MINNESOTA STATE BOARD OF INVESTMENT MEETING
NOVEMBER 25, 1987

&

INVESTMENT ADVISORY COUNCIL MEETING
NOVEMBER 24, 1987

AGENDA

STATE BOARD OF INVESTMENT MEETING

Wednesday, November 25, 1987
8:00 A.M.
Room 118 - State Capitol
Saint Paul

TAB

1. Approval of Minutes of October 1, 1987

2. Report on Escheated Property (M. McGrath)

3. Executive Director's Report (H. Bicker)
   - A. Quarterly Investment Review (July 1-Sept. 30, 1987) — A
     1. Basic Retirement Funds
     2. Post Retirement Fund and Other Investment Funds
   - B. Portfolio Statistics (September 30, 1987) — B

4. Reports from Investment Advisory Council Committees (J. Yeomans)
   - A. Administrative and Asset Allocation Committees — C
     1. Quarterly Meeting Schedule for 1988
     2. Fiscal Year 1987 Retirement Benefit Increase
     3. Update on Fiscal Year 1987 Annual Report
     4. Update on Local Plan Consolidation with PERA
     5. Legislative Proposals for 1988
     6. Basic Retirement Funds Investment Policy Paper Part IV - Performance Evaluation
   - B. Equity Manager Committee — D
     1. Review of Managers
   - C. Fixed Income Manager Committee — E
     1. Review of Manager Performance
     2. GIC Bidding Results
     3. Rebalancing of Dedicated Bond Portfolio
     4. Bond Index Fund Policy Paper
     5. State Mutual Fund Surplus Notes
   - D. Alternative Investment Committee — F
     1. Strategy Review
     2. Manager Review Meetings

AGENDA

INVESTMENT ADVISORY COUNCIL MEETING

Tuesday, November 24, 1987
2:00 P.M.
MEA Building - Conference Room "A"
41 Sherburne Avenue
Saint Paul

TAB

1. Approval of Minutes of June 2, 1987 and October 1, 1987 Meetings

2. State Auditor Arne H. Carlson

3. Executive Director's Report (H. Bicker)
   - A. Quarterly Investment Review (July 1-Sept. 30, 1987) — A
     1. Basic Retirement Funds
     2. Post Retirement Fund and Other Investment Funds
   - B. Portfolio Statistics (September 30, 1987) — B

4. Reports from Investment Advisory Council Committees (J. Yeomans)
   - A. Administrative and Asset Allocation Committees — C
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     3. Update on Fiscal Year 1987 Annual Report
     4. Update on Local Plan Consolidation with PERA
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   - D. Alternative Investment Committee — F
     1. Strategy Review
     2. Manager Review Meetings

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

MINUTES
INVESTMENT ADVISORY COUNCIL
June 2, 1987

The Investment Advisory Council met on Tuesday, June 2, 1987 at 2:00 P.M. in the MEA Building, St. Paul.

MEMBERS PRESENT: Harry Adams, James Eckmann, Elton Erdahl, Arvin Herman (for Paul Groschen), Ken Gudorf, James Hacking, Vern Jackels, Jay Kiedrowski, Malcolm McDonald, Mike Rosen, Joe Rukavina, Ray Vecellio, Debbie Veverka, and Jan Yeomans.

MEMBERS ABSENT: Paul Groschen, Ken Gudorf, Judy Mares, and Gary Norstrem.

SBI STAFF: Howard Bicker, Jeff Bailey, Beth Lehman, John Griebenow, Harriet Balian, Charlene Olson.

OTHER ATTENDING: Tom Richards, Richards & Tierney; James Heidelberg; Mike Ousdigian; Peter Sausen; Bob Whitaker; Craig Rushmeyer, New Era Financial Group, Wayzata; and Gary Austin, TRA.

The minutes of the March 3, 1987 meeting were approved.

EXECUTIVE DIRECTOR'S REPORT

Howard Bicker first reviewed the asset allocation and investment performance of the Basic Retirement Funds. He stated the assets of the Basic Retirement Funds increased in value by 13.4% during the first quarter, due to a very strong common stock market. Mr. Bicker stated that although the Basic Retirement Funds had a cash flow of $3.6 million during the first quarter of the year, the Funds experienced a negative cash flow of $115 million for the last year due to the Rule of 85. Mr. Bicker reported that the total rate of return for the Basic Retirement Funds was 13.3% for the quarter and 16.6% for the year including alternative investments. Excluding alternative investments the Basic Funds were up 14.9% for the quarter and 18.3% for the year. These returns placed the Basic Funds in the top quartile of all public and private pension funds over that period. Mr. Bicker stated that the Basic Funds' active equity managers matched the

performance of the common stock market during the first quarter, but they underperformed the market for the year. Mr. Bicker reported that the Basic Funds' bond managers showed a return of 2.3% for the quarter and 10.9% for the year outperforming the market during both time periods.

Mr. Bicker then summarized the performance of the Post Retirement Fund. He stated the Fund grew at a rate of 4.5% for the quarter and 14.5% for the most recent year. Much of this growth was due to a very sizable positive cash flow from early retirements under the Rule of 85. Mr. Bicker reported that the Post Retirement Fund's equity portfolio produced a 20% total rate of return for the first quarter while the market was up 21.2%.

In closing, Mr. Bicker stated that as of March 31, 1987, all assets under management at the State Board of Investment were $11.7 billion.

INVESTMENT ADVISORY COUNCIL REPORT

ADMINISTRATIVE AND ASSET ALLOCATION COMMITTEES

Jan Yeomans stated that the Committees considered five issues. The first issue was the travel policy for Board members. The Committee recommended a continuation of the current policy which allocates $2000 annually for each Board member and/or their staff for SBI related travel. The second issue was renewal of the contract with Richards & Tierney, the Board's consultant, at $120,000 for one year. The third issue was consideration of Part III of the staff Investment Policy Paper which recommended changes in the structure of both the equity and fixed income segments of the Basic Retirement Funds. The fourth issue discussed was a staff proposal relating to periodic rebalancings of the Basic Retirement Funds. The staff recommended that a rebalancing be required if an asset class deviates by more than 10% from its policy allocation. The Committees accepted this recommendation and further recommended that staff have the discretion to rebalance if there is a deviation in the range of 5-10%. The fifth issue concerned a proposal to construct commingled short-term investment pools working in conjunction with the Department of Finance. Mr. Rukavina moved the Council accept the Committee report. The motion passed unanimously.

EQUITY MANAGER COMMITTEE

Ms. Veverka stated the Equity Manager Committee considered three issues. First, the Committee recommended several changes contained in the staff paper on the investment management structure of the equity segment of the Basic Retirement Funds. The Committee accepted the proposal to introduce flexible, rather than fixed, allocations to the active and passive portions of the stock segment. Further, the Committee accepted the proposal to select active managers solely on the basis of their potential to produce superior returns. Finally, they accepted a proposal to create a passively managed completeness fund to offset any style

biases that may occur in the active manager group. The second issue discussed was a staff proposal to modify the external manager performance fee formula. The Committee accepted a staff recommendation to institute a sliding scale base fee. This change will effectively lower the fees paid at any given level of performance. The final issue concerned renewal of the external stock manager contracts. The Committee recommended all contracts be renewed for the next fiscal year and felt the 30-day cancellation clause provides sufficient flexibility to make any changes that may be necessary in the near future. Mike Rosen moved approval to accept the Committee report. The motion was unanimously approved.

FIXED INCOME MANAGER COMMITTEE

Jim Hacking stated the Fixed Income Manager Committee recommended adoption of the proposals contained in Part III of the staff investment policy paper pertaining to the fixed income portion of the Basic Funds. This will include the introduction of a passively managed bond index fund in lieu of a total allocation to active management. It also includes a flexible allocation to the passive and active segments and a corresponding completeness fund. Mr. Hacking stated the Committee recommended that all the fixed income manager contracts be renewed for the next fiscal year. The 30-day cancellation clause in all the contracts gives the Board the authority to terminate a contract at any time should that be deemed necessary. Malcolm McDonald moved approval of the Committee report. The motion passed unanimously.

ALTERNATIVE INVESTMENT COMMITTEE

Mr. McDonald stated that the Alternative Investment Committee reviewed the current commitments to all alternative investment managers. He stated the Committee is also reviewing consultants to assist in monitoring alternative asset managers and to help the Committee refine investment objectives for the entire alternative investment segment of the Basic Funds.

LEGISLATIVE UPDATE

Mr. Bicker reviewed the results of the Board's proposal to the 1987 Legislature. Three of the four requests were granted: to increase the authorized equity limit from 75% to 85% of a fund; to increase the authorized limit on alternative investments from 20% to 35% of a fund; and to add non-rated and high yield fixed income securities as authorized investments for the Board. The request to invest in international securities was not granted. He stated that there were a number of other proposals of interest to the SBI, including a new defined contribution plan within PERA for volunteer ambulance drivers and new authority to invest in debt issues of domestic mutual insurance corporations.

SOUTH AFRICA TASK FORCE

Jay Kiedrowski, Chair of the South Africa Task Force, stated that the Task Force met to review the implementation of Phase III of the SBI's resolution. He stated that based on the financial analysis and legal advice received concerning the impact of the Phase III requirement, the Task Force recommends that the Board continue to implement its divestment program through attrition and limit application of the resolution to the actively managed stock portfolios. The Board's active managers will be directed to discontinue purchases of the stock of any company that does not meet the Phase III requirement unless the manager determines the failure to buy a particular stock would be a violation of its fiduciary responsibility. He also stated that the Task Force plans to reconvene prior to the Board's next quarterly meeting to review progress on implementation of the Phase III recommendation.

The meeting adjourned at 3:00 P.M.

