, a plot of the fund IRR over time will be negative for the first few years, and then increase rapidly in the later years. The shape of this plot, shown in Exhibit 3-5, is called a **J-curve** or a **hockey stick**.

The IRR is an answer to the question, "How well did you do with my money while you had it?" Many investors would like to get the answer to a different question, which asks, "Overall, how much money did you make for me?" The IRR's inability to answer this second question is a final weakness. For example, consider the following two funds. Fund ABC takes a \$1M investment at the beginning of year 1 and then returns \$2M at the end of year 1. Fund XYZ takes a \$1M investment at the beginning of year 1 and then returns \$32M at the end of year 5. Both funds have an (annual) IRR of 100 percent. Clearly, however, assuming a normal investment and inflation environment, fund XYZ will be preferred by all investors. It would be nice to have a measure of this superior performance. The VC industry indeed has such a measure, which goes by many names—**value multiple**, **investment multiple**, **realization ratio**, **absolute return**, **multiple of money**, **times money**. They all mean the same thing: "For every dollar I gave you, how much did I get back?" Each of these expressions can be divided into realized and unrealized investments. For instance, a value multiple is the sum of the **realized value multiple** and **unrealized value multiple**.

EXHIBIT 3-5

THE J-CURVE/HOCKEY STICK PATTERN OF RETURNS



EXAMPLE 3.2

The $200M ABC Fund is seven years into its 10-year life. Its annual investments, fees, distributions, and portfolio value are given in Exhibit 3-6.

EXHIBIT 3-6

CASH FLOWS FOR THE ABC FUND

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Investments	20.0	30.0	40.0	40.0	30.0	0.0	0.0
Portfolio value	20.0	56.0	112.8	186.6	188.1	195.7	203.5
Total distributions	0.0	0.0	0.0	65.0	37.6	39.1	40.7
Carried interest	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Distributions to LPs	0.0	0.0	0.0	65.0	37.6	39.1	40.7
Cumulative distributions to LPs	0.0	0.0	0.0	65.0	102.6	141.8	182.5
Port value after capital returned	20.0	56.0	112.8	121.6	150.5	156.5	162.8
Management fee	4.0	4.0	4.0	4.0	4.0	4.0	4.0

NOTE: All entries are in $millions.

Problem Compute the IRR, value multiple, realized value multiple, and unrealized value multiple for ABC at the end of year 7.

Solution To compute the IRR, we first need to aggregate the investments, fees, and distributions into a single cash flow to LPs as

$$\begin{aligned}\text{Cash Flow to LPs} = \text{Distributions to LPs} - \text{new investments} \\ - \text{management fees}\end{aligned} \tag{3.7}$$

These cash flows are −$24M for year 1, −$34M for year 2, −$44M for year 3, $21M for year 4, $3.6M for year 5, $35.1M for year 6, and $36.7M for year 7. The portfolio value at the end of year 7 is $162.8M. This value is counted as a positive cash flow for the IRR calculation. We can use a spreadsheet or calculator to compute the IRR of this cash flow stream as 23.8 percent.

The value multiple is as follows:

$$\begin{aligned}\text{Value Multiple} = (&\text{Total Distributions to LPs [all years]} \\ &+ \text{value of unrealized investments})/(\text{Invested Capital} \\ &+ \text{Management Fees})\end{aligned} \tag{3.8}$$

Total distributions to LPs through year 7 are $182.5M. The value of unrealized investments = the portfolio value after year 7 = $162.8M. Invested capital is the sum of new investments over all years = $160M. The total management fees through year 7 = $28M. Thus, the value multiple = ($182.5M + $162.8M)/($160M + $28M) = 1.84.

The realized value multiple is as follows:

$$\begin{aligned}\text{Realized Value Multiple} &= (\text{Total Distributions to LPs[all years]}) \\ &/(\text{Invested Capital} + \text{Management Fees}) \\ &= \$182.5\text{M}/(\$160\text{M} + \$28\text{M}) = 0.97\end{aligned} \tag{3.9}$$

The unrealized value multiple is as follows:

$$\begin{aligned}\text{Unrealized Value Multiple} &= (\text{Value of unrealized investments}) \\ &/(\text{Invested Capital} + \text{Management Fees}) \\ &= \$162.8\text{M}/(\$160\text{M} + \$28\text{M}) = 0.87\end{aligned} \tag{3.10}$$

