The 2% Solution For Maryland: Increasing Pension Fund Investment In Venture Capital

A Plan For Bringing In Unrealized Income And For Stimulating Economic Development

Published by
The Abell Foundation
111 S. Calvert Street
Suite 2300
Baltimore, Maryland 21202

TABLE OF CONTENTS

Executive Summary

Introduction

In 1989, The Abell Foundation published a report in support of a Maryland General Assembly resolution which recommended that the Maryland State Retirement and Pension System consider investing a portion of assets in venture capital as a way to boost returns and reduce risk for the pension fund and to stimulate the development of Maryland companies. The report argued that Maryland should follow the example of several states across the country and invest a small percentage (1-5) of its pension funds in venture capital, with preference given to venture capital partnerships that commit to make their best efforts to invest in Maryland companies. The report concluded, "Investing in venture capital can be justified on the merits of superior investment return, reduction of risk through diversification, and support and stimulus for the state's economic well being."

An earlier report argued that Maryland should follow the example of several states across the country and invest a small percentage (1-5) of its pension funds in venture capital.

The resolution passed the Maryland General Assembly and the Maryland Venture Capital Trust was established with an initial investment of $2 million from the State of Maryland general fund. Within the following two years, the Trust raised another $17.1 million from the Maryland State Retirement and Pension System ($15 million) and the Employees' Retirement System of the City of Baltimore and the Fire and Police Employees' Retirement System of the City of Baltimore ($2.1 million). As of June 1994, $19.1 million had been committed to eight venture capital partnerships, with each partnership committing to make "best efforts" to invest in Maryland companies.

Although it is still too early to assess the financial performance of the Trust at this stage (since most venture capital investments take years to mature), data on the progress of the partnerships indicates that the state's economic development goals have been achieved. Following the Maryland Venture Capital Trust's initial investments, the eight venture partnerships have invested $19.3 million in 20 Maryland companies. This follows investments in Maryland companies of $7.1 million made by these partnerships prior to the Trust's investments, for a total investment to date of $26.4 million in 23 Maryland companies which employ 1,053. Because the eight funds still have $50 million available to invest, Maryland companies might benefit from further investment.

The Abell Foundation undertook this study to evaluate, on a national basis, the market of public investments in venture capital. In particular, the following questions were posed:

Data on the progress of the partnerships indicates that the state's economic development goals have been achieved.

- How does the Maryland pension fund's participation in venture capital investments compare to other public pension funds' participation in venture capital investing?
- Are there sound economic reasons why Maryland state and local pension funds, as well as the private pension funds in the region, should invest more funds in venture capital? If so, what is the right amount of venture capital to be invested?
- How will an increase in venture capital investments have an impact on the state's economy?

To answer these questions, a survey of public pension funds across the country was undertaken to obtain information on current strategies and trends for future venture capital investing. To assemble and analyze this information on public investments in venture capital and to address the economic issues raised by this study, numerous interviews and discussions were conducted with institutional investment managers and advisors, venture capitalists, industry analysts and staff members of public and private pension funds.

The Maryland State Retirement and Pension Systems should increase their venture capital programs from 0.10% to 2% of total fund dollars.

Recommendations

1. The Maryland State Retirement and Pension Systems, and other public pension systems in the region, should increase their venture capital programs from 0.10% to 2% of total fund dollars.

Public pension fund investments in venture capital have been growing dramatically over the last decade and a half. Over 30 states in the U.S. have programs underway or in development that invest in venture capital. The majority of these state pension funds have approximately 2% of their total fund dollars invested in venture capital. Venture capital has outperformed traditional asset classes by 5% per year over the last twenty years. In addition, venture capital has low correlations with other asset classes and therefore can raise the expected return of a portfolio without necessarily increasing its overall expected risk. The time is ideal for further investing in venture capital, both in terms of the national and regional capital markets. A prudent strategy for the Maryland pension fund would be to invest 1% ($160 million) of the total pension fund assets in venture capital over the next five years and an additional 1% ($160 million) over the following five years, bringing the pension fund's allocation to venture capital up to the 2% national average of total fund dollars ($320 million) in ten years.

2. Pension systems should diversify within their venture capital portfolio.

Pension funds should reduce their risk in part by diversifying investments among a range of venture capital — seed, early, mezzanine and later stage venture capital — as well as other private equity subclasses, as each subclass has a different sensitivity to changes in the capital markets.

Pension funds should reduce their risk in part by diversifying investments among a range of venture capital.

3. Pension funds' venture capital portfolios should be overseen by experienced professionals and executed by venture capitalists.

Venture capital and most subclasses in the alternative investments category are privately-negotiated, long-term investments that require active management. Therefore, it is critical that pension fund venture capital and alternative investment programs be developed and managed for the pension fund by professionals with expertise in managing institutional funds. Regardless of the structure of ongoing management of the portfolio, pension funds should select experienced venture capitalists to initiate and structure the specific company investments.

The state pension fund would have grown by an additional $640 million over the last ten years if it had invested 2% of its portfolio in venture capital.

4. Pension funds in Maryland should initiate policies to encourage investing of fund dollars in the state.

Maryland and the Mid-Atlantic region have a supply of experienced venture capitalists. In addition, the state has a growing supply of ventures with superior growth potential. These two strengths create a healthy environment for investing in Maryland. To encourage investments in-state, pension funds in Maryland should establish "best efforts" policies of investing public dollars in Maryland. In addition to a "best efforts" policy, Maryland should explore other successful models for regional investing like the Massachusetts Technology Development Corporation (MTDC), a Massachusetts state sponsored venture capital firm, which has achieved a superior long-term return (17.5% over a 14 year period) from investing in only Massachusetts-based emerging companies. With the right model, venture capital should be able to achieve superior returns and significantly impact the local economy.

Conclusion

Because pension funds are important players in the venture capital industry, their decisions regarding asset allocations are critical to emerging growth companies and to the state's economy. Compared to other states, the Maryland state pension fund is behind in the percentage of its portfolio dedicated to venture capital. This report examined 21 out of the 30 state pension funds that invest in venture capital and determined that the average allocation to venture capital per fund was 2.4% ($306 million). By comparison, Maryland invests 0.10%.

The decision to invest such a small amount in venture capital is more than just an economic development concern; it may cost the pension fund and its beneficiaries millions of dollars in lost returns. With the assistance of T. Rowe Price, this report found that the state pension fund would have grown by an additional $640 million over the last ten years if it had invested 2% of its portfolio in venture capital (assuming histori-

cal market returns). Beyond the economic development reward, investing in venture capital appears to make financial sense.

Although some may argue it is too early to tell, the Maryland pension system has already seen positive signs from its initial investment in venture capital. There is ample evidence to indicate that a further investment in venture capital is prudent, now. In developing an expanded program in venture capital, the following questions should be asked and analyzed:

There is ample evidence to indicate that a further investment in venture capital is prudent, now.

- What is the optimal level of venture capital for each particular pension fund? An asset allocation analysis evaluating risk and reward trade-offs should be performed for each fund's portfolio.

- What diversification strategy should be developed? A larger alternative asset allocation strategy (e.g. 5% of total fund dollars) should be explored.

- How should the venture capital program be implemented and what is the best management model? Should professional investment expertise be hired to run a program in-house or to advise the pension system as a third party?

- Which models make economic sense to achieve a dual impact (i.e. venture capital as both a source of high returns and local economic development)?

- What specific policies can be implemented to make a large venture capital program most effective for Maryland (e.g. specific targets for seed-stage and later-stage investments)?

This report concludes, as The Abell Foundation report did six years ago, that when managed professionally, venture capital can increase the expected rate of return of the portfolio; provide diversified benefits to the portfolio; and further stimulate the economy. The state's pension funds should waste no time in moving forward.

This report concludes that when managed professionally, venture capital can increase the expected rate of return of the portfolio; provide diversified benefits to the portfolio; and further stimulate the economy. The state's pension funds should waste no time in moving forward.

I. What is Venture Capital?

"Professional venture capital" as capital provided by firms of full-time professionals who invest alongside management in young, rapidly growing or changing companies that have the potential to develop into significant competitors in regional, national and global markets.

Definition of Venture Capital — The National Venture Capital Association defines "professional venture capital" as capital provided by firms of full-time professionals who invest alongside management in young, rapidly growing or changing companies that have the potential to develop into significant competitors in regional, national and global markets. The most visible venture capital money is provided by private venture capital partnerships or closely held venture capital corporations which are funded by a network of investors including public and private pension funds, endowment funds, foundations, corporations, individuals, foreign investors and venture capitalists.[1]

Life Cycle of Venture Capital — Venture capitalists invest money at various stages of a young company's development with the goal of realizing a substantial return on investment when a company is acquired or goes public. Venture capital returns develop over time along the path of the standard industry "J-Curve". Bigler Investment Management Co. and Crossroads Capital, venture capital advisors and managers of public and private institutional funds, depicted a typical venture capital partnership life cycle (see exhibit A) which includes four major phases of the J-curve: 1) investing capital in the first three years; 2) returning capital in years four to six; 3) returning profits in years seven to ten; and 4) liquidating after year ten.[2] Since venture capital has a ten or more year life cycle, it should be viewed as a long-term and illiquid investment.

Returns and Risks — The expected returns and risks of venture capital are higher than those of traditional assets given that venture capital investments are made in companies in emerging markets. Of all venture capital investments in companies, approximately one-third produce dramatic or superior returns on investment. The remaining two-thirds are flat or generate negative returns. The source of the returns to the investors are often the gains realized from a sale of a company or its initial public offering. More recently, venture capital partnerships have been required to hold onto their investments a few years after the sale of the company or its public offering in order to satisfy the requests of new investors.

Characteristics of Venture Capital — Venture capital, within itself, can be a diverse portfolio choice. Venture capital is used to fund companies at different stages of development, each of which have different levels of risk. Brinson Partners, an institutional private market investor and manager of public and private funds, defines the different stages of company development into the following five categories (see exhibit B): 1) seed — company is exploring business concept; 2) start-up — company is developing product and initial marketing; 3) early stage — company is initiating full-scale manufacturing and sales; 4) expansion — company is expanding operations and needs working capital; and 5) mezzanine — company is initiating major expansion.[3] Most venture capital investors choose to diversify among these stages of company development, although some will focus on only one or two stages.

In a 1995 Q1 venture capital study performed by Price Waterhouse National, the largest percentage of venture capital went to "expansion stage" companies.

Breakdown of Investments By Development Stage
1Q 1995

Stage	Percentage of Total Dollars
Seed/Start-Up	10
Early	20
Expansion	38
Mezzanine/Late	21
Other/Unknown	11
Total	100%

Source: Price Waterhouse National Study

The largest percentage of venture capital went to "expansion stage" companies.

In addition to company stage, industry focus also differentiates venture capital investments. As with stages, some venture capital firms focus their investments in a few industries, while others diversify among industries. As shown in the chart on the following page of 1993 disbursements prepared by Brinson Partners, venture capital provides funds for a broad range of industries (see exhibit C for a five year breakdown).[4] The Q1 1995 study performed by Price Waterhouse National shows approximately the same breakdown with the exception of a large increase in the industrial sector at the cost of the telecommunications and software sectors (these numbers are skewed by a few large deals).

Geographic focus is another method venture capital firms differentiate themselves.