Respectfully submitted,

Howard J. Bicker
Executive Director

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

MINUTES

STATE BOARD OF INVESTMENT
INVESTMENT ADVISORY COUNCIL
Spring Hill Conference Center

October 1, 1987

The State Board of Investment and the Investment Advisory Council met jointly at Spring Hill Conference Center, Wayzata, Minnesota, on Thursday, October 1, 1987. Governor Rudy Perpich, Secretary of State Joan Anderson Growe, State Treasurer Michael A. McGrath, and State Auditor Arne H. Carlson, were present. Attorney General Hubert H. Humphrey III was not present. The following members of the Investment Advisory Council attended: Harry Adams, Jim Eckmann, Elton Erdahl, Ken Gudorf, Jim Hacking, Vern Jackels, Nellie Johnson, Malcolm McDonald, Judy Mares, Mike Rosen, Joe Rukavina, Ray Vecellio, Deborah Veverka, Jan Yeomans. Members of the Investment Advisory Council absent were Paul Groschen and Gary Norstrem. Others attending were: Bill Giese, Claudia Gudvangen, Dan Haggerty, Al Hans, Jim Heidelberg, Richard Helgeson, Larry Hill, Ed Hunter, Jack Koltes, Mitzi Malevich, Jake Manahan, Larry Martin, Bob Mersky, Mike Miles, Mike Ousdigian, Noel Rahn, Tom Richards, Peter Sausen, Dave Tierney, Elaine Voss, Arvin Herman, Gary Hovland, Gary Austin, and John Hustad. SBI staff in attendance were Howard Bicker, Jeff Bailey, Harriet Balian, Doug Gorence, John Griebenow, Roger Henry, Beth Lehman, Linda Nadeau, and Daralyn Peifer.

Governor Perpich called the meeting to order at 8:45 A.M.

Howard Bicker, Executive Director, made introductory comments and reviewed structural changes the Board has experienced since the early 1980's.

Beth Lehman, Assistant to the Executive Director, reviewed the Board's current structure, including the scope and impact of Board activities, oversight responsibilities of the Board, and its decision-making structure.

Jeff Bailey, Assistant Executive Director, discussed the investment objectives, asset allocation and management structure of the Basic Retirement Funds. Tom Richards, Richards & Tierney, Inc., then reviewed the performance of the Basic Funds, including a comparison of the Basic Funds with other public and private pension funds.

Jeff Bailey and Howard Bicker then discussed the Post Retirement Fund, including a review of the Post Retirement benefit increase mechanism and the benefit increases it generates.

Howard Bicker reviewed several programs operated by the Board which provide the Board a competitive return and also offer economic benefits to the State of Minnesota. These include: the Minnesota Certificate of Deposit program; a negotiated purchase of a Minnesota Housing Finance Agency bond issue; purchase of a Minnesota Small Business Finance Agency bond issue; and Superior Ventures, a Minnesota-based venture capital limited partnership.

Representatives of the Board's primary clientele reviewed their relationship with the SBI. Jan Yeomans, Chair, Investment Advisory Council (IAC), reviewed the IAC's involvement in the Board's investment management program. Jim Hacking, Executive Director, PERA, and Elton Erdahl, Executive Director of TRA, discussed the retirement systems' relationship with the SBI. Mike Ousdigian, Minnesota Association of Retired Public Employees, spoke on behalf of the retiree groups.

The meeting temporarily adjourned for lunch at noon, and reconvened at 1:00 P.M. The afternoon portion of the agenda served as the regular quarterly meeting of the State Board of Investment. The minutes of the June 3, 1987 meeting of the Board were unanimously approved.

Howard Bicker reviewed staff goals for fiscal year 1988. He stated staff will continue to refine the investment process for funds managed by the State Board of Investment through the use of flexible allocation between active and passive management, a continued search for new managers, and the use of derivative instruments.

Each of the committees of the Investment Advisory Council reported on major developments during the last five years that have had a major impact on their respective areas of responsibility. Jan Yeomans reported on the Administrative and Asset Allocation Committees, Deborah Veverka presented a report

on the Equity Manager Committee, Jim Hacking presented a report from the Fixed Income Manager Committee, and Ken Gudorf reported on the activities of the Alternative Investment Committee. Mr. Gudorf also presented recommendations for three new commitments: a $115 million commitment to Kohlberg, Kravis & Roberts (KKR) venture capital fund; a $20 million commitment to AEW-State Street Real Estate Fund V; and a $20 million commitment to Golder, Thoma and Cressey (GTC) Fund III, a venture capital fund. State Auditor Arne Carlson moved approval of these three additional investments. Secretary of State Joan Anderson Growe seconded the motion. The motion was unanimously approved.

The meeting was adjourned at 1:45 P.M.

Respectfully submitted,

Howard Bicker

Howard J. Bicker
Executive Director

Tab A

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MINNESOTA STATE BOARD OF INVESTMENT

BASIC RETIREMENT FUNDS

QUARTERLY INVESTMENT REVIEW

SEPTEMBER 30, 1987

MINNESOTA STATE BOARD OF INVESTMENT

BASIC RETIREMENT FUNDS

THIRD QUARTER 1987

Summary

ASSETS

The market value of the Basic Retirement Funds' assets increased 2.5% during third quarter 1987. The quarterly asset growth was attributable solely to investment performance, as withdrawals from the funds exceeded contributions by $66 million. A strong performance by the common stock market enabled the Basic Funds' assets to grow by 21% for the year ending September 30th, 1987, despite net withdrawals from the Funds of over $120 million. Over the last several years, the Basic Funds experienced substantial net withdrawals due to the "Rule of 85." The heavy withdrawals continued into August of this year. In September, however, the Basic Funds' received their first significant positive contributions ($50 million) in over two years. The positive cashflow is expected to continue in the coming quarters.

Asset growth of the Basic Retirement funds for the last five years and three quarters is presented below.

Calendar Year	Market Value (millions)	Percent Change from Previous Period
1982	$ 2,806	+ 30.6
1983	3,129	+ 11.5
1984	3,265	+ 4.4
1985	4,030	+ 23.4
1986	4,474	+ 11.0
1987 1Q	5,075	+ 13.4
2Q	5,137	+ 1.2
3Q	5,264	+ 2.5

ASSET MIX

The asset mix of the Basic Funds remained essentially unchanged during the third quarter of the year. Minor shifts in the weightings of the common stock and bond segments reflected the relative performances of the capital markets. In addition, the third quarter weighting of the cash equivalents segment of the portfolio was slightly above its normal level. The overweighting was due to the receipt of a large contribution at the quarter's end.

Asset class weightings for the most recent two quarters and year are presented below.

	ASSET MIX		
	9/30/86	6/30/87	9/30/87
Common Stocks	59.1%	59.8%	61.7%
Bonds	24.3	19.8	17.6
Cash Equivalents*	6.2	9.8	10.0
Alternative Equity Assets	10.4	10.6	10.7
	100.0%	100.0%	100.0%

*Includes cash uncommitted to long-term assets plus cash held by all external managers.

INVESTMENT RETURNS

The Basic Funds' total portfolio outperformed its assigned performance benchmarks, the TUCS median balanced portfolio and the capital markets composite, for the most recent quarter and year. For the third quarter, the total portfolio produced a 3.7% rate of return. Excluding the Funds' alternative equity assets, the total portfolio performance for the period was 3.9%. The TUCS median balanced tax-exempt fund produced a 2.7% quarterly return, while the capital markets composite returned 3.3%.

Aided by the explosive performance of the common stock market in the first quarter of 1987 and continued strong stock performance throughout the remainder of the year, the Basic Funds' generated a 24.0% performance for the year with alternative assets and a 26.5% return without. The TUCS balanced portfolio and the capital markets composite produced returns for the year of 20.0% and 24.4%, respectively.

The Basic Funds benefited from their sizable common stock exposure during the latest year. The positive performance of the Funds versus the median tax-exempt balanced portfolio during recent periods is due primarily to the Funds' long-term policy asset mix favoring common stocks. As was reviewed at the October Board seminar, the policy asset mix is based on the superior performance of common stocks over the history of the capital markets. The asset mix is designed to add value to the Basic Funds' over their long-term investment time horizon relative to more conservative policies. However, given the year-to-year variability of common stocks, in the short-run the Basic Funds can be expected to outperform the median balanced portfolio during periods of positive relative stock performance and underperform during periods of negative stock performance.

Total portfolio and asset segment performance is displayed below.

	Total Rate of Return	
	Third Quarter 1987	Year Ending 9/30/87
Common Stocks	6.3%	37.6%
Bonds	-2.2	2.8
Cash	1.7	6.5
Alternative Equity Assets	2.1	6.1
Total Fund (including alt. assets)	3.7	24.0

EQUITY PERFORMANCE

As a group, the Basic Funds' common stock managers matched the performance of the stock market in the third quarter and slightly underperformed the market in the latest year. The Basic Funds' common stock segment produced a 6.3% return for the quarter and a 37.6% return for the year. The performance of the Wilshire 5000 was 6.2% for third quarter and 38.2% for the most recent year.

The performance of the individual stock managers is discussed in greater detail in this quarter's IAC Equity Committee report. In general, third quarter 1987 witnessed the continuation of the pattern seen over the last several years. Several of the managers significantly outperformed the stock market, while others lagged the market by wide margins. The aggregate manager performance reflected the third quarter behavior of the stock market. Large capitalization stocks exceeded the performance of small cap ones. Returns generated by the individual market sectors continued to vary widely. Although all of the sectors produced positive returns for the third quarter, the Capital Goods and Materials and Services sectors outperformed the remaining sectors by overwhelming margins. As a group, the managers benefited from their market weighting of these two sectors and their substantial underweighting of the Energy sector, the poorest performing market sector during the quarter.

The risk composition of the aggregate stock manager portfolio changed very little during the quarter. The managers are currently overweighted in the Capital Goods and Technology sectors and underweighted in the Energy and Utility sectors.

The common stock manager performance for the most recent quarter and year is detailed below.

Total Portfolio Returns

	Third Quarter 1987	Year Ending 9/30/87
Fred Alger	8.3%	35.1%
Alliance Capital	10.8	55.2
Beutel Goodman	8.6	32.8
BMI Capital	4.1	38.6
Forstmann Leff	8.4	36.4
Hellman Jordan	4.8	43.9
IDS	5.9	40.5
Investment Advisers	8.8	40.9
Lieber & Company	2.7	21.8
Peregrine Capital	3.9	29.1
Waddell and Reed	9.8	40.0
Internal Manager	3.5	32.6
Wilshire Associates (Index Fund)	6.0	37.6
Total Basic Retirement Funds' Common Stock Segment	6.3	37.6
Wilshire 5000	6.2	38.2

BOND PERFORMANCE

The Basic Retirement Funds' active bond manager group exceeded the performance of the bond market during the most recent quarter and the latest year. As a group, the bond managers produced a -2.2% rate of return for the quarter and a 2.8% return for the year. The bond market, in contrast, generated performance of -2.8% for the quarter and 0.2% for the year ending September 30, 1987.

Recent months have been very difficult ones for active bond managers in general. After a long period of positive returns, the bond market produced negative performances in five of the last six months, with a particularly sharp drop in bond prices in the month of September. The performances of the individual Basic Funds' bond managers were consistent with the interest rate sensitivity (duration) of their portfolios. As would be expected, the bond managers with shorter duration portfolios performed well during the downturn in bond prices relative to managers with longer duration portfolios.