■

Most LPs compute value multiples on a net basis, with fees and carry already subtracted; if you read "value multiple" in this book or in the trade press, you can assume that it refers to a net value multiple. In some cases, firms may report value multiples on a gross basis, perhaps because the GP team wants to discuss a performance record for a time period when they were not explicitly charging fees or carry. This can occur when the GPs' prior investing experience took place outside the standard partnership structure. For many GP teams raising their first fund, such experience may represent the only evidence of their past performance. This **gross value multiple (GVM)** is computed as follows:

$$\begin{aligned}\text{GVM} = (&\text{Total distributions to LPs [all years]} \\ &+ \text{value of unrealized investments} \\ &+ \text{carried interest})/\text{invested capital}\end{aligned} \tag{3.11}$$

Gross value multiples are also helpful for quickly communicating the raw investment performance of a GP and for calculating shortcut estimates for carried interest. Also, we can go back and forth between GVMs and value multiples by making a few extra calculations. For example, consider a fully invested fund at the end of its life, so investment capital = invested capital, and all investments have been realized. Then, we can rewrite Equation (3.11) as follows:

$$\text{GVM} = \text{total distributions/investment capital} \tag{3.12}$$

where total distributions include both carried interest plus all LP distributions. We can then compute its carried interest as

$$\begin{aligned}\text{Carried interest} &= \text{carry\%} * (\text{total distributions} - \text{carry basis}) \\ &= \text{carry\%} * (\text{GVM} * \text{investment capital} - \text{carry basis})\end{aligned} \tag{3.13}$$

where ***carry%*** represents the percentage level of carried interest and the carry basis is either committed capital or investment capital as specified by the fund partnership agreement. We can now express the (net) value multiple of a completed fund by rewriting Equation 3.(3.8) in terms of the GVM and other inputs as follows:

$$\begin{aligned}\text{Value multiple} &= (\text{total distributions to LPs})/(\text{investment capital} \\ &\quad + \text{management fees}) \\ &= (\text{total distributions} - \text{carried interest})/\text{committed capital} \\ &= [\text{GVM} * \text{investment capital} - \text{carry\%} * (\text{GVM} \\ &\quad * \text{investment capital} - \text{carry basis})]/\text{committed capital.}\end{aligned} \tag{3.14}$$

Finally, there is one more definition that will be useful in later chapters. For many of our valuation analyses, we will need to estimate the fraction of the investment that we expect to be paid to the GP as carried interest. For a completed fund, we define this ***GP%*** as

$$\begin{aligned}\text{GP\%} &= \text{carried interest}/\text{total distributions} = \text{carry\%} * \\ &\quad (\text{GVM} * \text{investment capital} - \text{carry basis})/ \\ &\quad (\text{GVM} * \text{investment capital}).\end{aligned} \tag{3.15}$$

Note that GP% will never be higher than carry%, because carry% is paid on all profits, whereas GP% is a percentage of total distributions. Since profits will always be lower than total distributions, GP% will always be lower than carry%. Also, remember that carry% is a contractual number in the partnership agreement, whereas GP% is an estimated percentage that depends on the eventual GVM of the fund.

The following example allows us to practice with these definitions.

EXAMPLE 3.3

XYZ Partners is raising their first fund, XYZ Partners Fund I, with $100M in committed capital, annual management fees of 2 percent, carried interest of 20 percent, and a carried interest basis of committed capital. The four individuals on the XYZ team have previously managed the captive VC portfolio for the Goldenbucks family. During the 10 years of managing the Goldenbucks' VC portfolio, the partners did not charge management fees or carried interest, and they achieved a GVM of 2.5.

Problem

(a) Suppose that XYZ Fund I earns the same GVM as the partners earned for Goldenbucks. What would be the value multiple be for the fund?
(b) What would be the GP% of the fund?

Solution

(a) To see how this formula would translate into XYZ Fund I, we must make adjustments for management fees and carried interest. For a $100M fund with 2 percent annual fees, lifetime fees would be $20M, and investment capital would be $80M. Then, we can substitute these quantities and GVM = 2.5 into Equation (3.14) to obtain the following:

$$\begin{aligned}\text{Value multiple} &= (2.5 * \$80\text{M}) - 0.20 * ((2.5 * \$80\text{M}) - \$100\text{M})/\$100\text{M} \\ &= [\$200\text{M} - 0.20 * (\$100\text{M})]/\$100\text{M} = 1.8.\end{aligned} \tag{3.16}$$