Disbursements By Industry
1993

Industry	Percentage Of 1993 $
Software	21
Medical/Healthcare	14
Telecommunications	13
Consumer	10
Biotechnology	9
Communications	4
Other Electronics	3
Industrial	3
Computer Hardware	3
Other	20
Total	100%

Source: Brinson Partners

Along with company stage and industry focus, geographic focus is another method venture capital firms differentiate themselves. Geographic focus is often more manageable for smaller venture capital firms as it assists partners' ability to regularly monitor and participate in the ongoing operations of their investment companies.

II. Venture Capital as an Investment Choice

The venture capital industry has grown dramatically over the last decade and a half, from less than $3 billion in company commitments in 1977 to approximately $35 billion[5] by the end of 1993. In 1993, $3.1 billion of venture capital funding was disbursed to over 1200 companies (see exhibit D). Why is venture capital an attractive investment choice? Overall, the potential risks and rewards of venture capital improve the expected performance of funds. Venture capital has historically produced superior long-term returns in addition to diversification benefits for portfolios.

Superior Long-Term Returns — Venture capital has outperformed traditional asset classes over the long-term. In the attached graph (see exhibit E) prepared by Venture Economics, the Venture Capital 100 Index is shown producing superior performance to the S&P 500 Index and Value Line Composite Index over the last twenty years.[6] Brinson Partners' analysis of the annualized returns over this time period showed that venture capital produced an 18% annualized return, an excess of 5% over traditional asset classes (see table on the next page).[7]

Venture capital has historically produced superior long-term returns in addition to diversification benefits for portfolios.

Investable Capital Market
Performance Characteristics
(3/31/74 - 3/31/94)

	Annualized Returns	Risk*
Venture Capital	18.11%	26.36%
U.S. Equity	13.09	18.02
Total Non U.S. Equity	13.56	19.16
High Yield Bonds	11.12	12.05
Non-U.S. Bonds	11.91	12.71
International Dollar Bonds	10.57	6.58
U.S. Bonds	9.89	7.92
U.S. Real Estate	8.18	3.69
Cash Equivalents	7.43	1.38

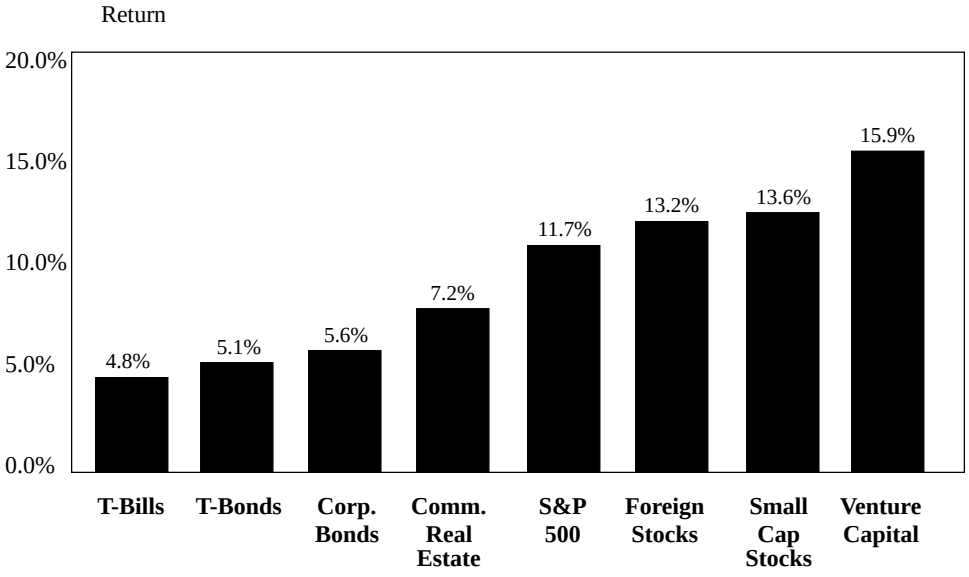
* Annualized standard deviation based on quarterly logarithmic returns.
Source: Brinson Partners, Inc.

In another analysis, the investment banking firm of Morgan Stanley compared the annualized return of 21 different asset classes over the short and long term.[8] The returns for venture capital fluctuated significantly year-to-year, underperformed some of

the other asset choices in years five and ten, but outperformed all of the traditional asset classes by over 200 basis points over the long-term period of 1945-1993 (see exhibit F in Appendix, summarized below).

Investors must be willing to invest in venture capital funds for at least 15 years.

Performance Comparison
Annualized Returns
1945-1993



Source: Prepared by Bigler/Crossroads with data from Morgan Stanley.

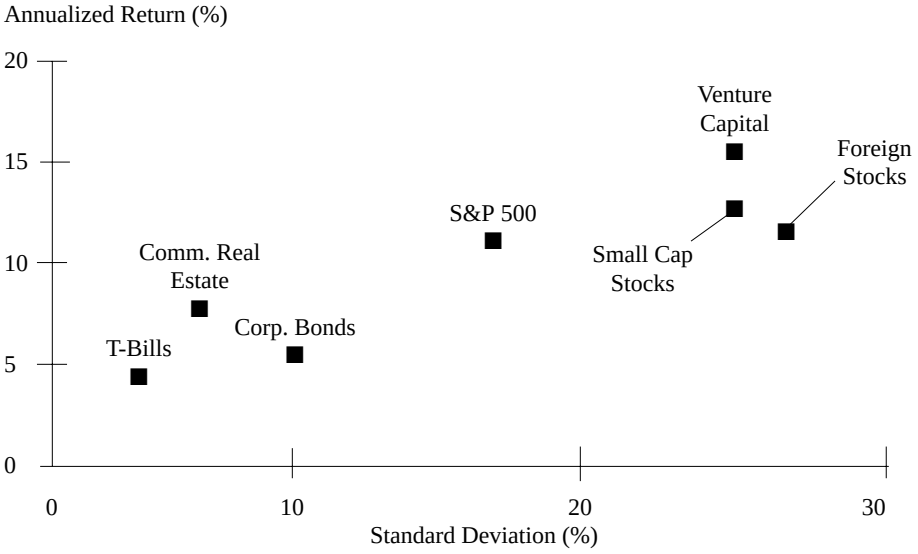
It is clear that venture capital investments have long life cycles. Venture capital investments require patient capital. The ability to exit from a venture capital investment either by the sale of the company or an initial public offering can take place ten or more years after the initial investment. Investors must be willing to invest in venture capital funds for at least 15 years.

Most financial analysts attribute the higher returns of venture capital to three factors: 1) access to opportunities not available through public markets; 2) inefficient pricing in the private market; and 3) premiums associated with illiquidity.[9] The information on these small and private companies is not broadly known and analyzed by the marketplace. It is, therefore, more likely to be discovered by experienced venture capitalists.

Higher Risk with Diversification Benefits — The higher expected returns for venture capital are more variable than those of traditional assets given the risks associated with the small size and newness of many of the companies backed by venture capital. This variance gives venture capital a higher risk than most asset classes. (Risk is measured by standard deviation as shown in the graph below summarizing risk and reward characteristics of key asset classes).

Venture capital is different from other asset choices because its returns do not move in the same relation to the stock market.

Risk/Reward Characteristics 1945-1993



Source: Prepared by Bigler/Crossroads with data from Morgan Stanley.

These risks, however, are reduced in part when venture capital investments are diversified among subclasses of venture capital and invested with other assets. Venture capital is different from other asset choices because its returns do not move in the same relation to the stock market. Venture capital is less sensitive to changes in the market as demonstrated by its low covariance with other asset choices (see exhibit G).[10] Therefore, it provides portfolios with significant diversification benefits. The illiquidity risks of venture capital investments, on the other hand, cannot be mitigated as venture capital investments have a ten or more year life cycle and are very difficult to exit from prior to sale of a company or initial public offering.

More Efficient Risk/Reward Trade-Off — Generally, the inclusion of significant amount of venture capital among traditional asset classes in a portfolio improves the expected performance of the fund by increasing the expected return. Using the economic "capital-asset pricing model" which selects asset allocations in portfolios to optimize risk and return, pension funds can move their expected portfolio return to an optimal level along what is considered the "efficient frontier" by including a significant amount of venture capital, potentially increasing the risk of the portfolio but improving the expected return and the overall risk/reward trade-off for investors.

As in the case of Los Angeles County Employee's Retirement Association (LACERA), investing in alternative assets such as venture capital produced a higher return and a more optimal asset allocation. In 1993, LACERA ran an asset allocation model with a 5% (of total fund dollars) allocation to alternative investments which identified that LACERA could achieve a 6.3% rate of return improvement from its substitute asset class of large capitalization equities, which translated into an additional 0.315% annual improvement in return for the total fund in addition to moving the asset mix to an optimal level along the "efficient frontier" which maximizes risk versus return. The opportunity cost for LACERA not to make this change amounted to $770 million over a ten year period.[11]

The results of the analysis indicated that the state pension fund might have raised the portfolio's total expected return by 15 basis points (0.15%) with a 2% allocation to venture capital and 30 basis points (0.30%) with a 4% allocation to venture capital — without increasing the overall expected risk of the portfolio.

Maryland Asset Allocation Analysis—In an effort to estimate the change in expected return and risk of a significant increase in the amount of venture capital in the Maryland State Retirement and Pension System's portfolio, an asset allocation comparison analysis was performed using historical market data from the last twenty years with the assistance of T. Rowe Price Associates. The expected return and risk of a sample portfolio (portfolio A in attached chart), showing a mix of assets similar (but not identical) to the state pension system's portfolio as of June 30, 1994, was compared to two modifications of the sample portfolio which included increased amounts of venture capital (portfolios B and C in the chart on page 14).

The results of the analysis indicated that the state pension fund might have raised the portfolio's total expected return by 15 basis points (0.15%) with a 2% allocation to venture capital and 30 basis points (0.30%) with a 4% allocation to venture capital — without increasing the overall expected risk of the portfolio. These increases in expected return are a result of the replacement of traditional equities in the portfolio (as measured by the S&P 500), which have produced annual returns of 13% over the last 22 years, with venture capital which has generated annual returns of 20.4% over the same period — a 7.4% differential. Over a ten year period, the $16 billion state pension fund could have grown by an additional $640 million and $1.28 billion, respectively, if the fund had been invested in 2% and 4% of venture capital, based on historical market data.

Since venture capital has lower correlations to other assets than traditional asset classes, converting up to 4% of the pension fund's equity investments to venture capital to raise the expected return of the portfolio will increase its diversification and thus

reduce its overall expected risk. Higher levels of venture capital (above 4% of the fund) will continue to increase the expected return of the portfolio but will also begin to raise the portfolio's expected risk. As stated in the Maryland State Retirement and Pension Systems' June 30, 1994 Comprehensive Annual Report on page 56, "One of the keys to successful asset allocation is the selection of various asset classes whose expected returns are not highly correlated."

"One of the keys to successful asset allocation is the selection of various asset classes whose expected returns are not highly correlated."