During the third quarter, the bond managers altered the risk composition of the aggregate portfolio. The managers shortened the duration of the combined portfolio slightly and increased the aggregate allocation to cash. Sector concentrations shifted as well. As a group, the managers increased their allocation to Treasury/Agency securities and trimmed their holdings in the Corporate and Mortgage sectors.

The Basic Fund bond manager performance for the quarter and year is displayed below.

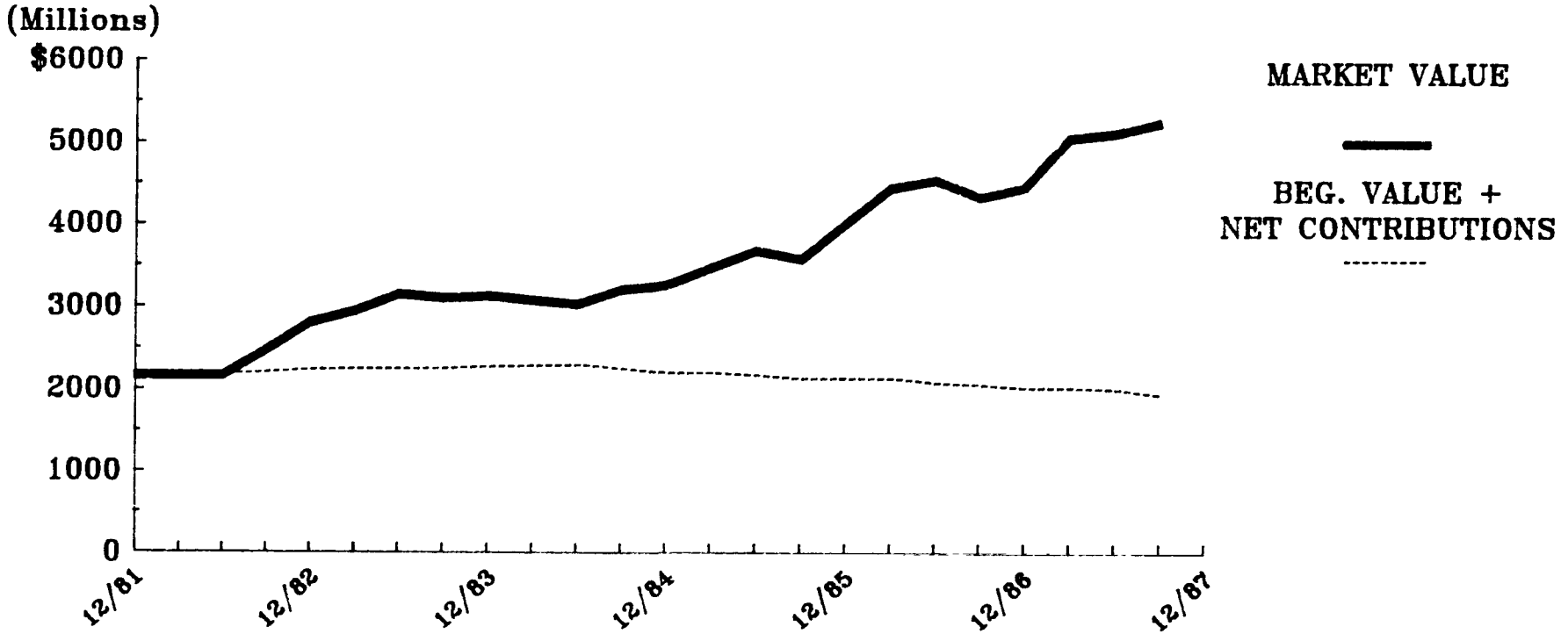
	Total Portfolio Returns	
	Third Quarter 1987	Year Ending 9/30/87
Investment Advisers	- 1.9%	0.8%
Lehman Management	- 2.1	0.1
Miller Anderson	- 3.6	7.6*
Morgan Stanley	- 0.5	3.7
Peregrine Capital	- 0.8	2.8
Western Asset	- 3.1	0.6
Total Basic Retirement Funds' Bond Segment	- 2.2	2.8
Salomon Brothers Broad Bond Index	- 2.8	0.2

* Performance reflects positive impact of pricing adjustment in 4Q 1986.

FIGURE 1

BASIC RETIREMENT FUNDS

ASSET GROWTH



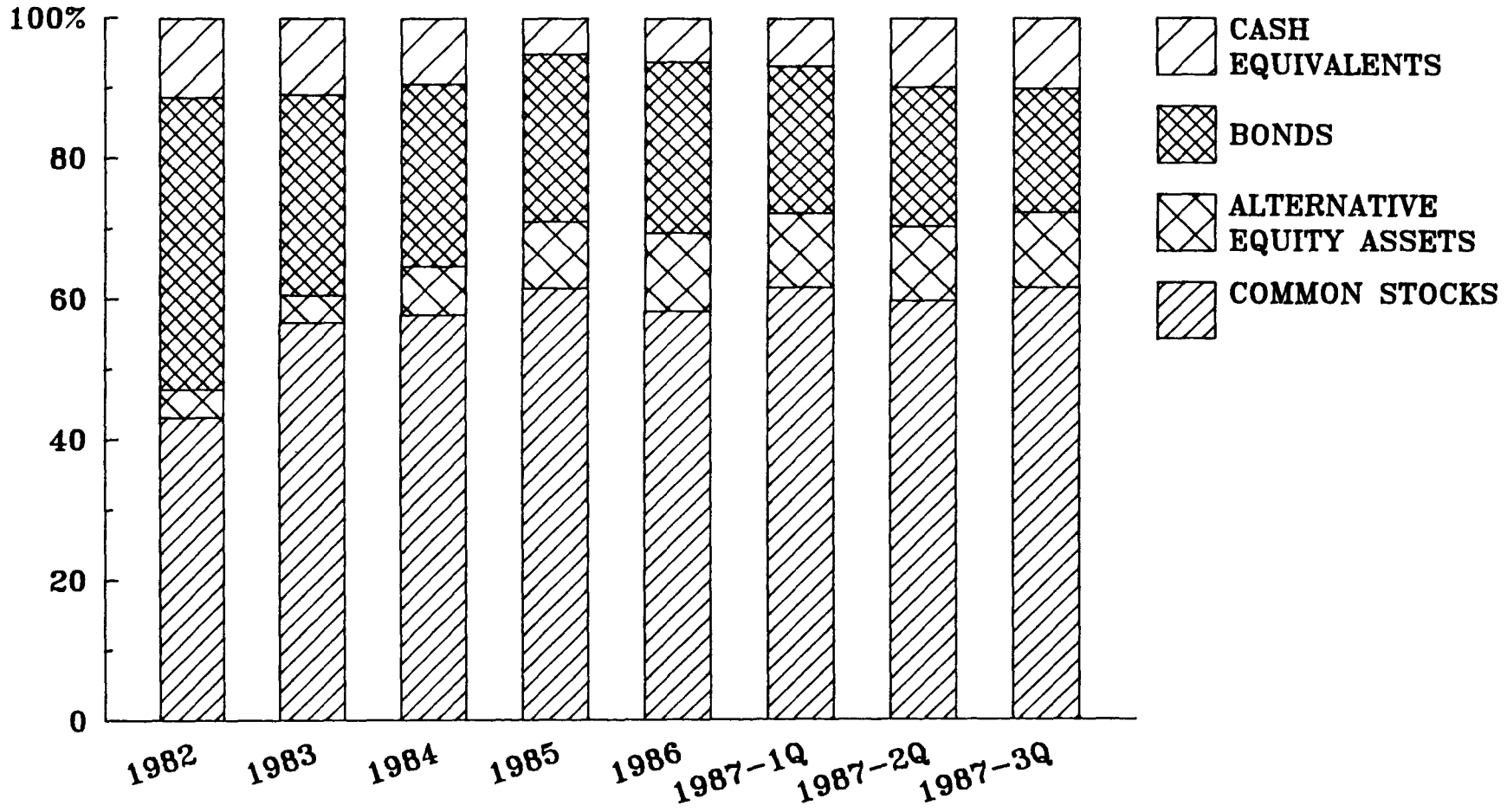
	12/82	12/83	12/84	12/85	12/86	9/87
BEGINNING VALUE	2,148.8	2,806.2	3,129.0	3,265.0	4,029.6	4,474.1
NET CONTRIBUTIONS	91.0	40.0	-77.6	-62.7	-112.8	-83.3
INVESTMENT RETURN	566.4	282.8	213.6	827.3	557.3	873.0
ENDING VALUE	2,806.2	3,129.0	3,265.0	4,029.6	4,474.1	5,263.8

(MILLIONS OF DOLLARS)

FIGURE 2

BASIC RETIREMENT FUNDS

HISTORICAL ASSET MIX



PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 1

BASIC RETIREMENT FUNDS
ASSET MIX

PERCENT OF MARKET VALUE
(End of Period Allocations)

		Common Stocks		Bonds		Cash*		Real Estate		Resource Funds		Venture Capital	
		$Million	Percent	$Million	Percent	$Million	Percent	$Million	Percent	$Million	Percent	$Million	Percent
1982		1,212	43.2	1,165	41.5	317	11.3	93	3.3	17	0.7	-	-
1983		1,773	56.7	892	28.5	342	10.9	101	3.2	21	0.7	-	-
1984		1,887	57.8	847	25.9	308	9.4	178	5.5	23	0.7	22	0.7
1985		2,481	61.6	961	23.8	204	5.1	288	7.1	47	1.2	49	1.2
1986		2,608	58.3	1,088	24.3	277	6.2	367	8.2	63	1.4	71	1.6
1987	1Q	3,130	61.7	1,060	20.9	347	6.8	391	7.7	63	1.2	85	1.7
	2Q	3,070	59.8	1,016	19.8	506	9.8	396	7.7	63	1.2	86	1.7
	3Q	3,248	61.7	928	17.6	526	10.0	406	7.7	63	1.2	93	1.8

*Includes cash uncommitted to long-term assets plus cash held by all external managers.