(b) From Equation (3.15), we can compute the GP% as

$$\begin{aligned}\text{GP\%} &= 0.20 * (2.5 * \$80\text{M} - \$100\text{M})/(2.5 * \$80\text{M}) \\ &= \$20\text{M}/\$200\text{M} = 0.10.\end{aligned} \tag{3.17}$$

■

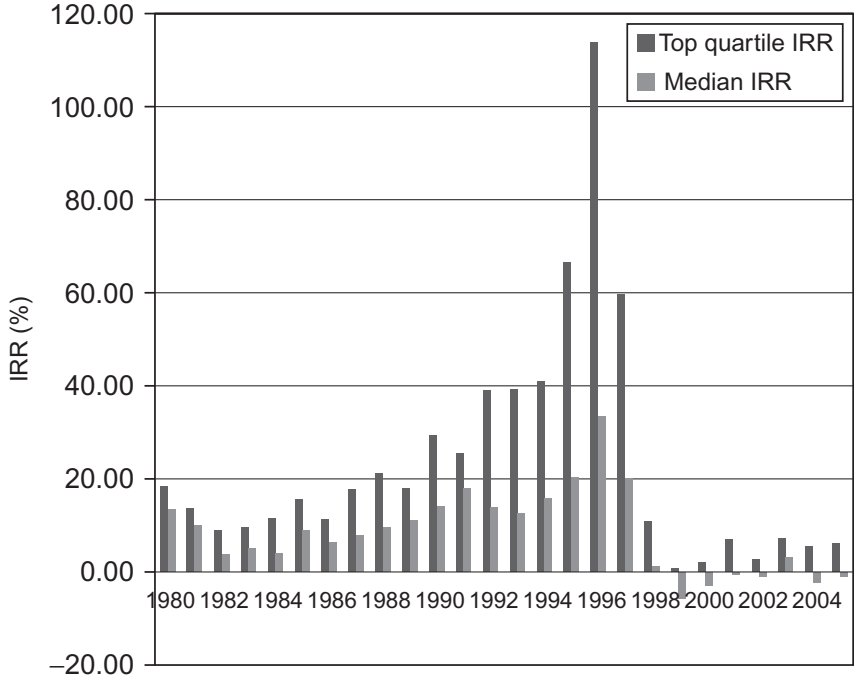
3.2.2 Evidence

LPs get access to fund level return data through their own databases or through gatekeepers. Well-known gatekeepers include Cambridge Associates (who release the aggregate VC index discussed in Section 3.2), Hamilton Lane Advisors, State Street (who launched its own venture capital and related private equity indices in 2007), and Pacific Corporate Group. For those of us outside the LP community, data is harder to find.

The longest-standing source of fund level return data is Venture Economics (VE). Both GPs and LPs report returns to VE under a strict rule of secrecy, in which VE promises not to disclose any identifying information about specific funds. Although VE does not provide information about specific funds, its summary data has been an industry standard since the 1980s. The publicly available source for this data is its annual publication, *Investment Benchmarks Report* (*IBR*). In each year of the *IBR*, VE gives summary statistics for the vintage year. VE claims to have data on 25 percent of all funds, and overrepresentation of the largest funds allows this 25 percent to cover over 50 percent of all industry dollars.

EXHIBIT 3-7

VE MEDIANS AND TOP-QUARTILE BY VINTAGE YEAR



SOURCE: Thomson VentureXpert.

Each annual *IBR* dedicates several pages to each vintage year, with summary information about IRRs and value multiples during the complete evolution of that vintage year. Perhaps its most closely watched statistics are the cutoffs for the median and **top-quartile fund** for each vintage year. Because VE is the only public provider of this information, these cutoffs have become the de facto benchmarks. Because it is very difficult to measure risk for individual funds, the dominant performance measures in the industry are these vintage year comparisons. Exhibit 3-7 displays the median IRR and top-quartile IRRs for all vintages since 1980.

The *IBR* data shows that median performance peaked for vintage year 1996, and that the mid-1990s were extremely fortunate years to be raising VC funds. The median IRRs of funds raised in 2004 and 2005 are still negative—that is expected and consistent with the J-curve—whereas the poor median performance of 1999 and 2000 funds after a decade cannot be attributed to the J-curve and seems likely to be with us for good.

Although the detailed VE data is not available to the public, subsets of the data have been released to academic researchers. These subsets are cleansed of identifying information, but do include codes that allow researchers to link funds from the same GP without actually knowing who that GP is. Kaplan and Schoar (2005) use this data to answer the crucial question posed at the beginning of this section, which asks, "Is GP performance persistent across funds?" Using several measures of performance, the authors find that the answer is a clear "yes". For example, let N = the sequence

number for funds of a specific GP. Kaplan and Schoar found that the IRR of Fund N is a significant predictor for the IRR of Fund $N + 1$ and for the IRR of Fund $N + 2$, and the authors also demonstrate that their results are robust to using other measures of fund performance and to several differences in fund style.