Asset Allocation Comparison Analysis
Based on Historical Returns from 1/73 - 6/95

	Maryland Pension Fund 1994 Allocation	**A** Sample Portfolio - 0% Venture	**B** Modified Sample - 2% Venture	**C** Modified Sample - 4% Venture
Asset Class				
Total	100%	100%	100%	100%
Fixed Income	51%	53%	53%	53%
Equity - Domestic	38	38	36	34
Equity - Intern'l	5	6	6	6
Cash/Short-Term	3	3	3	3
Real Estate	3	0	0	0
Venture Capital	0	0	2	4
Expected Return		11.07%	11.22%	11.37%
Expected Risk		10.59%	10.57%	10.59%

Note: The asset allocation analysis was performed by Patrice Cromwell with the assistance of T. Rowe Price Associates. The benchmarks used between 1/1/73 - 6/30/95 included the S&P 500, the Lehman Brothers Government and Corporate Bond Index, the Morgan Stanley EAFE for international stocks, and the U.S. 30 day T-bill rate. The venture capital data were provided by Brinson Partners. All asset allocation percentages were rounded to the nearest percentage point. The sample portfolio A is only a rough estimate of the current Maryland State pension system portfolio. Portfolio A does not include venture capital since it represents approximately 1/10 of 1% of the total portfolio. Also, the sample portfolios do not include real estate since appropriate historical data for real estate was not available. The percentage of the pension system's real estate portfolio was spread in the sample portfolios between equity and fixed income securities.

To explore the potential benefits further, the Maryland State Retirement and Pension Systems, in addition to other pension funds in Maryland, should perform internal asset allocation analyses based on actual data and future performance projections to evaluate the specific expected return and risk benefits of investing a larger portion of their funds in venture capital.

III. Venture Capital's Secondary Benefit
—Fostering the Creation of Companies and Economic Development

Venture-Backed Companies Have Added Substantially To The Economy.

Venture-Backed Companies Are The Fastest Growing Companies — In addition to the financial benefits of higher returns and improved risk/return characteristics, venture capital has the added benefit of creating corporate growth. The National Venture Capital Association's (NVCA) Fourth Annual Economic Impact of Venture Capital Study demonstrated that young venture-backed companies are from the fastest growing industry segments of the U.S. economy and, consequently, produce a greater amount of economic activity than non venture-backed companies.[12] In a summary of 1800 venture-backed companies, NVCA found that compared to Fortune 500 companies over a five year period, venture capital-backed companies have, on average:

- Achieved a 21.6% compound average sales growth rate versus less than 1% for Fortune 500 companies;
- Invested over 16% of their equity in R&D, versus 10% for Fortune 500 companies;
- Produced a greater percentage of skilled jobs (55% versus 14% for Fortune 500 companies); and
- Invested in plant and equipment at over twice the rate of Fortune 500 companies (17% versus 7%).[13]

Venture-Backed Companies Have Added Substantially To The Economy — The NVCA's study estimated that each venture-backed company produced 137 jobs, $3.6 million in exports, $6.7 million in R&D investments and $1.5 million in taxes over the last five years.[14]

The Need for Capital is More Critical Than Ever — According to the National Venture Capital Association (NVCA), the average venture-backed company is approximately five years old and privately held.[15] Just to survive these first five years, venture-backed companies today need to raise on average $19 million, a 170% increase from companies surveyed in 1985.[16] Venture capital is clearly a critical element of young companies survival. Venture capital investments represent 68% of venture-backed companies' private equity financing. According to the NVCA, these venture-backed companies, on average, have been going public recently at a very early age of five and a half years, providing themselves with additional financing and their investors with an exit strategy.

The Mid-Atlantic region has one of the largest concentrations of venture capital dollars under management in the U.S. today.

Maryland and the Mid-Atlantic Region Have Received A Boost From Venture-Backed Companies — The Mid-Atlantic region has one of the largest concentrations of venture capital dollars under management in the U.S. today. As of the end of 1993, the Mid-Atlantic region had $4.3 billion invested in venture capital partnerships, ranking the region number four following California with $8.3 billion, New York with $7.6 billion and Massachusetts with $4.8 billion (see exhibit H). Maryland accounted for

20% ($862 million) of the Mid-Atlantic region's $4.3 billion. The pool of venture funding in the region has resulted in a large number of venture-backed companies in the region (see exhibit H).

The Mid-Atlantic Venture Capital Industry Has Grown Dramatically — Venture capital in the Mid-Atlantic region began with the creation of two Washington-based companies in the late 1950's (Allied Capital and Greater Washington Investors) in response to newly-passed Small Business Investment Corporation (SBIC) legislation. Baltimore's entrance into venture capital began a decade later with the founding of Broventure in the late 1960's and New Enterprise Associates (NEA) in the late 1970's NEA today, a national firm with offices in five cities, has emerged as the largest start-up and early-stage investor in the country. Presently, the Mid-Atlantic region has 25 venture firms. A significant number of these firms were created in the 1980's, several of which emerged as regionally focused venture funds (Grotech Capital Group, Catalyst Ventures and Triad Investors Corporation). In addition, the region has a substantial and ongoing presence (either in the form of a second office or regularly visiting partners) of national and neighboring venture capital firms which have invested significantly in regional companies.[17]

Overall, the growth of the total venture capital presence in the Mid-Atlantic region has lead to additional and larger equity investments in Maryland and its neighboring states and even greater levels of economic impact. Each year over the last nine years, the Mid-Atlantic region has invested hundreds of millions of dollars in the region as well as helped start a significant number of new venture-backed companies (see exhibit H for a year-by-year analysis). These investment dollars have had direct fiscal benefits to the region. In 1994 alone, the Mid-Atlantic venture-backed companies contributed $2.0 billion in revenue (in the form of wages, purchased goods and taxes) and provided 43,000 jobs to the Maryland economy. Since 1991, these numbers have grown some 33% and 258%, respectively.

Overall, the growth of the total venture capital presence in the Mid-Atlantic region has lead to additional and larger equity investments in Maryland and its neighboring states and even greater levels of economic impact.

State and City Funds Enter Maryland Venture Market in 1990 — One of the newest entrants into the Mid-Atlantic venture capital industry is the Maryland Venture Capital Trust which was created by Maryland statute in 1990. The principal objective of the Trust is to achieve a high rate of return through investing in newly formed and existing venture capital funds which, as part of their overall investment strategy, will invest in business enterprises in the State of Maryland that are in the initial stages of development.[18] The Trust provides an opportunity for Maryland state and local pension funds and the State of Maryland and its political subdivisions to indirectly invest a portion of their funds in venture capital investments.

The Trust provides an opportunity for Maryland state and local pension funds and the State of Maryland and its political subdivisions to indirectly invest a portion of their funds in venture capital investments.

The Trust has equity commitments from pension funds totaling $19.1 million: $15 million from the Maryland State Retirement and Pension System; $2 million from the State of Maryland; and $2.1 million from the Employees' Retirement System of the City of Baltimore and The Fire and Police Employee's Retirement System of the City of Baltimore. As of June, 1994, the full $19.1 million had been committed to eight

venture capital partnerships. Each of these partnerships has committed to invest these funds with a primary goal of achieving superior return and a secondary goal of increasing equity investments in the region.[19]

Data on the progress to date indicates that the Maryland Venture Capital Trust has stimulated additional investments in Maryland companies.

Although it is too early to assess the financial performance of the Maryland Venture Capital Trust at this stage, data on the progress to date indicates that the Maryland Venture Capital Trust has stimulated additional investments in Maryland companies. Since the Maryland Venture Capital Trust's commitment to these eight partnership funds, seven partnerships have invested an additional $19.3 million in 20 Maryland companies (11 new investments and 9 follow-on investments). In total, these funds have invested $26.4 million in 23 Maryland companies. Since these partnerships have invested only 36% of their total fund dollars, Maryland companies might be the beneficiaries of an additional $50 million in investment dollars for a total of $75 million, if Maryland companies continue to capture 23% of the dollars invested by these funds.[20]

The economic benefits of the Maryland Venture Capital Trust in Maryland are the spending benefits of these investment dollars, the investment dollars of the co-investors and the revenues and jobs produced by these 23 companies - $115 million in revenues (1994) and 1,053 jobs.[21]

Summary of the Maryland Venture Capital Trust Investments in Venture Capital

Total Dollars Committed to Venture Capital: $19.1 million
Number of Venture Capital Partnership Funds Invested in: 8 (see below)

- Calvert Social Venture Partners
- Catalyst Ventures
- Edison Venture Fund III
- Grotech Partners IV
- Kitty Hawk Capital III
- Oxford Bio Science Partners
- TDH III
- Tritech Partners

Total size of 8 partnership funds: $327.3 million
Amount Invested To Date: $116.2 million (36% of total)

Dollars Invested in Maryland as of 7/15/95

- Total (23 companies) $26.4 million
- After MVCT Commitment $19.3 million
  (20 companies - 11 new, 9 follow-on)

Maryland Companies Economic Benefits as of 7/15/95

- Total Revenues $115 million (1994)
- Total Employees 1,053

The Robust IPO Market Signals Maryland's Commercialization Success — The number of and dollars raised from public offerings, in addition to the number of companies financed through venture capital, are also important measures of a region's entrepreneurial health and future growth potential. When compared to other states, the Mid-Atlantic region has been one of the leading regions for Initial Public Offerings (see exhibit H). In each of the last four years, ten-to-twenty new companies from the Mid-Atlantic region have raised $350-670 million in the Initial Public Offering marketplace totaling $2.2 billion from 1991 - 1994. Maryland companies have raised $48-125 million in each of the last four years, for a total of $377 million during this period. Although the number of offerings and amount of dollars raised from these offerings fluctuates from year-to-year, it is clear that the region has both a strong supply of venture capitalists and successful entrepreneurial ventures.

The region has both a strong supply of venture capitalists and successful entrepreneurial ventures.

IV. Pension Funds
— The Leading Investors in Venture Capital

Endowments and foundations still invest the most extensively on a percentage basis in alternative assets like venture capital.

Venture capital commitments have historically come from individuals, private foundations and corporations. At the end of the 1970's, the U.S. Department of Labor's interpretation of ERISA regulations changed and gave public pension funds the ability to invest in venture capital. Ever since, public pension funds have been the fastest growing source of new venture capital commitments. In 1993, public and private pension funds provided the majority, 59%, of the total market of venture capital commitments, versus 36% in 1989 (see exhibit I).[22] Public pension funds now represent over half of the pension fund commitments (close to 30% of the total venture capital commitments) which total over $1 billion a year. The remaining percentage of pension funds providing commitments are pension funds of large corporations like BG&E, AT&T, GE, IBM, etc.

Notably, however, endowments and foundations still invest the most extensively on a percentage basis in alternative assets like venture capital. In a 1992 study performed by Goldman Sachs and Frank Russell, endowments and foundations allocated 10.4% of their fund dollars to alternative assets including venture capital, versus 4.9% for corporate funds and 2.5% for public funds. Of all funds that had an alternative asset programs, almost 90% invested in venture capital, the most often utilized alternative investment strategy.[23]

V. Results of Survey on Pension Funds Investing in Venture Capital

Over 30 states, including Maryland, have one or more pension fund programs underway or in development that invest in venture capital. The following list of states have active programs in venture capital:

California	Los Angeles	New Mexico	Rhode Island
Colorado	Louisiana	New York	Tennessee
Connecticut	Massachusetts	North Carolina	Texas
D.C.	Michigan	North Dakota	Utah
Delaware	Minnesota	Ohio	Virginia
Florida	Missouri	Oklahoma	Washington
Illinois	Montana	Oregon	Wisconsin
Iowa	Nevada	Pennsylvania	
Kansas	New Hampshire	Puerto Rico	

Each year, more states continue to initiate venture capital programs. For example, the New Jersey Legislature passed legislation this year to allow the state pension fund to invest in venture capital. Public pension funds' primary objectives for investing in venture capital are to achieve superior returns and to realize diversification benefits. An additional benefit, that many state pension funds seek and expect, is the positive economic impact of regional equity investment.