TABLE 2

BASIC RETIREMENT FUNDS

ASSET MIX - ACTUAL vs. POLICY

PERCENT OF MARKET VALUE
(End of Period Allocations)

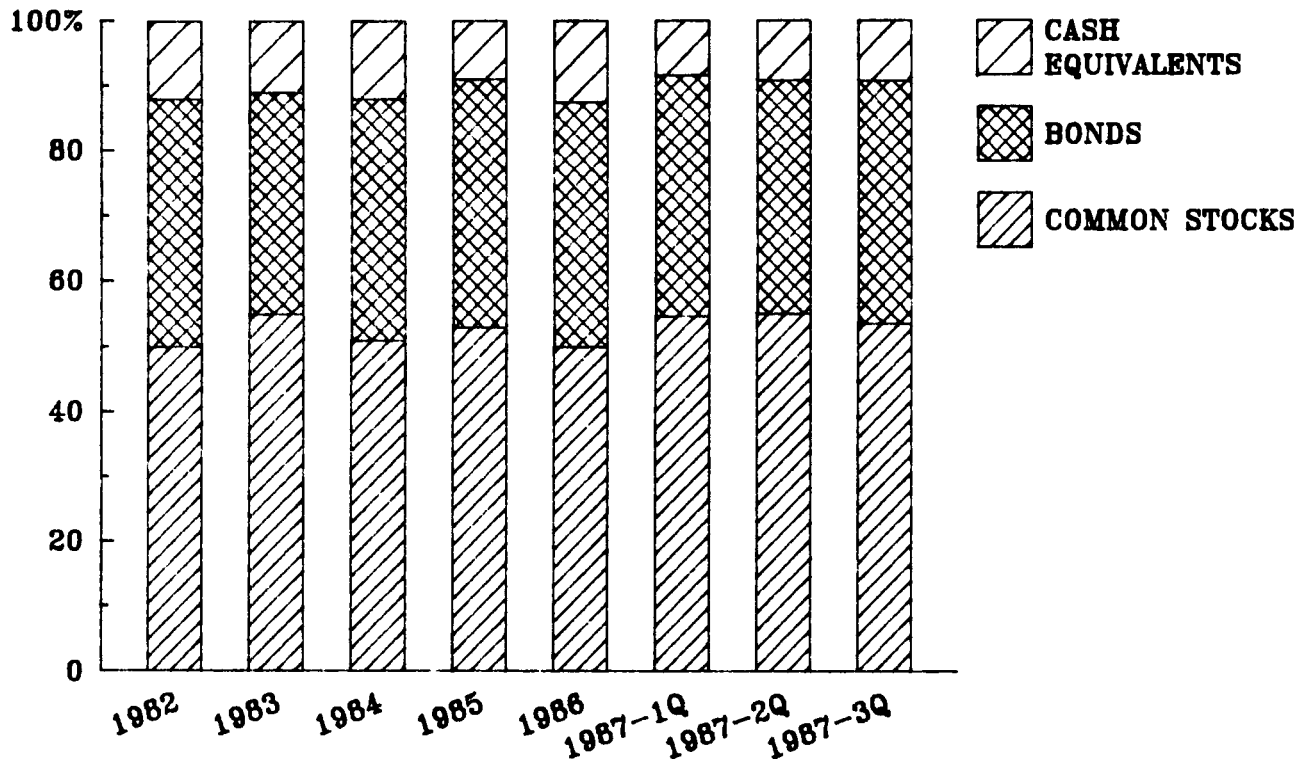
		Common Stocks*						Fixed Income**			Real Estate*			Resource Funds Venture Capital*		
		Passive Management			Active Management											
		Actual	Policy	Diff.	Actual	Policy	Diff.	Actual	Policy	Diff.	Actual	Policy	Diff.	Actual	Policy	Diff.
1983	1Q	0	40	-40	57.9	20	+37.9	38.3	25	+13.3	3.2	10	-6.8	0.6	5	-4.4
	2Q	0	40	-40	61.9	20	+41.9	34.5	25	+ 9.5	3.0	10	-7.0	0.6	5	-4.4
	3Q	0	40	-40	63.4	20	+43.4	32.8	25	+ 7.8	3.2	10	-6.8	0.6	5	-4.4
	4Q	43.5	40	+ 3.5	18.5	20	- 1.5	34.1	25	+ 9.1	3.2	10	-6.8	0.7	5	-4.3
1984	1Q	42.2	40	+ 2.2	17.8	20	- 2.2	35.7	25	+10.7	3.5	10	-6.5	0.8	5	-4.2
	2Q	41.7	40	+ 1.7	17.7	20	- 2.3	33.3	25	+ 8.3	5.5	10	-4.5	1.8	5	-3.2
	3Q	42.5	40	+ 2.5	17.9	20	- 2.1	32.6	25	+ 7.6	5.3	10	-4.7	1.7	5	-3.3
	4Q	42.1	40	+ 2.1	18.0	20	- 2.0	32.7	25	+ 7.7	5.5	10	-4.5	1.7	5	-3.3
1985	1Q	43.0	40	+ 3.0	18.3	20	- 1.7	31.4	25	+ 6.4	5.7	10	-4.3	1.6	5	-3.4
	2Q	43.2	40	+ 3.2	18.7	20	- 1.3	30.7	25	+ 5.7	5.6	10	-4.4	1.8	5	-3.2
	3Q	42.8	40	+ 2.8	18.8	20	- 1.2	29.5	25	+ 4.5	6.6	10	-3.4	2.3	5	-2.7
	4Q	44.6	40	+ 4.6	19.2	20	- 0.8	26.5	25	+ 1.5	7.2	10	-2.8	2.5	5	-2.5
1986	1Q	45.8	40	+ 5.8	20.0	20	0.0	25.1	25	+ 0.1	7.0	10	-3.0	2.1	5	-2.9
	2Q	43.7	40	+ 3.7	20.4	20	+ 0.4	26.3	25	+ 1.3	7.3	10	-2.7	2.3	5	-2.7
	3Q	41.9	40	+ 1.9	19.7	20	- 0.3	26.7	25	+ 1.7	8.4	10	-1.6	3.3	5	-1.7
	4Q	40.8	40	+ 0.8	19.8	20	- 0.2	27.9	25	+ 2.9	8.3	10	-1.7	3.2	5	-1.8
1987	1Q	42.8	40	+ 2.8	21.4	20	+ 1.4	24.9	25	- 0.1	7.8	10	-2.2	3.1	5	-1.9
	2Q	40.4	40	+ 0.4	21.7	20	+ 1.7	26.9	25	+ 1.9	7.9	10	-2.1	3.1	5	-1.9
	3Q	41.7	40	+ 1.7	22.7	20	+ 2.7	24.5	25	- 0.5	7.8	10	-2.2	3.3	5	-1.7

*Includes cash held by external managers in the particular asset class.
**Includes cash uncommitted to long-term assets.

FIGURE 3

TAX-EXEMPT BALANCED PORTFOLIO UNIVERSE

HISTORICAL ASSET MIX



	1982	1983	1984	1985	1986	1987-1Q	1987-2Q	1987-3Q
COMMON STOCKS	48%	52%	48%	50%	48%	52%	54%	52%
BONDS	36	32	35	36	36	35	35	36
CASH EQUIVALENTS	12	10	11	9	12	8	9	9

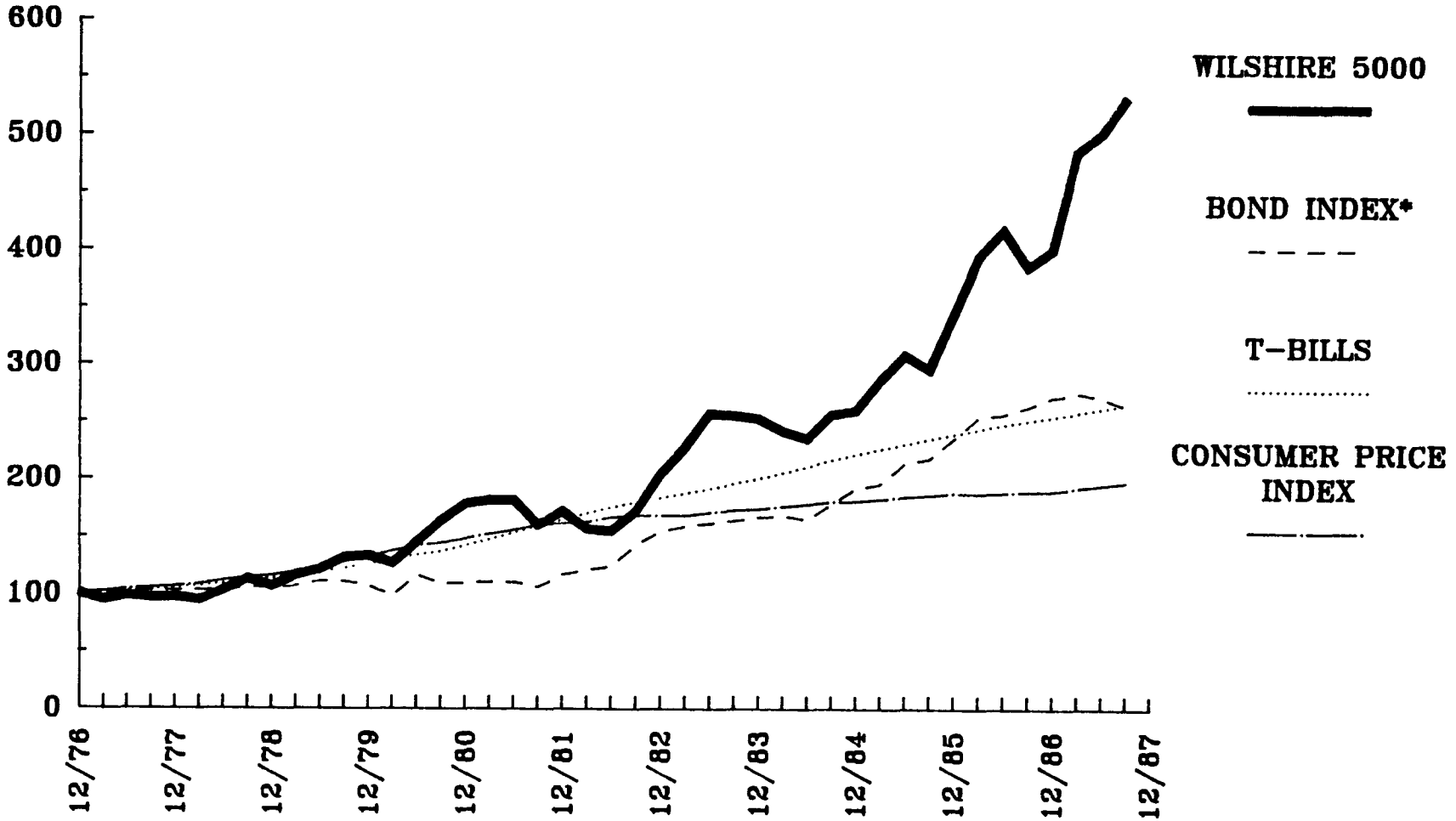
PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

Figure 3 and the accompanying table depict the median asset class weightings held in Wilshire Associate's TUCS universe of balanced portfolios during the most recent three quarters and five calendar years. The figure and table are intended to give a perspective of the historical asset allocation of balanced tax-exempt corporate and public funds. The portfolios in the balanced universe differ in composition. Many of the portfolios are comprised of only common stocks, bonds, and cash equivalents. Other portfolios in the balanced universe, however, contain alternative assets such as real estate and venture capital in addition to stocks and bonds.