In recent years, some new data sources on fund level returns have appeared. This appearance was driven mostly by media requests to public LPs under the Freedom of Information Act (FOIA). Public LPs, such as public-pension funds and the endowments of public universities, fought hard to avoid disclosing the returns on their private equity portfolios, but ultimately some disclosure was required. FOIA requests uncovered the returns of several large and experienced LPs, including the University of California, California Public Employee Retirement System (CALPERS), the University of Michigan, and the University of Texas. These disclosures gave the public its first look at the performance of some of the most famous names in VC.

These FOIA disclosures inspired a new entrant into the VC performance market. Private Equity International (PEI) began by gathering all the information from FOIA requests and then combining this information with proprietary data from LPs and GPs. They now offer several products to the general public, including an annual publication, *The Private Equity Performance Monitor (PEPM).* This publication gives performance data for hundreds of funds; we will discuss this evidence extensively in our listing of the "best VC funds" in Chapter 5.

To give you just a flavor of the data, Exhibit 3-8 shows the returns and multiples of Kleiner, Perkins, Caufield, & Byers (KPCB), taken from the disclosures of the University of California and included in the 2005 PEPM.

Exhibit 3-8 shows why KPCB is so famous. By comparing these results to the benchmarks in Exhibit 3-7, we can see that every fund from 1980 through 1996 was above the median IRR. Truly spectacular results were obtained by KPCB VII (1994 vintage) and KPCB VIII (1996 vintage), which achieved value multiples of 32.0 and 17.0, respectively. Furthermore, the 1999 vintage KPCB IX fund, which had a net IRR of −23.3 percent as of March 2004 and thus looked like the firm's first "loser", turned out to be the very best of hundreds of funds raised that year. Why? Because KPCB IX had about 20M shares of Google, which went public on August 19, 2004, and regulatory filings show that these shares were distributed at about $200 per share. Assuming that about 14M of these shares went to LPs (KPCB has a 30 percent carried interest), that would mean about $2.8 billion was distributed to LPs. Thus, even if KPCB gets no other realizations from the entire fund, they would still give their investors a value multiple of at least 5 (<2800/500) from fund IX.[5]

[5]While we cannot officially verify our assertion that KPCB IX was a homerun fund, we take comfort from the disclosure that another famous fund that invested in Google, Sequoia Capital III, has a value multiple of 14.84 and a net IRR of 106% as of September 2007 (2008 Private Equity Performance Monitor). This $250M fund reported a value multiple of 0.44 as of March 2004, prior to the Google IPO; thus an increase of 14.4X (14.84-0.4) in the value multiple was likely due to the Google exit. The back-of-the-envelope calculation using 30% carry and 20M shares distributed at $200 per share yields 11.2X (2800/250) incremental contribution of Sequoia's Google investment to its fund performance. The numbers (14.4 and 11.2) roughly match, and if anything tells us that our assumptions *understate* the true exit value of the Google investment for its VC backers.

EXHIBIT 3-8

KLEINER PERKINS CAUFIELD & BYERS FUNDS

Fund	Vintage Year	Committed Capital ($M)	Net IRR	Value Multiple	Date Reported
II	1980	65	50.6%	4.3	Mar-04
III	1982	150	10.2%	1.7	Dec-04
IV	1986	150	11.0%	1.8	Dec-04
V	1989	150	35.7%	4.0	Dec-04
VI	1992	173	39.2%	3.3	Mar-04
VII	1994	225[1]	121.7%	32.0	Mar-04
VIII	1996	299	286.6%	17.0	Mar-04
IX	1999	550	−23.3%	See text	Mar-04
X	2000	625	−17.5%	0.6	Mar-04
XI	2004	400	NA	NA	NA
XII	2006	600	NA	NA	NA
XIII	2008	700	NA	NA	NA

[1]Only $170M of Fund VII was drawn down.

NOTE: There have been no publicly available updates of KPCB funds since December 2004.

SOURCE: Dow Jones LP Galante, 2005 Private Equity Performance Monitor.