National Survey Conducted on Public Investments In Venture Capital — To develop additional information on public investments in venture capital, a survey of public pension funds that have invested in venture capital was conducted. For this study, 36 surveys were distributed, 26 of which were compiled. Of these 26 surveys, 21 were completed by pension fund staff or advisors either in writing or in telephone interviews. The additional five were completed with information obtained from published journals. The major findings of the study are described below. The survey questionnaire and summary of findings is attached as exhibit J and K, respectively. Please note that the sample size of respondents for many of the topics listed below was too low and therefore the results should not be considered "statistically significant". These findings are indications only of the general characteristics and trends of state pension fund programs.

The average size of the pension funds' responding to the survey was $18 billion, ranging from $2 billion to $74 billion.

The median allocation for venture capital was 2% of total fund dollars among the pension funds surveyed with programs in venture capital.

Survey Findings

1. The average size of the pension funds' responding to the survey was $18 billion, ranging from $2 billion to $74 billion. Of the 26 returned surveys, 21 states were represented.

2. The median allocation for venture capital was 2% of total fund dollars among the pension funds surveyed with programs in venture capital. Approximately 58% (15

Larger pension funds have more dollars invested in venture capital, but a smaller percentage of their overall portfolio.

of 26 funds) of the pension funds interviewed that invested in venture capital had allocation targets for the amount of total fund dollars to be invested in venture capital. Of these funds, venture capital was either a separate investment category or within an alternative asset or private equity category. The average allocation to venture capital per fund among these programs was 2.4% ($306 million) of the total fund with a range of 0.1%-7.5%. The average dollars committed to venture capital to date among each of these states is $184 million, or 60% of target.

3. Many pension funds have targets for a broader asset category of either alternative investments or private equity which included venture capital as a subclass without a target asset allocation percentage. According to Brinson Partners, broader alternative investment and private equity categories are a growing trend. The median allocation for this broader category of alternative investments among these states was 5% of total fund dollars and the average was 5.7%, or $1.38 billion, with a range of 2% - 15%. Many of these pension funds (36% of the total or 9 of 26 funds), invest in venture capital as 25-50% of their alternative investments category. The remaining funds (6% of the total or two funds) invested in venture capital as a separate category without any targets or within a private equity category.

4. It appears that larger pension funds have more dollars invested in venture capital, but a smaller percentage of their overall portfolio. Excluding the highest and lowest outlier in the reporting sample of 15 funds, the pension funds:

- Over $20 billion, invested an average of $412 million or 1.7%;
- Between $10-$20 billion, invested $295 million per fund or 2%; and
- Less than $10 billion, invested $111 million per fund or 2.7%;

It appears that the largest pension funds (over $20 billion) more often have allocation targets for the broader alternative asset category, which includes venture capital, but not specific targets for venture capital.

It is clear that investing in venture capital requires a critical amount of dollars to implement diversification goals.

5. In addition, it appears that the largest pension funds (over $20 billion) more often have allocation targets for the broader alternative asset category, which includes venture capital, but not specific targets for venture capital. Even though these large funds have the biggest venture capital programs, they have shown a desire for flexibility in the range of their investments within the alternative asset category. This trend may be caused by the fact that large funds prefer very large investments ($25 million and over) which appear to be harder to find in venture capital relative to other investment options within the alternative investments category (e.g. buy-outs).

6. Of the funds surveyed, the average alternative asset program included at least a venture capital investment category and a few other alternative investment choices.

Each of the states surveyed had a venture capital portfolio and, generally, funds in buy-outs. Additional alternative asset categories included mezzanine debt, distressed companies, restructured loans, real estate, subordinated debt, energy, targeted investments and/or special situations (e.g. timber and communications equity). According to a 1992 study performed by Goldman, Sachs and Frank Russell, venture capital was the most widely used investment choice within the alternative asset category although buy-outs received the most dollars.[24]

The primary purpose for investing in venture capital for almost all of the pension funds surveyed is to increase the overall expected return of the portfolio.

7. The primary purpose for investing in venture capital for almost all of the pension funds surveyed is to increase the overall expected return of the portfolio. The target rates of return, however, varied dramatically by fund, ranging from goals of 8% to over 20%. Most portfolios set a target return at a specific number of basis points above a widely-used market index such as the S&P 500, CPI, NASDAQ or a long-term equity index. The diversity in target rates of return might reflect, in part, the mix of investment options of the particular pension fund within the venture capital, alternative asset or private equity categories chosen. Pension funds with outside managers tended to have higher return targets.

8. In addition to return objectives, most of the funds surveyed had diversification goals for their venture capital portfolios among stages of investment (seed, early, later, etc.), industry, and investment managers. Diversification is one reason why funds have wide ranges in the size of individual deals, which were reported in the survey to be as small as $500,000 and as large as $50 million.

9. Almost all of the funds surveyed invested in venture capital directly through private limited partnerships. Alternatively, a few invested in fund-of-funds in order to minimize the pension funds administrative workload and to ensure diversity of their overall portfolio. On the other hand, several of the larger funds also initiated direct investments in companies, which were some of the largest transactions reported (greater than $50 million). Based on the survey information, large funds are predictably biased toward larger deals. The administrative costs of analyzing, selecting and tracking deals is significant and more costly for large funds making many small investments. Since larger funds have more dollars committed to venture capital, they can focus on larger deals and still be able to diversify their venture capital portfolio.

A number of public pension funds have goals to invest in-state or regionally but most do not have mandates to do so.

10. A number of public pension funds have goals to invest in-state or regionally but most do not have mandates to do so. Of the twenty-one responses to the survey submitted, three states had a formal regional investment strategy, either as an explicit goal or mandate — Maryland, Ohio and Pennsylvania. Massachusetts has a new in-state pension investment program in development as well as a successful Massachusetts-only private fund (MTDC) that was created 14 years ago with state and federal

Overall, the returns of the venture capital and alternative investment portfolios varied dramatically among the pension funds surveyed.

funds (see page 24 & 25). Several other states also invest regionally, but not as a result of formal targets (California and Oregon). According to Brinson Partners, many states are now seeking to develop "best efforts" goals for investing in-state. Brinson indicated many of its clients — Virginia, Missouri, North Dakota, Montana, Washington and New Mexico, were exploring "best efforts" and other policies to encourage economic development. Of note, however, national funds with several state pension fund investors requesting "best efforts" regional investing might have more difficulty in implementing these policies versus regional venture capital funds. Five of the states surveyed (Ohio, Colorado, Maryland, Massachusetts and Pennsylvania) have reported positive economic impacts from their regional equity investments.

11. Overall, the returns of the venture capital and alternative investment portfolios varied dramatically among the pension funds surveyed. Some funds have produced returns in the high teens and twenties and others have produced negative returns. Although it may be too early to conclusively assess pension funds' returns since most programs have not liquidated, the returns in general have approximated industry averages for venture capital partnerships with the same vintage year. Since the reported returns may not have been calculated with parallel assumptions, the returns should only be viewed as general indicators of performance, not exact figures. The pension fund portfolios that were five years old and less in total averaged a return of over 12%, with the youngest of funds in the higher teens or twenties. The average return for portfolios in the five-to-ten years old range was 7% with most of the ten year old funds performing under this average. Many of the funds that are approximately ten years old entered the market in the early 1980's, a time when capital was pouring into the venture market following the golden years of venture capital in the 1970's As a result, the increased funding in the market raised the competition for good investments and their prices.

The average industry forecasts for the future are in the high teens, slightly lower than the 20% range predicted in the early 1990's.

Venture capital returns are long-term investments and need to be analyzed by their age or vintage year (the year in which the venture capital partnership was funded and closed) in addition to the major characteristics of the fund like company stage mix and the size of the fund. Seed and early stage investments have a higher expected return as well as risk. In addition to the particular fund characteristics, the funds performance will depend on the macroeconomics of the capital markets — the amount of capital, the number of partnerships, and the strength of the initial public offering market (which provides for a strong exiting environment for venture capitalists).

Due to a lower than expected performance of mid-1980's funds, the venture capital industry has experienced consolidation and restructuring during the last several years. As a result, venture capitalists still in the market today are more experienced and professional, making the market overall more mature and expectations of return more realistic. The average industry forecasts for the future are in the high teens, slightly lower than the 20% range predicted in the early 1990's.[25]

Achieving superior returns in venture capital requires active[26] and experienced management of the portfolio. Venture Economics has studied the performance of the top venture capital partnership performers and concluded that investing in venture capital should not be done "at the average." Given the risks involved in terms of illiquidity, pension fund investors should invest in managers that will produce first quartile performance funds.[27] Previous successful experience improves the likelihood of future success, especially in terms of partnerships. Eighty percent of the top performing partnerships in five year old portfolios will be the top performers in year ten. Investors making decisions about management groups to fund follow-on partnership can get a signal as early as year four and five of a young partnership's capability to be a top performing partnership.[28]

Achieving superior returns in venture capital requires active and experienced management of the portfolio.

12. Of the public pension funds responding to the survey on return information (19 funds), over two-thirds had one or more outside consultants to advise staff and trustees and/or perform due diligence on investment choices. Even though the returns of the surveyed funds ranged dramatically from one fund to the next, 66% of the portfolios with outside managers or advisors (8 of 13 funds reporting the information) performed at or above the industry average while only 33% (2 of 6 funds) did so in portfolios that were managed exclusively in-house. From discussions with representatives from pension funds, the trend appears to be moving in the direction of increasing the role and scope of outside experts. A number of funds have increased the discretion of their outside advisors even though most funds still kept the control of major investment decisions in-house with their investment committee or Board of Trustees. This change toward outside experts may be a result of the need for active management and the growing ability of pension funds to impact the venture capital industry. Due to the size of their investments and their estimated risks, pension funds are now negotiating for and achieving better terms and conditions from partnerships (including lower management fees) and performing due diligence with greater scrutiny.[29]

Of the public pension funds responding to the survey on return information (19 funds), over two-thirds had one or more outside consultants to advise staff and trustees and/or perform due diligence on investment choices.

VI. State Strategies on Managing Capital Portfolios

— Case Studies of Delaware, Massachusetts, Pennsylvania and Virginia

A more detailed look at four state pension systems provides a snapshot over view of some of the different strategies that are being executed across the country.

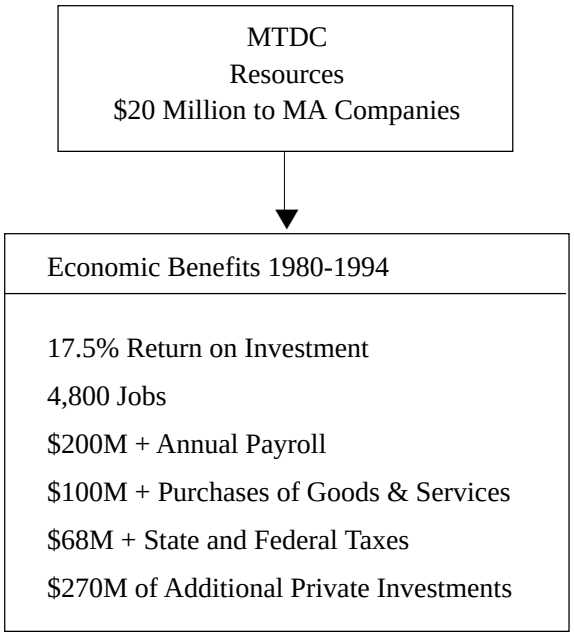
Massachusetts to-date has achieved positive returns on its venture capital investments.