FIGURE 4

PERFORMANCE OF CAPITAL MARKETS

CUMULATIVE RETURNS



*M.L. MASTER INDEX THROUGH 12/79
SALOMON BROAD INDEX THEREAFTER

FIGURE 5

BASIC RETIREMENT FUNDS

INVESTMENT RETURNS

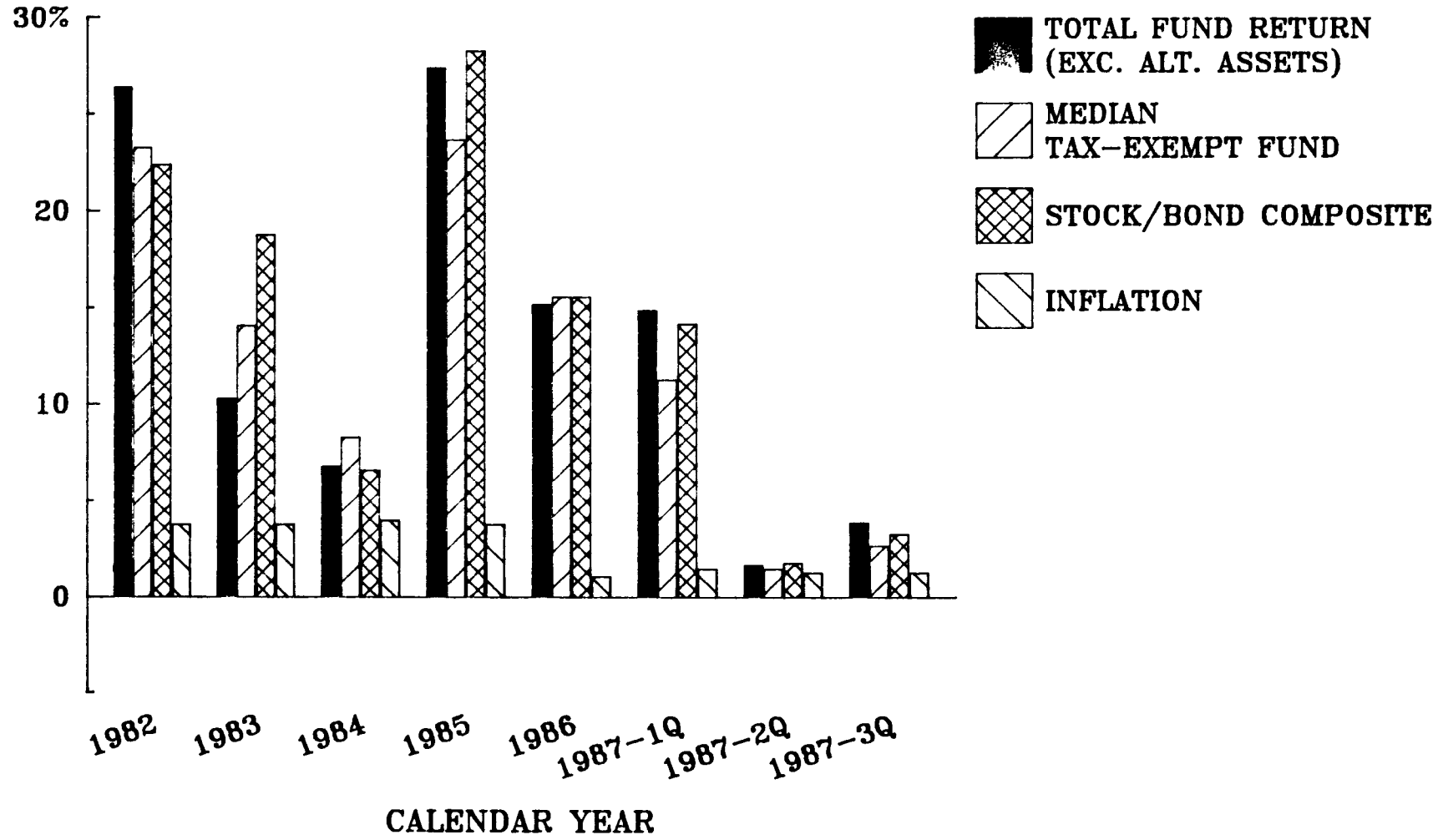


TABLE 3

BASIC RETIREMENT FUNDS

INVESTMENT RETURNS RELATIVE TO PERFORMANCE STANDARDS

Calendar Year	Total Fund Return (exc. alt. assets)	Median Tax-exempt Fund	Stock/Bond* Composite	Inflation	90 Day T-Bills	Total Fund Return (inc. alt. assets)
1982	26.4	23.3	24.4	3.9	11.7	25.7
1983	10.3	14.1	18.2	3.8	9.3	10.1
1984	6.8	8.3	6.9	4.0	10.4	6.9
1985	27.4	23.7	28.3	3.8	7.9	25.6
1986	15.2	15.6	15.6	1.1	6.3	13.8
1987 1Q	14.9	11.3	14.2	1.5	1.4	13.3
2Q	1.7	1.5	1.7	1.3	1.4	1.6
3Q	3.9	2.7	3.3	1.3	1.5	3.7
1 Year Through 9/30/87	26.5	20.0	24.4	4.3	5.7	24.0
3 Years Annualized Through 9/30/87	22.6	20.7	22.5	3.1	7.0	20.8
5 Years Annualized Through 9/30/87	18.8	18.3	20.6	3.3	8.1	17.7

*50/45/5 Wilshire 5000/Salomon Broad Bond Index/T-Bill Composite Through 12-31-82;
65/30/5 Wilshire 5000/Salomon Broad Bond Index/T-Bill Composite Thereafter

TABLE 4

BASIC RETIREMENT FUNDS

INVESTMENT RETURNS - DETAIL

CALENDAR YEAR	COMMON STOCKS		BONDS		ALTERNATIVE EQUITY ASSETS
	Basics	Wilshire 5000	Basics	Salomon Bond Index	Basics
1982	21.6	18.7	38.1	29.8	11.9
1983	12.7	23.5	9.3	7.8	7.4
1984	2.7	3.1	14.6	15.1	11.8
1985	31.4	32.6	21.4	21.8	6.8
1986	15.2	16.1	15.1	15.5	2.3
1987 1Q	20.7	21.2	2.3	1.3	1.8
2Q	3.2	3.3	- 2.3	- 1.6	1.6
3Q	6.3	6.2	- 2.2	- 2.8	2.1
1 Year Through 9/30/87	37.6	38.2	2.8	0.2	6.1
3 Years Annualized Through 9/30/87	26.9	27.5	13.3	13.7	5.8
5 Years Annualized Through 9/30/87	22.2	25.3	13.7	13.0	7.0

TABLE 5

BASIC RETIREMENT FUNDS

EQUITY MANAGER PERFORMANCE

TOTAL PORTFOLIO RETURNS

Managers	Third Quarter 1987	Year Ending 9/30/87	Two Years Ending 9/30/87 (Annualized)	Three Years Ending 9/30/87 (Annualized)	Four Years Ending 9/30/87 (Annualized)
Fred Alger	8.3%	35.1%	33.8%	26.0%	17.8%
Alliance Capital	10.8	55.2	42.7	35.3	24.7
Beutel Goodman	8.6	32.8	27.2	22.7	19.1
BMI Capital	4.1	38.6	32.6	23.8	12.6
Forstmann Leff	8.4	36.4	35.3	29.5	20.2
Hellman Jordan	4.8	43.9	33.0	26.8	20.6
IDS	5.9	40.5	38.0	30.1	22.5
Investment Advisers	8.8	40.9	33.8	25.7	19.8
Lieber & Company	2.7	21.8	26.4	23.9	17.4
Peregrine Capital	3.9	29.1	22.7	N.A.	N.A.
Waddell & Reed	9.8	40.0	31.1	24.3	15.6
Internal Manager	3.5	32.6	27.7	N.A.	N.A.
Wilshire Associates (Index Fund)	6.0	37.6	33.9	27.3	N.A.
Total Basic Retirement Funds' Common Stock Segment	6.3	37.6	33.3	26.9	19.6
Capital Markets Data					
Wilshire 5000	6.2	38.2	34.2	27.5	20.2
90-Day Treasury Bills	1.5	5.7	6.3	7.0	7.8
Inflation	1.3	4.3	3.0	3.1	3.4

TABLE 6

BASIC RETIREMENT FUNDS

BOND MANAGER PERFORMANCE

TOTAL PORTFOLIO RETURNS

Managers	Third Quarter 1987	Year Ending 9/30/87	Two Years Ending 9/30/87 (Annualized)	Three Years Ending 9/30/87 (Annualized)
Investment Advisers	- 1.9%	0.8%	8.3%	13.2%
Lehman Management	- 2.1	0.1	8.7	12.3
Miller Anderson	- 3.6	7.6*	11.7	14.5
Morgan Stanley	- 0.5	3.7	10.9	14.3
Peregrine Capital	- 0.8	2.8	8.1	11.6
Western Asset	- 3.1	0.6	10.3	13.9
Total - Basic Retirement Funds' Bond Segment	- 2.2	2.8	10.0	13.3
Capital Markets Data				
Salomon Brothers Broad Bond Index	- 2.8	0.2	9.8	13.7
90-Day Treasury Bills	1.5	5.7	6.3	7.0
Inflation	1.3	4.3	3.0	3.1

* Performance reflects positive impact of pricing adjustment in 4Q 1986.

MINNESOTA STATE BOARD OF INVESTMENT

POST RETIREMENT INVESTMENT FUND

QUARTERLY INVESTMENT REVIEW

SEPTEMBER 30, 1987

MINNESOTA STATE BOARD OF INVESTMENT

POST RETIREMENT INVESTMENT FUND

THIRD QUARTER 1987

Summary

ASSETS

Despite net contributions of over $140 million, the Post Retirement Investment Fund experienced a slight decrease in the market value of its assets during the third quarter 1987. The decline was due to the poor performance of the bond market during the period. For the most recent year, the Post Funds' asset growth was positively impacted by both contributions and investment performance. The Post Funds' asset value increased by 8.7% for the year, with net contributions for the period of over $285 million.