SUMMARY

VC is a form of private equity, and for many years the returns to VC funds have indeed been very private. In recent years, however, several new data sources have been made available so that it is now possible to do some analysis of industry level and fund level returns. In this chapter, we analyzed two sources of industry level returns: the Cambridge Associates VC Index® (providing an upper bound for the net returns to the industry) and the Sand Hill Index® (providing a lower bound for the gross returns to the industry). Although both of these indices have superior performance to the NASDAQ, the risk-adjusted returns (to be studied in detail in Chapter 4) are close to zero. Although the industry as a whole does not offer superior risk-adjusted performance, the evidence on fund level returns suggests that top firms can consistently outperform their peers. To analyze fund level performance, it is necessary to use different measures of returns from the methods used at the industry level. The two main measures of fund level returns are the IRR and the value multiple, the latter also known by many other names. Fund level data is available in summary form from Venture Economics and in detailed form from Private Equity Intelligence.

KEY TERMS

Periodic return
Compound return
Annualized return
Gross return
Net return
Realized return
= historical return
Expected return
Gatekeeper
Survivor bias
Internal rate of return (IRR)
J-curve
= hockey stick
Value multiple
= investment multiple
= realization ratio
= absolute return
= multiple of money
= times money
Realized value multiple, unrealized value multiple
Gross value multiple
= gross investment multiple, etc.
Carry%
GP%
Top-quartile fund

REFERENCES

Hall, Robert E., and Susan Woodward, 2003, "Benchmarking the Returns to Venture", National Bureau of Economic Research working paper #10202.

Kaplan, Steven N., and Antoinette Schoar, 2005, "Private Equity Performance: Returns, Persistence, and Capital Flows", *Journal of Finance* 60(4), 1791–1824.

Private Equity Intelligence, *The 2005 Private Equity Performance Monitor.*

Private Equity Intelligence, *The 2008 Private Equity Performance Monitor.*

EXERCISES

3.1 The Bigco pension plan has invested in dozens of VC funds. The director of the pension plan is preparing his annual report to the Bigco board of directors. Summary information for Bigco's VC portfolio is given in Exhibit 3-9.

The board has asked for a five-year report of net returns and gross returns by year, plus the compound returns and annualized returns for all five years. You can assume that all new investments and management fees were paid for at the beginning of the year, and all distributions were paid at the end of the year.

3.2 Consider the case of XYZ Partners from Example 3.3. Now, instead of using a GVM of 2.5 (as in the example), assume that this GVM is unknown and equal to *K.*

(a) For any given *K,* solve for the carried interest, value multiple, and GP%.
(b) How large must *K* be for the value multiple to be greater than 3?
(c) How would your answer to parts (a) and (b) change if the carry basis were equal to investment capital? (In the original example, the carry basis is equal to committed capital.)

3.3 *True, False, or Uncertain:* If both EBV and Owl have the same GVM, then the value multiple of Owl will be lower than the value multiple of EBV. (See Appendices 2.A and 2.C for more information on EBV and Owl.)

EXHIBIT 3-9

BIGCO PENSION PLAN, VC PORTFOLIO

Year	2010	2011	2012	2013	2014
Beginning value	10,000	10,300	13,105	5,563	6,332
New investments	2,000	2,000	2,000	2,000	2,000
Ending value (before distributions)	13,800	16,605	9,063	9,832	12,498
Distributions to LPs	3,000	3,000	3,000	3,000	3,000
Distributions to GPs	500	500	500	500	500
Management fees	200	200	200	200	200

3.4 The $600M XYZ Fund has completed its 10-year life. Its annual investments, fees, distributions, and portfolio value are given in Exhibit 3-10.

EXHIBIT 3-10

CASH FLOWS FOR THE XYZ FUND

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Investments	50.0	100.0	100.0	150.0	100.0	0.0	0.0	0.0	0.0	0.0
Portfolio value	50.0	167.5	326.1	387.8	353.5	381.8	412.3	445.3	480.9	519.4
Carried interest	0.0	0.0	0.0	0.0	0.0	0.0	15.9	17.8	19.2	103.9
Distributions to LPs	0.0	0.0	150.0	200.0	70.7	76.4	66.6	71.2	76.9	415.5
Cumulative distributions to LPs	0.0	0.0	150.0	350.0	420.7	497.1	563.6	634.9	711.8	1127.3
Port value after capital returned	50.0	167.5	176.1	187.8	282.8	305.4	329.8	356.2	384.7	0.0
Management fee	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

(a) Compute the value multiple, realized value multiple, unrealized value multiple, and IRR for XYZ after *every year* of its life.
(b) Are these returns an example of the J-curve, or are they an exception?