Delaware: A Large and High Performing Program To-Date — The Delaware State Employees' Retirement Fund is a $2.3 billion fund which invests 10% of its funds in a private/illiquid asset category which includes venture capital, private convertibles, distressed securities, real estate and other assets. The fund's objectives are to achieve superior returns and diversification. After three years, $218 million invested in venture capital has produced at 17.8% time weighted return versus their long-term goal of 20%. The fund is managed by Ashford Capital Management, whose President serves as Secretary of Delaware's Investment Committee. According to Delaware's administrative staff, all the decisions are made by "a very active" Investment Committee which meets for two full days each month to discuss their due diligence and recommendations on proposed deals. This Committee is comprised of five members, three of which are on the fund's full Board.

Massachusetts: Performance with Regional Emphasis — The State of Massachusetts has two major pension funds which will soon be combined as a result of a recently passed state statute. The two funds are the $5 billion Massachusetts Pension Reserve Investment Trust (PRIT) and the $8 billion Massachusetts State Teachers & Employees Retirement System Trust (Master's Trust). In the future, all the venture capital dollars will be managed by PRIT's Management Board (PRIM), including approximately 2% of Master's Trust funds and 4% of PRIT funds (the current portion of its 12% dedicated to alternative investments).

The PRIM Board to-date has achieved positive returns on its venture capital investments. The PRIM Board engaged the Massachusetts-only venture capital firm, Massachusetts Technology Development Center (MTDC), in 1986 to manage $2 million in venture capital. On average, MTDC has produced a very successful, in-state 17.5% return on funds under management over the last fourteen years. In addition, the PRIM Board has produced a 10% return to-date on a less than 4 year old, $200 million venture capital program.[30]

MTDC: A Model Venture Capital Firm for Massachusetts' Economy



After examining the results of responses to requests for proposals from experienced individuals and venture capital firms, the Massachusetts pension systems decided to hire several experienced venture capitalists to create a new organization to run this fund.

Due to the past success and current confidence in the emerging company market and venture capital investing, a new Massachusetts only fund has been established this year, called the Commonwealth Capital Fund, which will manage $50 million of assets on behalf of PRIT and Master's Trust. This fund will be a Economically Targeted Investment (ETI) fund and which will invest in a wide array of Massachusetts companies from start-up to buy-out, high technology to no technology. After examining the results of responses to requests for proposals from experienced individuals and venture capital firms, the Massachusetts pension systems decided to hire several experienced venture capitalists to create a new organization to run this fund.

Pennsylvania: A Regional Emphasis Continued — The $14 billion Pennsylvania State Employees' Retirement System (SERS) has an allocation target of 2% of total funds for venture capital which is within a 5% target for private equity. SERS expects to reach their 2% goal of $290 million by 1998. SERS began their venture capital program with a 1% target. So far, $130 million has been invested in venture capital limited partnerships. The investments have ranged between seed, start-up, mezzanine and expansion stages.

When the venture capital program was first developed, SERS had a statutory requirement to invest 50% of the venture capital funds in Pennsylvania limited partner-

To date, the nine year old portfolio in venture capital has returned approximately a 6% annualized rate of return.

ships. To date, the nine year old portfolio in venture capital has returned approximately a 6% annualized rate of return. SERS has attributed this below market return in part to their choice of managers and their mandate to invest only in Pennsylvania managers. According to SERS staff, they have had "some very good successes but also some big losers." In 1992, their state statute governing their investment policies was broadened, allowing them to invest in Pennsylvania and non-Pennsylvania partnerships. SERS stated that this change has enabled them to invest in national and regional funds with more institutional experience and successful track records. Going forward, SERS expects to continue to prioritize investment in Pennsylvania companies (either through in-state or national partnerships) at a reduced rate of approximately 25% of venture capital dollars with a fund goal of overall investment type diversification. SERS expects to see a dramatic change in the fund's performance. Their targeted return is the S&P 500 plus 5%.

SERS manages their funds in-house with Cambridge Associates as an advisor. Both the staff of SERS and Cambridge generate their own deal flow and perform parallel due diligence to enhance the rigor of investment decisions. SERS has two staff members in each asset class — venture capital, real estate, equities and fixed income — plus two staff members for the Chief Investment Officer.

Virginia: A Diversification Strategy is Paying Off — Virginia Supplemental Retirement System has a $16.5 billion fund which has a 1.5% target of total funds in venture capital. Venture capital represents one forth of its private equity category (1.5% of 6%). Virginia has invested approximately $190 million (1.2%) in the last five years and expects that their target for venture capital will increase to a level within 1.8% - 2.5% over the next five years. Virginia's strategy is to diversify its investments by asset type, market niche, company stage, industry and manager and to set particular targets for each major diversification objective. The private equity category has the following components: 5-15% early stage venture capital; 10-20% later stage, 25-30% growth capital and buy-outs; and the remaining in subordinated debt, turnaround and energy.

Over the last four and a half years, the private equity portion of fund has produced a 12% rate of return. The director of the program has been pleased with the performance to date "given the J-curve affect" of venture capital investments. The program was originally planned with three objectives: 1) a long-term target return for private equity of S&P 500 plus 600 basis points; 2) a diversification strategy with targets by industry type; and 3) a reduced volatility of the portfolio due to venture capital's low correlation with other assets. Virginia has not placed any emphasis or regulations on investing in Virginia although it is considering a "best efforts" policy of regional investing in a new partnership commitment. The director believes that geographic mandates, versus emphases, can potentially reduce the overall expected return of the portfolio.

Recently, Virginia streamlined its outside consultants from three outside consultants (each advising on different size and type of deals) to one advisor, Brinson Partners. Brinson Partners advises Virginia on deals over $200 million and has authority to make decisions on deals under $200 million. Having one outside consultant with discretion versus three has taken some of the administrative burden away from Virginia's staff and reduced the complexity of managing the portfolio.

Recently, Virginia streamlined its outside consultants from three outside consultants to one advisor.

VII. Recommendations

The Maryland State Retirement and Pension Systems, and other public pension systems in the region, should increase their venture capital programs to 2% of total fund dollars.

1. The Maryland State Retirement and Pension Systems, and other public pension systems in the region, should increase their venture capital programs to 2% of total fund dollars.

Public pension fund investments in venture capital have been growing dramatically over the last decade and a half. Over 30 states in the U.S. have programs underway or in development that invest in venture capital. The majority of these state pension funds have approximately 2% of their total fund dollars invested in venture capital. Maryland state's pension fund invests in venture capital but at a much smaller percentage than most states. The Maryland State Retirement and Pension Systems along with the State of Maryland and two Baltimore City pension funds invested $19.1 million in venture capital through the Maryland Venture Capital Trust (a fund-of-funds for state and local pension fund dollars) beginning in 1990. The state's portion, $15 million of the $19.1 million of equity in the Maryland Venture Capital Trust, represents less than 1/10 of 1% of the $16 billion Maryland pension fund.

Since venture capital invested by experienced venture capitalists can: 1) raise the expected rate of return of portfolios; 2) provide portfolio diversification benefits; and 3) further stimulate the regional economy, it is recommended that the Maryland State Retirement and Pension Systems reevaluate the size of its allocation to venture capital and increase its investment to at least 2% ($320 million) of total fund dollars, a national average for public pension funds.[31]

Venture capital has outperformed traditional asset classes by 5% over the last twenty years. In addition, venture capital has low correlations with other asset classes and therefore can raise the expected return of a portfolio without necessarily increasing its overall expected risk. A sample asset allocation analysis on page 12 demonstrates that the Maryland pension fund could potentially invest up to 4% of its assets in venture capital and increase the portfolio's rate of return without increasing its expected risk. A 2% allocation of assets to venture capital could have raised the expected return by 15 basis points (0.15%) a year and grown the asset base an additional $640 million over ten years. These funds, if invested in part in Maryland, could also have had a major impact on the state's economy.

The time is ideal for further investing in venture capital, both in terms of the national and regional capital markets. The national venture capital market has matured since the 1970's and 1980's The industry has consolidated and eliminated in the process below market performers. In addition, the current market has a relatively low level of capital, enabling venture capitalists to enter deals at lower and more attractive prices.[32] Venture capital is now recognized by pension funds as a prudent pension asset category and a widely-used alternative to traditional investment opportunities.

A prudent strategy for the Maryland pension fund would be to invest 1% ($160 million) of the total pension fund assets in venture capital over the next five years and an additional 1% ($160 million) over the following five years, bringing the pension

fund's allocation to venture capital up to the 2% national average of total fund dollars ($320 million) in ten years.

2. Pension systems should diversify within their venture capital portfolio.

All pension funds, corporate and public, have a primary objective of achieving superior returns on their investments. By investing in venture capital, pension funds have opened the door to the higher returns and risks of investing in emerging markets. Pension funds should reduce these risks in part by diversifying investments among a range of venture capital — seed, early, mezzanine and later stage venture capital — as well as other private equity subclasses, as each subclass has a different sensitivity to changes in the capital markets. Pension funds with capital programs most often invest in venture capital as part of a broader strategy of investing on average 5% of total fund dollars in private equity and alternative investment classes. Clearly, diversification requires a larger asset allocation in order to divide funds among different investment choices.

Pension funds' venture capital portfolios should be overseen by experienced professionals and executed by venture capitalists.

3. Pension funds' venture capital portfolios should be overseen by experienced professionals and executed by venture capitalists.

Venture capital and most subclasses in the alternative investments category are privately-negotiated, long-term investments that require active management. Therefore, it is critical that pension fund venture capital and alternative investment programs be developed and managed for the pension fund by professionals with expertise in managing institutional funds. Pension fund venture capital programs require the establishment and implementation of specific asset allocation goals, diversification objectives, investment criteria and investment structure objectives for a long-term strategy of achieving superior returns. Industry expertise is needed to be able to compete in the marketplace for the most attractive investments. Pension funds are the largest investors in the industry and have the ability, if exercised, to improve the terms of their deals (and therefore expected returns) with venture capitalists.

Public pension funds often use fund-of-funds or investment management consultants to oversee their programs and assist the pension fund in selecting venture capital partnership investments. If Maryland initiates a larger program, the state should research various structures for managing the program. The Maryland Venture Capital Trust, which serves as a fund-of-funds, should be considered as a structure as well as other models that exist around the country. Regardless of the structure of ongoing management of the portfolio, pension funds should select experienced venture capitalists to initiate and structure the specific company investments. Venture capitalists are incented, as general partners in their deals, to achieve superior returns by capitalizing on the inefficiencies of the private marketplace. Venture capitalists need to be selected with rigorous criteria including successful investment performance of the partnership management team.

4. Pension funds in Maryland should initiate policies to encourage investing of fund dollars in the state.

To encourage investments in-state, pension funds in Maryland should establish "best efforts" policies of investing public dollars in Maryland.