During the last several years, the Post Fund has received large positive contributions due to the "Rule of 85." Now that early retirement provisions have expired, the contributions are expected to diminish.

The Post Funds' asset growth history for the last five calendar years and three quarters is presented below.

Calendar Year		Market Value (millions)	Percent Change from Previous Period
1982		1,523	+38.3
1983		1,803	+18.4
1984		2,246	+24.6
1985		3,107	+38.3
1986		3,808	+22.6
1987	1Q	3,980	+ 4.5
	2Q	3,997	+ 0.4
	3Q	3,991	- 0.2

ASSET MIX

The size of the Post dedicated bond portfolio was increased during the third quarter 1987. The increase was necessary to accommodate the additional liabilities generated by the increase in new retirees. As a result of the dedicated bond portfolio growth, the common stock and cash equivalents segments decreased in weighting, while the bond segment increased in size. A steady flow of contributions to the Post Fund in recent quarters resulted in excess cash reserves. With the dedicated bond portfolio adjustments complete, the cash equivalents segment has been reduced to a more normal level.

The Post Retirement Investment Fund's asset mix for the most recent two quarters and year is presented below.

	ASSET MIX		
	9/30/86	6/30/87	9/30/87
Common Stocks	16.1%	16.8%	14.1%
Bonds	77.3	74.2	81.2
Cash Equivalents	6.6	9.0	4.7
	100.0%	100.0%	100.0%

EQUITY PERFORMANCE

The Post Retirement Investment Fund's equity portfolio generated a 3.3% rate of return for the quarter. The equity portfolio underperformed the stock market, as represented by the Wilshire 5000, with its 6.2% quarterly performance. For the second consecutive quarter, the performance of the portfolio was negatively impacted by its substantial overweighting of the Finance sector of the market. In addition, the equity performance was impeded by a significant underweighting of the Materials and Services sector, one of the top performing sectors for the period. As a result of the weak quarter, the equity portfolio's performance for the latest year continues to trail that of the market. The equity portfolio generated a 26.1% rate of return for the year. The Wilshire 5000 return for the period was 38.2%.

The Post Investment Fund's equity portfolio performance for the most recent quarter and year are displayed below.

	Third Quarter 1987	Year Ending 9/30/87
Equity Portfolio	3.3%	26.1%
Wilshire 5000	6.2	38.2

DEDICATED BOND PORTFOLIO

The composition of the Post Retirement Investment Fund's dedicated bond portfolio changed slightly as a result of the third quarter adjustments. As proceeds from common stock sales and the excess cash reserves were invested in the Agency sector of the bond market during the adjustments, the sector increased in relative weighting.

The Post Fund's bond portfolio provided a -5.2% rate of return for the quarter and a -3.4% return for the year. This performance is consistent with the bond portfolio's design. The Post Fund's dedicated bond portfolio is structured so that portfolio income and maturities match the Fund's liability stream. As a result, the duration of the dedicated bond portfolio exceeds that of the bond market. Consequently, on a total return basis, the portfolio can be expected to underperform the bond market in down periods and outperform the market in up periods.

The composition of the Post Retirement Investment Fund's dedicated bond portfolio is outlined on the following page.

TABLE 7

POST RETIREMENT INVESTMENT FUND

DEDICATED BOND PORTFOLIO STATISTICS

SEPTEMBER 30, 1987

Value at Market	$2,402,559,000
Value at Cost	2,368,245,689
Average Coupon	7.01%
Current Yield	9.84
Yield to Maturity	9.86
Current Yield at Cost	9.70
Time to Maturity	14.96 Years
Average Duration	6.65 Years
Average Quality Rating	AAA
Number of Issues	274

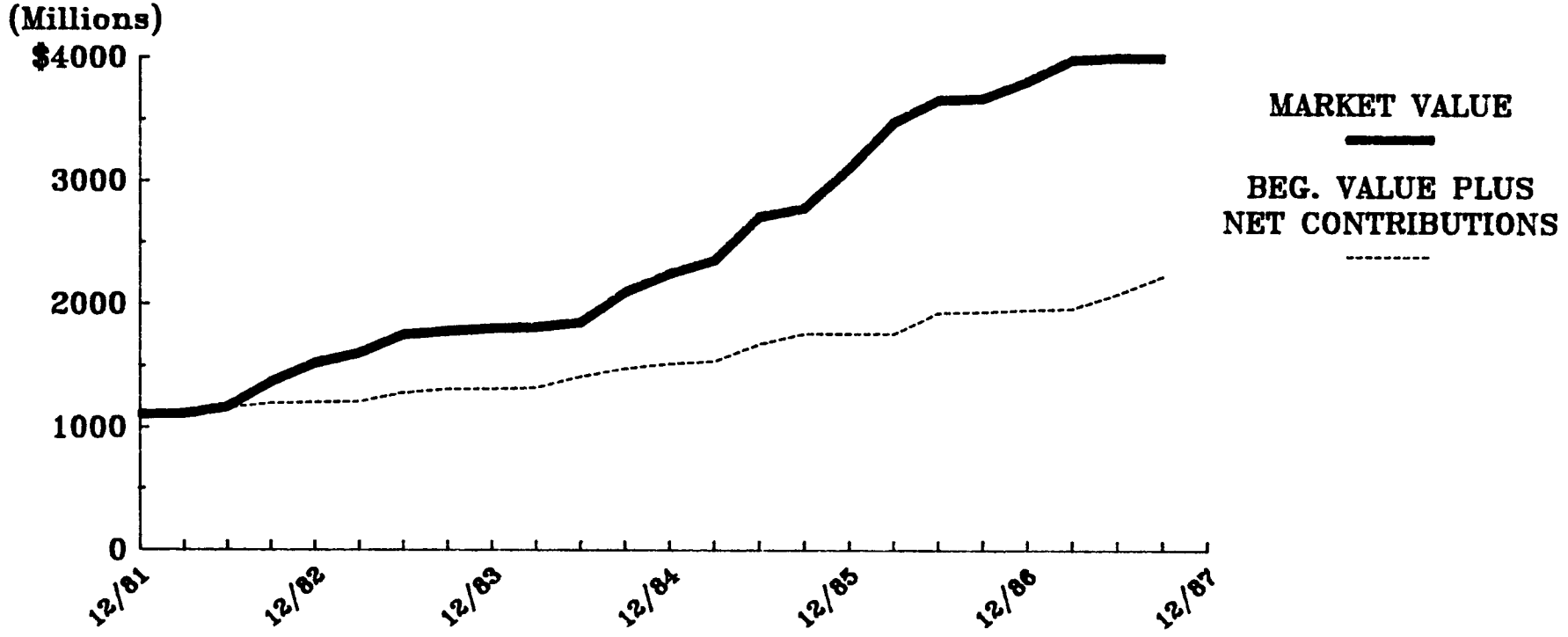
SECTOR WEIGHTINGS

Treasury	63.6
Federal Agency	15.5
Industrial	6.9
Utilities	5.3
Finance	4.4
Transportation	0.4
Mortgages	0.0
Miscellaneous	3.9
	100.0%

FIGURE 6

POST RETIREMENT INVESTMENT FUND

ASSET GROWTH



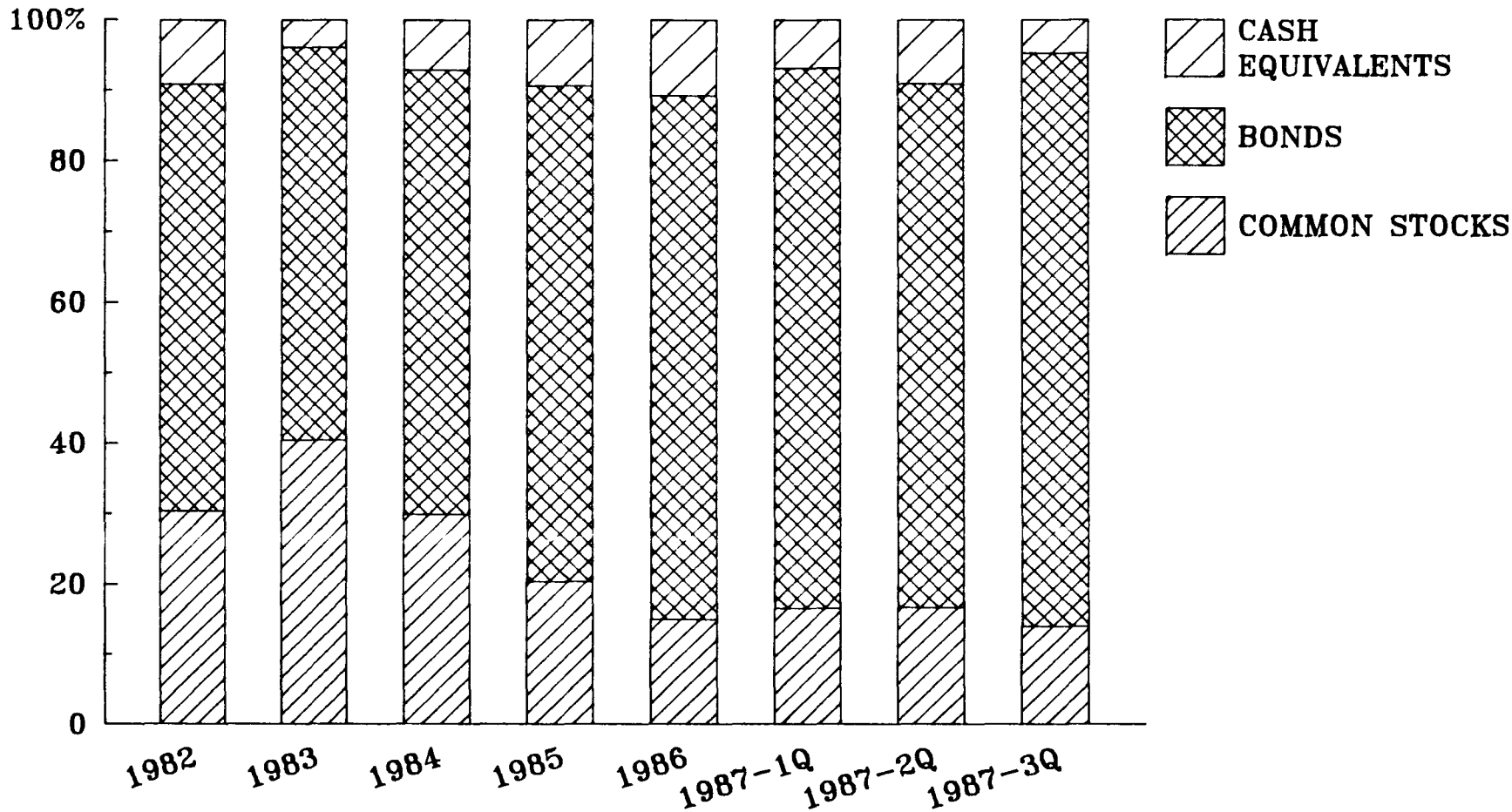
	12/82	12/83	12/84	12/85	12/86	9/87
BEGINNING VALUE	1,100.9	1,522.9	1,802.9	2,245.7	3,107.3	3,807.5
NET CONTRIBUTIONS	102.6	109.1	201.0	238.9	198.6	269.4
INVESTMENT RETURN	319.4	170.8	241.8	622.7	501.6	-85.5
ENDING VALUE	1,552.9	1,802.9	2,245.7	3,107.3	3,807.5	3,991.4

(MILLIONS OF DOLLARS)

FIGURE 7

POST RETIREMENT INVESTMENT FUND

HISTORICAL ASSET MIX



PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 8

POST RETIREMENT INVESTMENT FUND

ASSET MIX

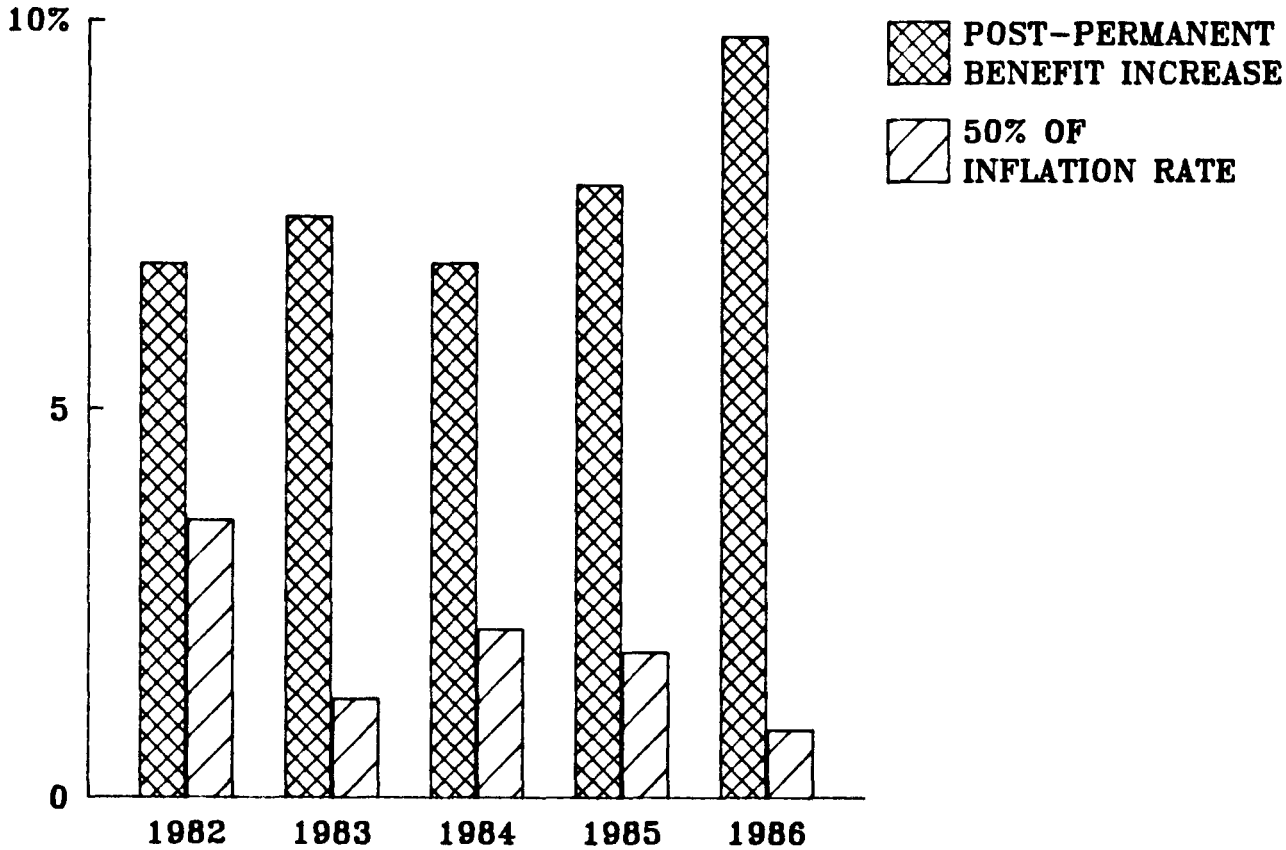
PERCENT OF MARKET VALUE

(End Of Period Allocations)

Calendar Year		Common Stocks $Million	Common Stocks Percent	Bonds $Million	Bonds Percent	Cash $Million	Cash Percent
1982		465.0	30.5	919.9	60.4	138.1	9.1
1983		730.3	40.5	1,002.1	55.6	69.8	3.9
1984		674.8	30.0	1,411.4	62.9	159.5	7.1
1985		636.5	20.5	2,182.5	70.2	288.3	9.3
1986		574.6	15.1	2,827.2	74.2	405.7	10.7
1987	1Q	664.7	16.7	3,046.3	76.5	268.6	6.8
	2Q	672.7	16.8	2,965.3	74.2	359.5	9.0
	3Q	563.6	14.1	3,241.8	81.2	186.0	4.7

FIGURE 8

POST RETIREMENT INVESTMENT FUND
BENEFIT INCREASES VERSUS INFLATION



	FISCAL YEAR					(Annualized)	
	1982	1983	1984	1985	1986	3 YR.	5 YR.
BENEFIT INCREASE	6.9%	7.5%	6.9%	7.9%	9.8%	8.2%	7.8%
50%-INFLATION RATE	3.6	1.3	2.1	1.9	0.9	1.6	2.0

FIGURE 9

POST RETIREMENT INVESTMENT FUND

EQUITY SEGMENT RETURNS

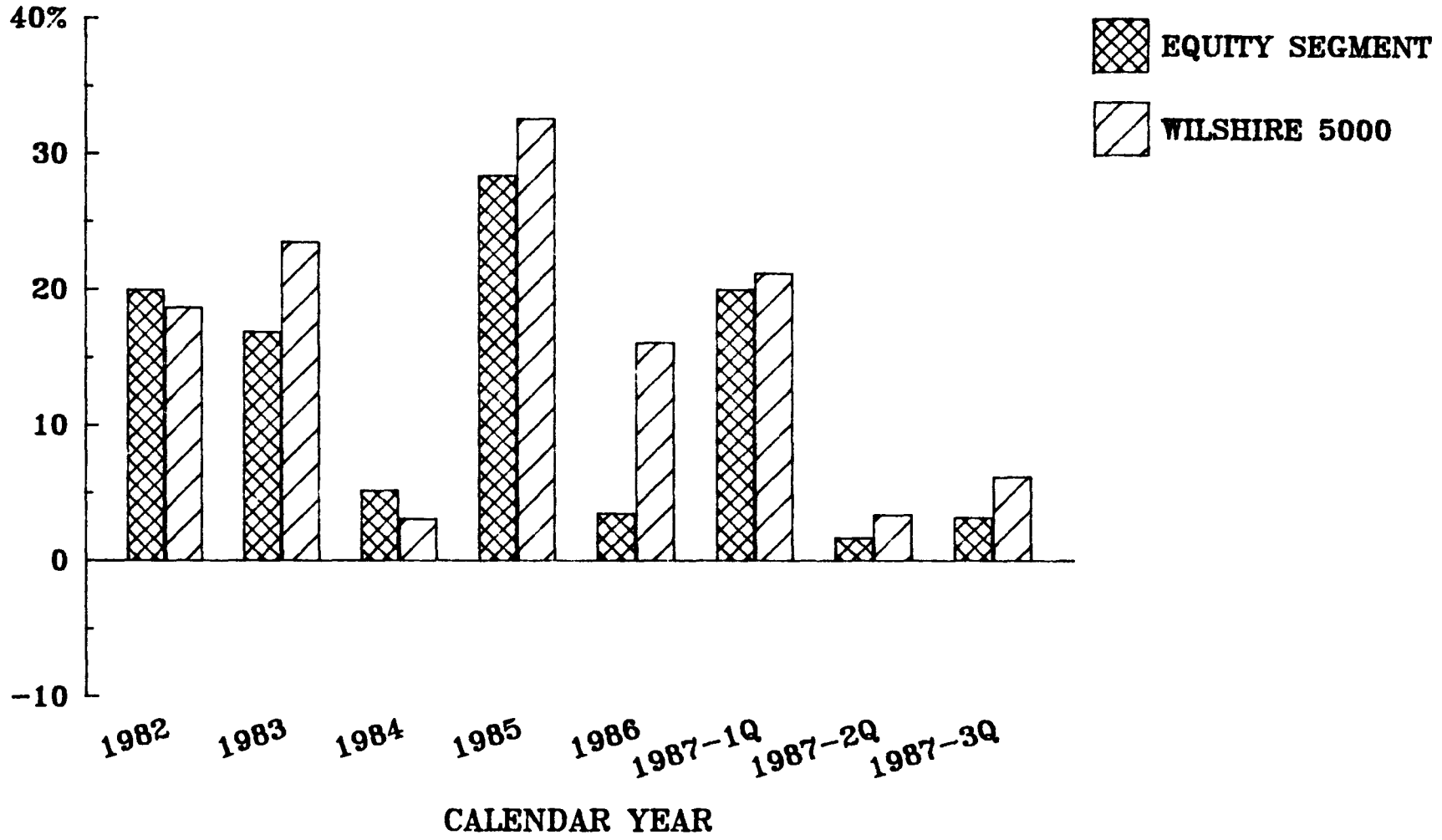


TABLE 9

POST RETIREMENT INVESTMENT FUND

EQUITY SEGMENT RETURNS

INVESTMENT RETURNS RELATIVE TO PERFORMANCE STANDARDS

	Total Returns	
	Post Retirement Fund	Wilshire 5000
1982	20.0%	18.7%
1983	16.9	23.5
1984	5.2	3.1
1985	28.4	32.6
1986	3.5	16.1
1987 1Q	20.0	21.2
2Q	1.7	3.3
3Q	3.3	6.2
1 Year Through 9/30/87	26.1	38.2
3 Years Annualized Through 9/30/87	19.6	27.5
5 Years Annualized Through 9/30/87	18.9	25.3

TABLE 10

POST RETIREMENT INVESTMENT FUND

EQUITY MANAGER DATA

SEPTEMBER 30, 1987

SECTOR WEIGHTINGS

SECTORS	WEIGHTING INTERNAL MANAGER	WEIGHTING WILSHIRE 5000
Capital Goods	4.1%	4.9%
Consumer Durables	5.4	3.9
Consumer Nondurables	15.6	28.1
Energy	9.0	8.9
Financial	20.6	12.4
Materials & Services	3.6	13.8
Technology	12.5	13.5
Transportation	7.4	3.2
Utilities	21.9	11.3
	100.0%	100.0%

QUARTER-END PORTFOLIO STATISTICS *

MANAGER	# OF STOCKS	EQUITY ALLOC.	MKT. VOLTY	DIVER.	YIELD	E/P	REL. RET.	P/B	5 YR EARN	MVAR	EVAR	SIZE	GROW	FINL
Internal Mgr.	104	100%	1.02	0.92	0.55	0.19	-0.45	-0.42	-0.08	-0.11	-0.07	0.09	0.01	0.32

* See Equity Manager Portfolio Statistics Glossary for definitions.