Maryland and the Mid-Atlantic region have a supply of experienced venture capitalists. In addition, the state has a growing supply of ventures with superior growth potential. These two strengths create a healthy environment for investing in Maryland. Companies are continuing to emerge from the growing entrepreneurial environment stimulated by the public and private sectors, the Mid-Atlantic venture capital industry and the region's world-class research institutions of federal labs and universities — National Institutes of Health (NIH), National Aeronautics and Space Administration (NASA), the National Institutes of Standards and Technology (NIST), The Johns Hopkins University, the University of Maryland System, among others.

To encourage investments in-state, pension funds in Maryland should establish "best efforts" policies of investing public dollars in Maryland. As demonstrated by the strength and size of the venture capital investments today in Maryland, it is clear that local equity investments have provided opportunities for their investors. In-state investments also positively impact the economy by adding additional revenues, taxes and jobs to the area's economy. A "best efforts" policy would encourage venture capitalists to look within Maryland first for deals with superior returns in an effort to maximize the overall benefits of state investments in venture capital.

The Maryland Venture Capital Trust, which has invested $19.1 million over the last three years in eight venture capital partnerships, has already seen positive results of a "best efforts" policy. Since receipt of funds from the Maryland Venture Capital Trust, these eight partnerships have committed $19.3 million new dollars to Maryland companies (these partnerships had already committed $7.2 million prior to the Maryland Venture Capital Trust investments) and only 36% of their combined asset base of $327 million has been invested to date. If these partnerships continue to invest in Maryland companies at their current rate of 23% of total fund dollars, Maryland companies could receive a total of $75 million in venture capital funding from the Maryland Venture Capital Trust's initial $19.1 million. The total dollars ($26.4 million) committed to 23 Maryland companies has helped the economy by enabling these companies to generate $115 million in revenues and 1,053 jobs within the state.

In addition to a "best efforts" policy, Maryland should explore other successful models for regional investing like the Massachusetts Technology Development Corporation (MTDC), a Massachusetts state sponsored venture capital firm, which has achieved a superior long-term return (17.5% over a 14 year period) from investing in only Massachusetts-based emerging companies (see page 24 & 25). With the right model, venture capital should be able to achieve superior returns and significantly impact the local economy.

Footnotes

[1] *National Venture Capital Association's Fourth Annual Economic Impact of Venture Capital Study*, Coopers & Lybrand and Venture One, (U.S.A., 1994), p.4.

[2] Bigler/Crossroads, p. 5.

[3] Brinson Partners, "Venture Capital Industry Presentation to Orange County Employees Retirement System," (presentation document dated August 23 and 24, 1994), p. 11.

[4] Ibid.

[5] 1993 Venture Capital Resources Near Record High," *Venture Capital Journal*, (May, 1994), p.36.

[6] *1993 Investment Benchmarks Report: Venture Capital*, Venture Economics, (Boston, 1994), p. 205.

[7] Brinson Partners, p. 17.

[8] Barton M. Biggs, "Another Vintage Year," (Morgan Stanley analyst report dated February 2, 1994), p. 5.

[9] Goldman Sachs and Frank Russell Company, "1992 Survey of Alternative Investments By Pension Funds, Endowments and Foundations," (presentation dated October, 1992), Section III, p. 13.

[10] Brinson Partners, "Private Market," Section III, p.17.

[11] Information obtained from a Los Angeles County Employees Retirement System Memorandum on Alternative Asset Investments dated April 8, 1993, p.5.

[12] *National Venture Capital Association's Fourth Annual Venture Capital Survey*, p. 6.

[13] Ibid, p. 8-13.

[14] Ibid, p. 7.

[15] *National Venture Capital Association's Fourth Annual Venture Capital Survey*, p. 5 & 6.

[16] *National Venture Capital Association's Fourth Annual Venture Capital Survey*, p. 15.

[17] Warfield's Business record and the Mid-Atlantic Venture Association, *Venture Capital In the Baltimore-Washington Common Market*, (Baltimore, Maryland, 1993), p. 9.

[18] Information obtained from p. 5 of the $25,000,000 Beneficial Interests in the Maryland Venture Capital Trust offering circular dated December 20, 1990.

[19] Information obtained from telephone discussion with the Administrator of the Trust, Ron Blank, the prior Managing Director of the Trust, John Weiss, and the Maryland Venture Capital Financial Statements as of December 31, 1993 and December 31, 1992 Together with Report of Independent Accountants, Note #1 of Notes to Financial Statements.

[20] Information obtained from a survey in July of 1995 of the eight partnerships invested in by the Maryland Venture Capital Trust conducted by Patrice Cromwell on behalf of the Abell Foundation.

[21] Ibid.

[22] Brinson Partners, p. 8.

[23] Goldman Sachs and Frank Russell Company, Section II, p. 5.

[24] Goldman Sachs and Frank Russell Company, Section I, p.4 and Section IV, p.20.

[25] Antonia Millen, "Past, Present and future," *Accountancy*, Vol. 113, Issue 1210, (June, 1994), p. 37.

[26] James H. Scott, Jr., "Managing Asset Class, " *Financial Analyst Journal*, Vol. 50, Issue 1, (January-February, 1994), p.66

[27] *1993 Investment Benchmarks Report: Venture Capital*, p. 174.

[28] *1993 Investment Benchmarks Report: Venture Capital*, p. 174.

[29] Peggie R. Elgin, "Venture Comeback Attracts Demanding Pension Investors," *Corporate Cashflow*, Vol. 14, Iss. 9, (August, 1993), p. 6-8.

[30] Massachusetts Technology Development Corporation, Annual Report, 1994.

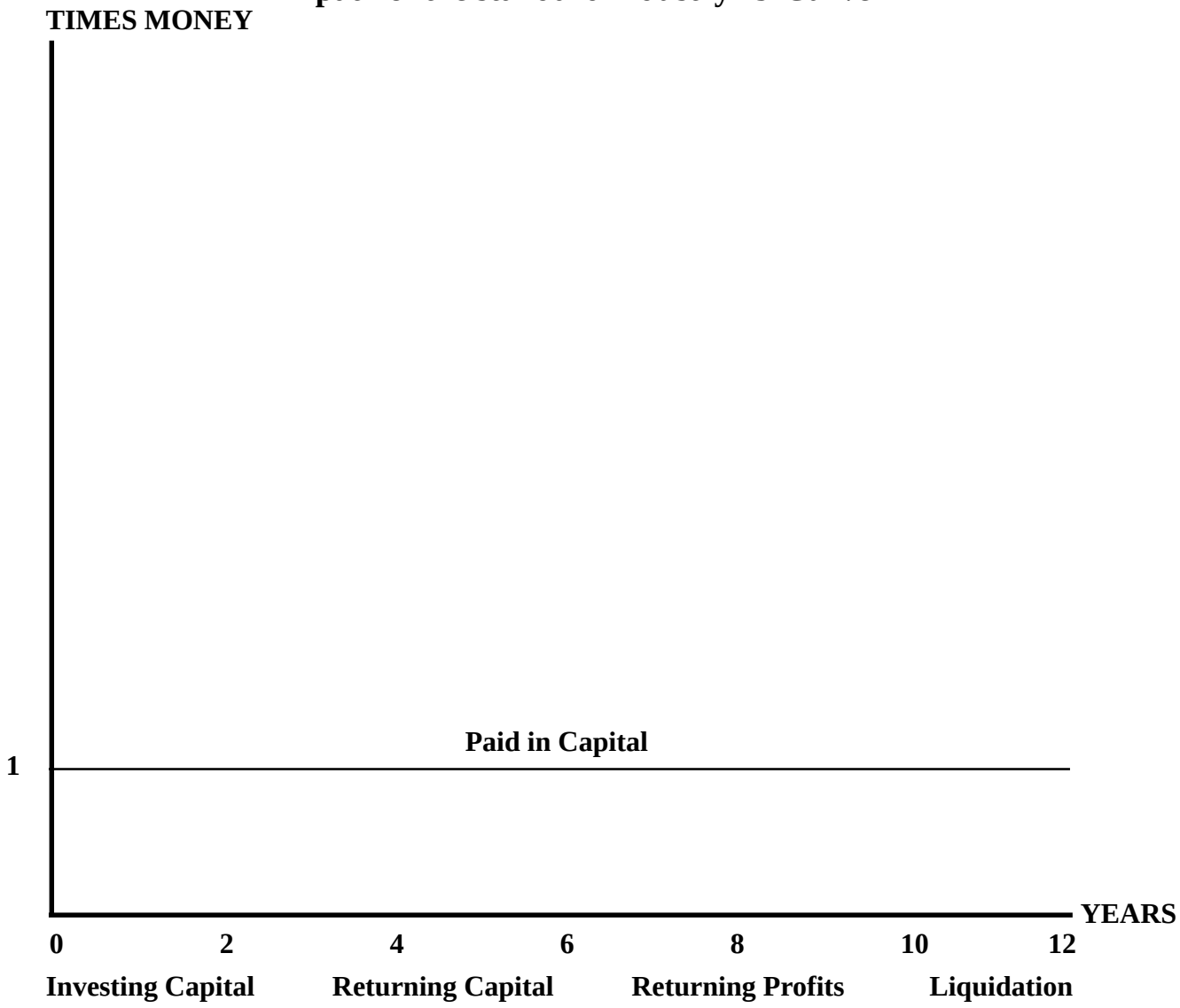
[31] Information obtained from a survey of 26 public pension funds (see exhibit K) conducted by Patrice Cromwell on behalf of The Abell Foundation.

[32] Bigler/Crossroads, "Venture Capital Program," (presentation document dated August 23, 1994), p.10.

EXHIBIT A

Typical Venture Capital Partnership Life Cycle

Partnership returns develop over time along the path of the standard industry "J-Curve"



BIGLER/CROSSROADS

EXHIBIT B

BRINSON PARTNERS, INC.

Types of Venture Capital Financing

- **Seed**
  — No management
  — Dollars to explore business concept

- **Start-Up**
  — Incomplete management
  — Dollars to develop product and initial marketing

- **Early Stage**
  — Management team complete
  — Dollars to initiate full scale manufacturing and sales

- **Expansion**
  — Company unprofitable
  — Working capital for expansion

- **Mezzanine**
  — Company profitable
  — Dollars for major expansion

EXHIBIT C

BRINSON PARTNERS, INC.

DISBURSEMENTS BY INDUSTRY
Percent of Financings

Rank	Industry	1993	1992	1991	1990	1989	1988
1	Software	21%	20%	23%	17%	15%	11%
2	Other	20	9	9	9	11	15
3	Medical/Healthcare	14	18	14	17	15	13
4	Telecom	13	11	12	11	9	10
5	Consumer	10	8	9	10	11	10
6	Biotech	9	9	7	8	7	9
7	Communications	4	3	2	2	3	3
8	Other Electronics	3	8	8	8	9	8
9	Industrial	3	6	5	6	7	5
10	Computer Hardware	3	7	10	10	11	13
11	Ind. Auto & Energy	0	1	1	2	2	3
	Total	100%	100%	100%	100%	100%	100%

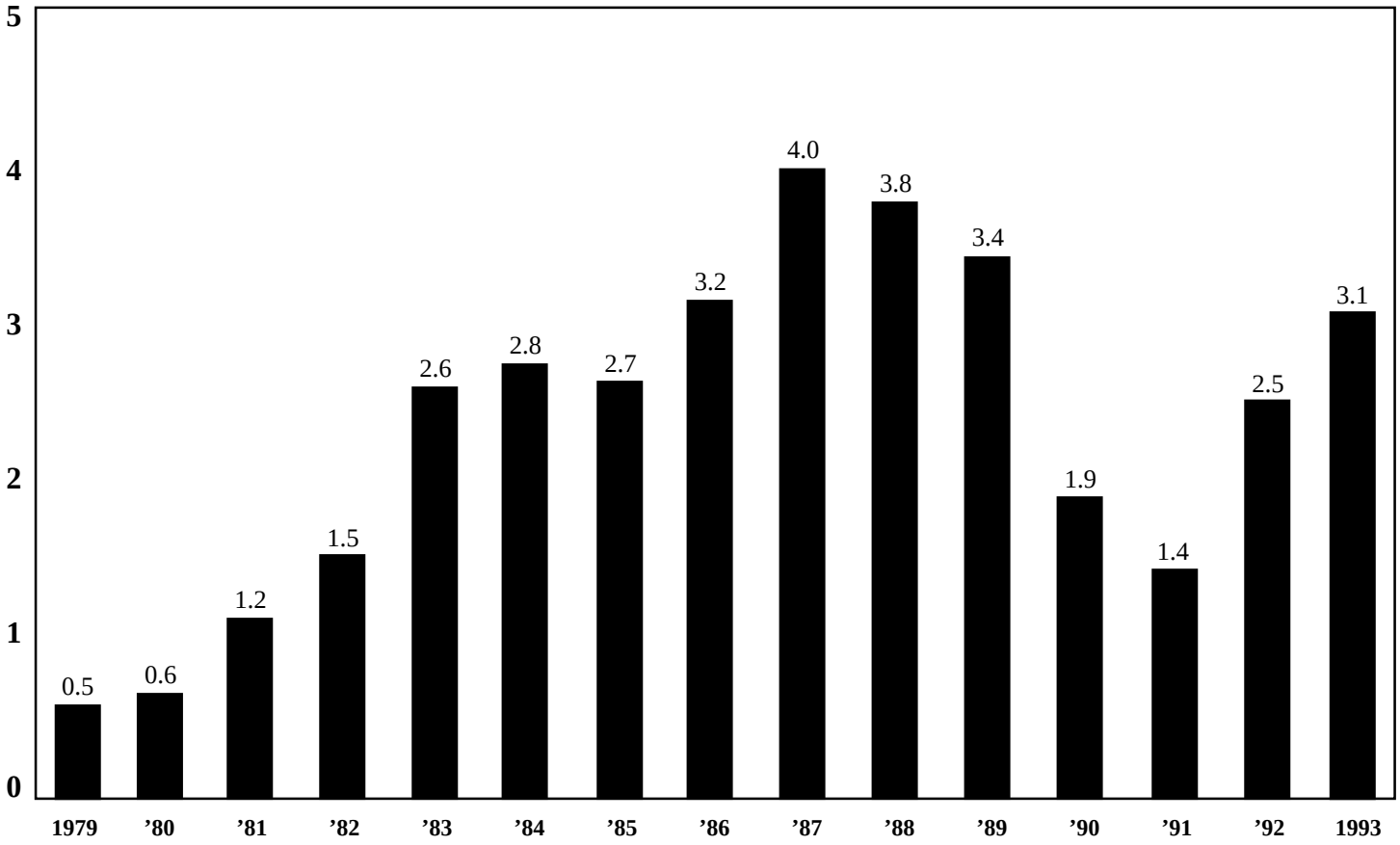
Source: Venture Economics

EXHIBIT D

BRINSON PARTNERS, INC.

VENTURE CAPITAL DISBURSEMENTS
1979-1993

Dollars in Billions



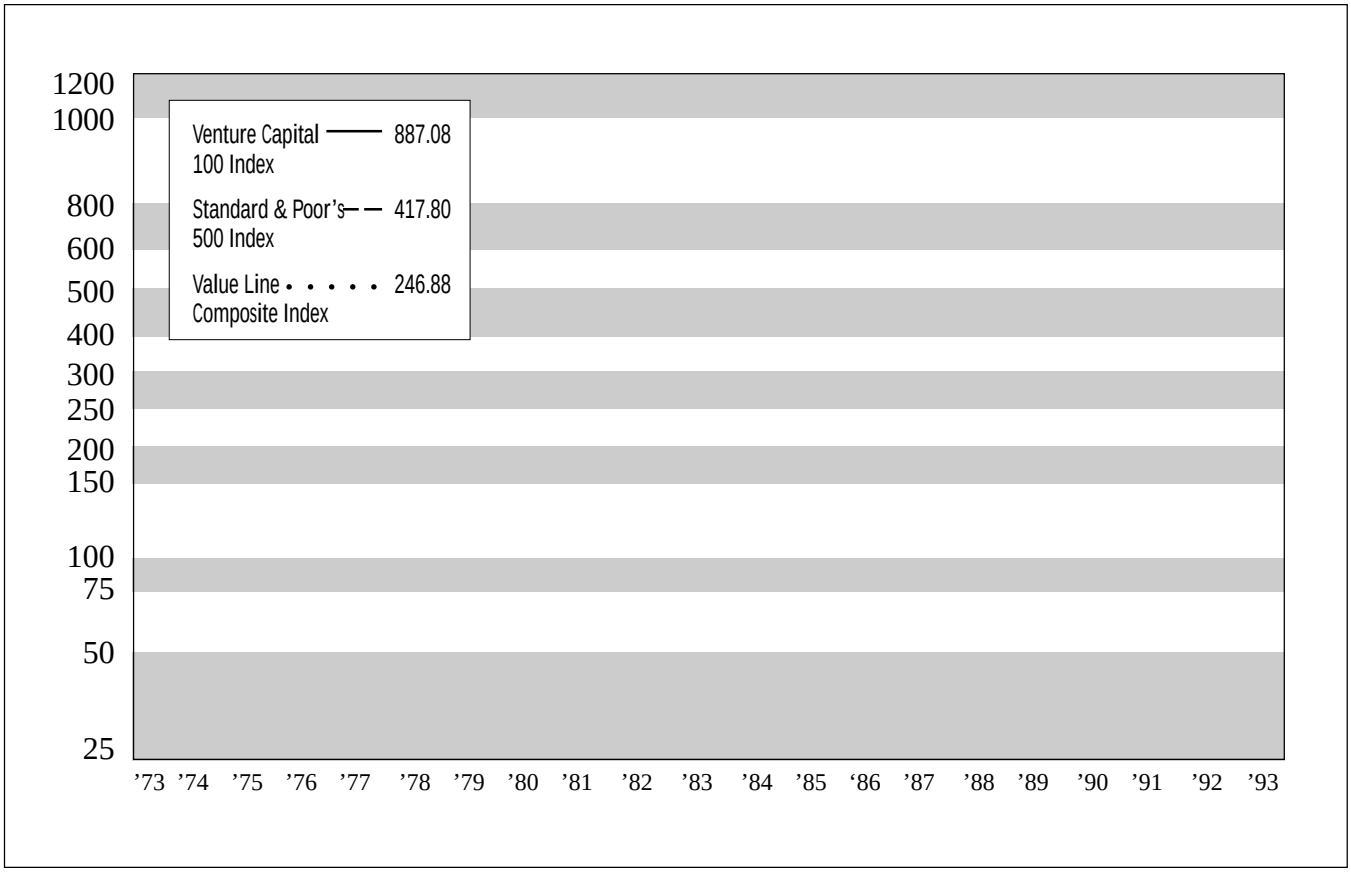
No. of Companies

375	504	797	918	1320	1469	1377	1504	1737	1516	1460	1018	792	1087	1200

Source: Prepared by Brinson Partners, Inc. with data from the Private Equity Analyst & Venture One

EXHIBIT E

Quarterly Index



Venture Economics Investment Benchmarks

EXHIBIT F

Annual Rates of Return Through 1993

	Modern Times (1945-1993)		Last 10 Years		Last 5 Years		
	Annualized Return	Standard Deviation	Annualized Return	Standard Deviation	Annualized Return	Standard Deviation	1993 Return
S&P 500	11.7%	16.3%	15.0%	11.8%	14.5%	13.6%	10.0%
Small Capitalization	13.6%	25.5%	10.0%	18.7%	13.3%	21.6%	21.0%
Emerging Growth Stocks	13.7%	25.8%	11.4%	18.4%	18.4%	20.2%	22.0%
T-Bills	4.8%	3.2%	6.4%	2.0%	5.7%	2.1%	3.1%
Inflation	4.4%	3.8%	3.7%	1.3%	4.0%	1.2%	2.9%
U.S. Long Treasury Bonds	5.1%	9.7%	14.3%	9.2%	13.6%	5.5%	17.2%
Intermediate-Term Govt. Bonds	5.8%	6.2%	11.1%	5.0%	10.7%	3.2%	8.2%
Corporate Bonds	5.6%	9.7%	13.8%	8.1%	12.6%	4.8%	12.2%
Junk Bonds	NA	NA	13.8%	13.1%	13.4%	17.4%	18.9%
Commercial Paper	5.6%	3.6%	7.0%	2.1%	6.1%	2.4%	3.3%
U.S. Farmland	9.8%	7.4%	4.7%	5.5%	7.1%	0.7%	6.0%
Residential Housing	7.2%	4.0%	4.4%	1.3%	3.8%	0.9%	3.0%
Commercial Real Estate	7.2%	5.8%	3.9%	5.7%	-0.4%	4.5%	2.1% est.
Venture Capital	15.9%	25.5%	7.5%	10.7%	12.2%	12.1%	28.5%
Gold	5.1%	25.8%	0.2%	14.3%	-1.0%	9.6%	17.8%
Silver	4.9%	55.8%	-5.5%	19.3%	-3.3%	20.9%	39.1%
Art	8.7%	14.5%	12.2%	16.7%	5.7%	18.3%	9.5%
EAFE	13.2%	26.8%	17.5%	26.9%	2.0%	19.7%	32.6%
Japanese Stocks	15.8%	29.1%	16.2%	25.2%	-7.0%	23.6%	25.5%
Foreign Bonds	NA	NA	14.1%	14.0%	9.3%	7.7%	15.1%
Emerging Market Equities	16.9%	25.8%	21.3%	27.9%	17.0%	35.4%	67.0%

Sources: Morgan Stanley Research, MSCI, Frank Russell Co., Salomon Brothers, Dimensional Fund Advisors, Lehman Brothers, CS First Boston, Natl. Assoc. of Realtors, Art Market Research, T. Rowe Price, Brinson Partners, IFC, Wall Street Journal

---

This memorandum is based on information available to the public. No representation is made that it is accurate or complete. This memorandum is not an offer to buy or sell or a solicitation of an offer to buy or sell the securities mentioned. Morgan Stanley & Co. Inc and others associated with it may have positions in and effect transactions in securities of companies mentioned and may also perform or seek to perform investment banking services for those companies.

EXHIBIT G

BRINSON PARTNERS, INC.

INVESTABLE CAPITAL MARKET
Performance Characteristics Correlation Matrix
December 31, 1969 - June 30, 1994

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. U.S. Equity	1.00													
2. Non-U.S. Equities	.67	1.00												
3. Venture Capital	.64	.45	1.00											
4. High Yield Bonds	.61	.45	.38	1.00										
5. U.S. Bonds	.42	.35	.11	.74	1.00									
6. International $ Bonds	.46	.41	.21	.74	.96	1.00								
7. Non-U.S. Bonds	.18	.59	.20	.34	.49	.53	1.00							
8. U.S. Real Estate	-.04	.02	.07	-.19	-.15	-.14	-.12	1.00						
9. Cash Equivalents	-.08	-.20	-.08	-.13	.01	-.01	-.24	.59	1.00					
10. Investable Capital Market Portfolio	.78	.89	.52	.65	.64	.67	.70	-.03	-.15	1.00				
11. Multiple Markets Index	.96	.79	.70	.67	.52	.57	.39	.00	-.10	.90	1.00			
12. Global Securities Markets Index	.96	.83	.61	.67	.55	.59	.42	-.05	-.12	.92	.99	1.00		
13. 60% Stock/40% Bond U.S. Index	.97	.67	.59	.71	.61	.64	.28	-.07	-.07	.84	.97	.97	1.00	
14. Inflation (CPIU)	-.23	-.31	-.07	-.37	-.32	-.33	-.27	.44	.53	-.35	-.26	-.30	-.28	1.00

*Based on quarterly logarithmic returns

REGIONAL COMPARISON

$ RAISED FROM IPOS

	CA	MA	MID ATL	MD
1988	$201.1	$68.7	$40.5	$24.2
1989	$231.1	$171.6	$66.7	$0.0
1990	$244.2	$86.7	$106.3	$24.7
1991	$1,234.3	$523.2	$630.8	$107.6
1992	$1,303.2	$400.0	$540.3	$48.0
1993	$1,629.2	$443.6	$666.9	$96.2
1994	$749.8	$237.8	$393.8	$124.7

$ VENTURE BACKED IPOS

	CA	MA	MID ATL	MD
1989	10	7	2	0
1990	9	5	3	1
1991	37	17	21	4
1992	44	19	13	1
1993	60	15	19	4
1994	30	11	10	4

$ VENTURE BACKED COMPANIES

	CA	MA	MID ATL
1985	447	181	60
1986	423	192	90
1987	556	207	127
1988	455	174	107
1989	486	154	97
1990	399	120	97
1991	417	98	61
1992	469	99	42
1993	361	117	52

MAVA BACKED MARYLAND COMPANIES
FISCAL BENEFITS

	1991A	1992A	1993A	1994A
Revenue (Bils.)	$1.5	$1.4	$1.2	$2.0
# Employees	12,000	13,000	16,000	43,000

REGIONAL COMPARISON

MID ATLANTIC
INDUSTRY BREAKDOWN OF IPOS

Biotech	14	Computer Hardware	9
Healthcare	35	Business Svcs	4
Communications	13	Environmental	5
Spec. Materials	6	Electronics	7
Other	5		
Retail	10		
Software	7		

MARYLAND
INDUSTRY BREAKDOWN OF IPOS

Biotech	7	Computer Hardware	3
Healthcare	6	Business Svcs	2
Communications	1	Environmental	1
Other	1	Software	4
Retail	2		

VENTURE POOL - $ MANAGED BY REGION
(1993 TOTAL UNDER MGT = $34.76B)

CA	$8.310 B
MA	$4.783 B
NY	$7.649 B
IL	$3.037 B
MID ATL	$4.295 B
MD	$0.862 B

$ INVESTED IN VENTURE FIRMS
($ Billions)

	CA	MA	MID ATL	MD
1985	$735	$430	$245	$0
1986	$585	$720	$270	$157
1987	$1,155	$720	$250	$108
1988	$915	$840	$75	$13
1989	$916	$388	$280	$88
1990	$461	$335	$335	$125
1991	$561	$286	$62	$0
1992	$928	$610	$295	$0
1993	$978	$196	$480	$260

EXHIBIT I

BRINSON PARTNERS, INC.

SOURCES OF CAPITAL COMMITMENTS
Percent of Total Funding

Sources of Funds	1993	1992	1991	1990	1989
Pension Funds	59%	42%	42%	53%	36%
Endowment & Foundations	11	19	24	13	12
Foreign Investors	4	11	12	7	13
Insurance Companies	11	14	5	9	13
Corporations	8	3	5	7	20
Individuals & Families	7	11	12	11	6
Total	100%	100%	100%	100%	100%

EXHIBIT J

Public Investments In Venture Capital Survey

Prepared by Patrice Cromwell for
The Abell Foundation and MAVA
(410) 821-8114 - Phone/fax

Date: _____

Name of Pension Fund: _____

Contact: _____ Title: _____

Phone: _____ Fax: _____

Address: _____

Total size of pension fund($): _____

Assets allocation targets for venture capital (%): _____

Is venture capital within a broader investment category? _____ (y/n)
(e.g. alternative investments, private equity, etc.)

If yes, which category? _____

What is the target % for this broader category? _____

What other type of investments are in this same category and what are their respective target percentages? (e.g. buyouts, etc.)

_____

Of the funds targeted for venture capital, what has been committed and invested?

Committed ($): _____ Invested ($): _____

Do you expect that the venture capital target will increase, decrease or remain the same over the next five years?

_____

What is the dollar range of venture capital investments? _____

What is the target return for venture capital? _____

What has been the performance of the venture capital portion of the fund?

Time Period: _____ Return and basis of Return: _____

Are there investment focus targets or mandates (regional, industry, stage)?

_____

_____

Do you have nay evidence of economic impact? _____

How is the venture capital portion of the fund managed (Professionally, in-house)?

How: _____ If professionally, who? _____

Comments?: _____

Public Pension Fund Survey of Venture Capital Investment Programs

Pension System	Fund Size $B	Venture % of Fund	Broad Asset Catgry	Broad Assets % of Fund	VC $M Commit.	VC $M Commit % of Fund	VC $M Invest.	VC Target To Change?	Size of VC Deals ($M)
California Public Employees*	74.0	NA	Alt Inv	2%	NA	NA	NA	NA	NA
NYS & Local Retirement	60.0	NA	Alt Inv	5%	$220	0.4%	$145	Maybe Dr.	$3-40
California State Teachers	48.0	NA	Alt Inv	5-7%	$1,500	3.1%	$600	No	NA
Ohio Public Employees	30.0	None	NA	NA	$53	0.2%	$30	No	$3-15
Wisconsin State Investment	27.0	2%	Pri Pl	NA	$145	0.5%	$85	No	$5-10
Michigan Department of Treas.	24.3	1-2%	NA	NA	NA	NA	NA	No	NA
Minnesota State Board	23.0	7.50%	Alt Inv	15%	$725	3.2%	$443	No	>$10
Pennsylvania Public School*	22.0	1-2%	NA	NA	$233	1.1%	$103	NA	NA
Washington State Investment	20.0	NA	Alt Inv	10%	Al $2.5B	NA	Al $2B	Incr.	$20
Oregon Public Employees	18.0	NA	Alt Inv	5-15%	NA	NA	$75	No	Appx $25
Virginia Supplemental	16.5	1.50%	Pri Eq	6%	$283	1.7%	$190	Incr @2%	$0-5
Maryland State Retirement	16.0	0.10%	NA	NA	$15	0.1%	NA	NA	$.5-10
Los Angeles Co Employees	15.0	NA	Alt Inv	5%	$150	NA	NA	No	NA
Colorado Public Employees	14.3	2-3%	Alt Inv	5%	$220	1.5%	$154	No	$1-4/50
Pennsylvania State (SERS)	14.0	2%	Pri Eq	5%	$290	2.1%	$130	No	$15-25
Iowa Public Employees	7.3	2%	NA	NA	$166	2.3%	$109	Incr	$1.5-20
Massachusetts MASTERS*	7.3	2%	NA	NA	NA	NA	NA	NA	NA
Utah State Retirement	6.5	NA	Alt Inv	5%	NA	NA	$200	No	Range
Nevada Public Employees	5.8	1.60%	Equity	40%	$77	1.3%	$45	No	$5-10
Massachusetts PRIM	5.0	3%	Alt Inv	12%	$210	4.2%	$165	Incr	$2-15
Rhode Island Employees	3.5	5%	NA	NA	$168	4.8%	$72	No	$3-42
D.C. Retirement Board	2.7	NA	Alt Inv	3%	Al $73	NA	Al $48	No	$.5-25
Montana PERS &TRS	2.7	1.00%	Alt Inv	0-5%	$28	1.0%	$20	No	$.5-1
Delaware State Employees	2.3	NA	Priv/Ill	10%	Pr $251	NA	Pr $218	No	NA
New Hampshire Retirement	2.1	NA	Alt Inv	5%	Al $125	NA	Al $33	No	$2-20
New Mexico Severance Tax	2.0	2%	NA	NA	$27	1.4%	$20	No	$1-2

*Survey not yet returned or completed by interview. Information obtained from VCJ or other journals.

Public Pension Fund Survey of Venture Capital Investment Programs

Pension System	VC Target Return	VC Return To Date Yrs	VC Return To Date %	Regional Invest. Goals	Econ. Impact Study	VC Portfolio Management
California Public Employees*	NA	NA	NA	NA	NA	NA
NYS & Local Retirement	New Horizon+6%	10	6.10%	No	NA	Internal
California State Teachers	15-20%	NA	NA	Efforts	NA	Internal & External
Ohio Public Employees	15%+	10	0-10%	Mandates	Yes	LP funds
Wisconsin State Investment	15-18%	8	<5%	No	NA	Internal & External
Michigan Department of Treas.	NA	NA	NA	NA	NA	NA
Minnesota State Board	LT Eq. +3%	10	16.70%	No	NA	Fund GPs
Pennsylvania Public School*	CPI+15%/S&P+6%	NA	NA	NA	NA	NA
Washington State Investment	20%+	13	<10%	No	NA	Brinson
Oregon Public Employees	Public mkt+5%	7	7-8%	No	Est.	Internal & External
Virginia Supplemental	S&P+6%	4.5	12%	No	NA	Brinson
Maryland State Retirement	Superior return	<2	Cash Disb.	Best Efforts	Yes	MD Venture Capital Trust
Los Angeles Co Employees	NASDAQ+5%	3 & 1	20% & 36%	No	NA	Chancellor
Colorado Public Employees	S&P+5%	5	9.44	No	Yes	Internal & External
Pennsylvania State (SERS)	S&P+5%	9	6%	Goals	Yes	Internal & Cambridge
Iowa Public Employees	CPI+10%/18%	3	13%	Previously	NA	Pathway
Massachusetts MASTERS*	NA	NA	NA	NA	NA	NA
Utah State Retirement	20%	9	9.00%	No	NA	Abbott hired recently
Nevada Public Employees	17%	10 & 1	(1%) & 14%	NA	NA	Pathway
Massachusetts PRIM	13%	4	10%+	No	NA	Outside Prof. & Fund GPs
Rhode Island Employees	8%	5	4.50%	No	NA	Bigler/Crossroads
D.C. Retirement Board	13% IRR	5	Al 11.2%	No	NA	Internal & Fund GPs
Montana PERS &TRS	S&P+1.5%	5	13%	No	NA	Brinson
Delaware State Employees	20% IRR	3	18%	NA	NA	Ashford Capital
New Hampshire Retirement	15%	NA	NA	No	NA	22 different funds
New Mexico Severance Tax	S&P+6%	5	12.12%+	No	NA	Internal & Brinson

*Survey not yet returned or completed by interview. Information obtained from VCJ or other journals.