MINNESOTA STATE BOARD OF INVESTMENT

SUPPLEMENTAL INVESTMENT FUND

- INCOME SHARE ACCOUNT
- GROWTH SHARE ACCOUNT
- COMMON STOCK INDEX ACCOUNT
- BOND MARKET ACCOUNT
- MONEY MARKET ACCOUNT
- GUARANTEED RETURN ACCOUNT
- BOND ACCOUNT

QUARTERLY INVESTMENT REVIEW

SEPTEMBER 30, 1987

MINNESOTA STATE BOARD OF INVESTMENT

SUPPLEMENTAL INVESTMENT FUND

THIRD QUARTER 1987

Summary

The Minnesota Supplemental Investment Fund is a multi-purpose investment program that offers a range of investment options to state and local public employees. The different participating groups use the Fund for a variety of purposes:

- o It functions as the investment manager for all assets of the Unclassified Employees Retirement Plan.
- o It acts as the investment manager for all assets of the supplemental retirement programs for state university and community college teachers and for Hennepin County Employees.
- o It is one investment vehicle offered to public employees as part of the state's Deferred Compensation Plan.
- o It serves as an external money manager for a portion of some local police and firefighter retirement plans.

The Supplemental Investment Fund serves more than 14,000 individuals. On September 30, 1987 the market value of the entire fund was $414 million.

A wide diversity of investment goals exists among the Fund's participants. In order to meet those needs, the Fund has been structured much like a "family of mutual funds." Participants may allocate their investments among one or more accounts that are appropriate for their needs, within the statutory requirements and rules established by the participating organizations. Participation in the Fund is accomplished through the purchase or sale of shares in each account.

As of the beginning of fiscal year 1987, participants in the Supplemental Investment Fund may select from among the following seven investment options:

- o Income Share Account - an actively managed, balanced portfolio utilizing both common stocks and bonds

- Growth Share Account - an actively managed, all common stock portfolio

- Common Stock Index Account - a passively managed, all common stock portfolio designed to track the performance of the entire stock market

- Bond Market Account - an actively managed, all bond portfolio that reflects changes in the market value of bonds

- Money Market Account - a portfolio utilizing short term, liquid debt securities

- Guaranteed Return Account - an option utilizing guaranteed investment contracts (GIC's), which offer a fixed rate of return for a specified period of time.

- Bond Account - a portfolio of intermediate term debt securities that are bought and held to maturity. This option is available only to local police and firefighter retirement plans.

SUPPLEMENTAL INVESTMENT FUND

INCOME SHARE ACCOUNT

The primary investment objective of the Income Share Account is similar to that of the Basic Retirement Funds. The Account seeks to maximize long-term real rates of return, while limiting short-run portfolio return volatility.

To achieve this objective, the Income Share Account is invested in a balanced portfolio of common stocks and fixed income securities. The Account's target long-term asset allocation is 60% common stocks, 35% bonds, and 5% cash equivalents. Common stocks provide the potential for significant capital appreciation, while bonds provide a deflation hedge and portfolio diversification.

The investment management structure of the Income Share Account combines internal and external management. The SBI investment staff manages the entire fixed income segment of the Account's portfolio and approximately 25% of the common stock segment. The balance of the common stock portfolio is managed externally. The Account participates in the passive component of the common stock segment of the Combined Investment Funds.

The September 30, 1987 market value of the Income Share Account was $221 million.

The Income Share Account's asset mix for the last five calendar years is presented on pages 37 and 38.

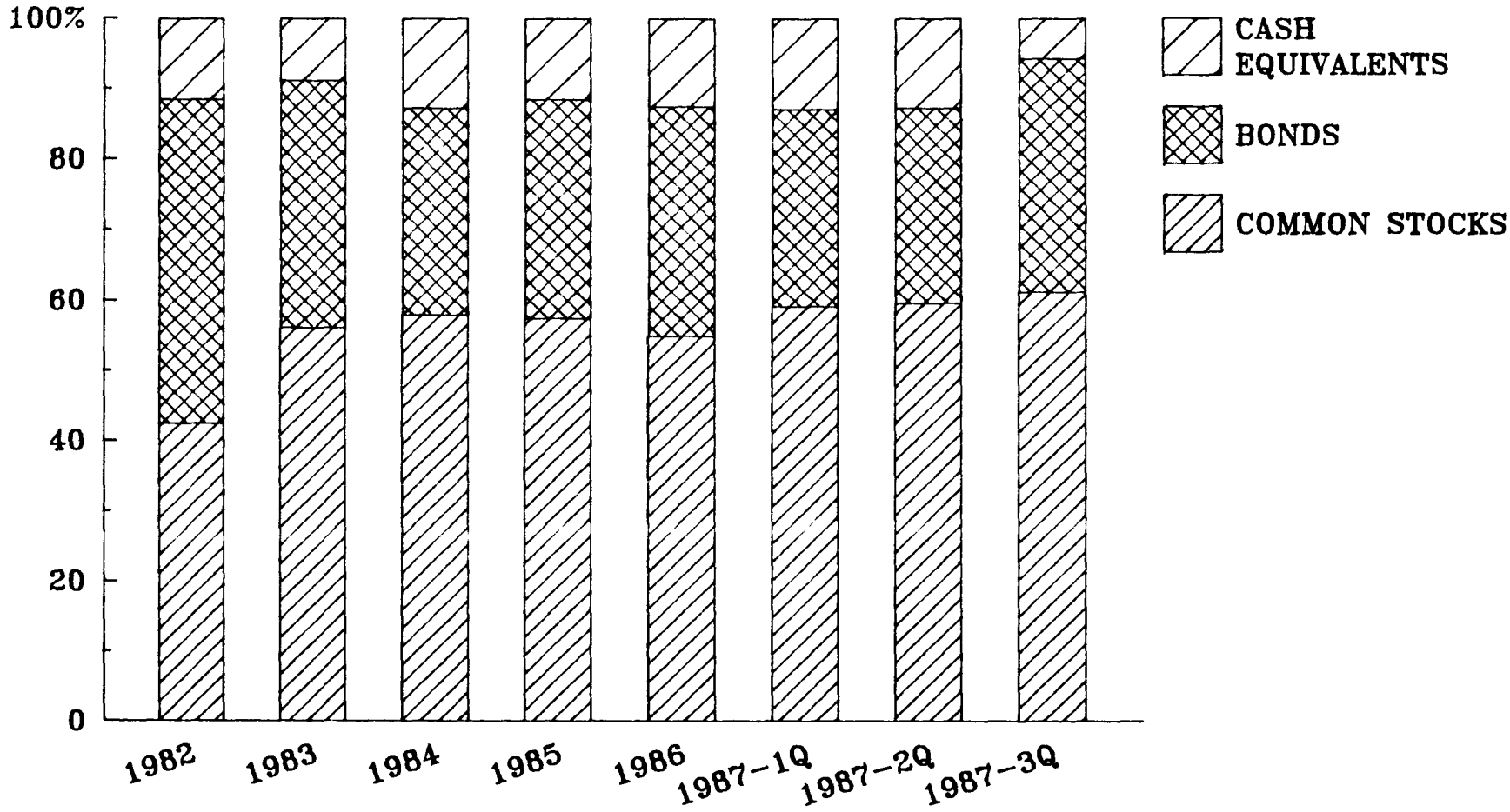
Total account and asset segment performance is displayed on page 39. Individual external manager performance is presented on page 16.

FIGURE 10

SUPPLEMENTAL INVESTMENT FUND

(INCOME SHARE ACCOUNT)

HISTORICAL ASSET MIX



PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 11

SUPPLEMENTAL INVESTMENT FUND
(Income Share Account)
ASSET MIX

PERCENT OF MARKET VALUE
(End Of Period Allocations)

Calendar Year		Common Stocks $Million	Common Stocks Percent	Bonds $Million	Bonds Percent	Cash* $Million	Cash* Percent
1982		42.7	42.5	46.2	46.0	11.5	11.5
1983		63.5	56.2	39.6	35.0	9.9	8.8
1984		74.4	58.0	37.6	29.3	16.4	12.7
1985		92.8	57.5	50.0	31.0	18.5	11.5
1986		101.9	55.0	60.2	32.5	23.1	12.5
1987	1Q	123.8	59.2	58.4	27.9	27.1	12.9
	2Q	127.8	59.7	59.1	27.6	27.3	12.7
	3Q	135.5	61.3	72.9	33.0	12.7	5.7

*Includes cash held by the external managers

TABLE 12

SUPPLEMENTAL INVESTMENT FUND

INCOME SHARE ACCOUNT

INVESTMENT PERFORMANCE

Total Returns

	THIRD QUARTER 1987	YEAR ENDING 9/30/87
Total Account	2.8%	20.2%
Median Fund*	2.7	20.0
Composite**	2.8	22.4
Equity Segment	5.3	33.1
Wilshire 5000	6.2	38.2
Bond Segment	- 1.9	2.6
Salomon Broad Bond Index	- 2.8	0.2

* TUCS Median Balanced Portfolio

** 50/45/5 Wilshire 5000/Salomon Broad Bond Index/T-Bills Composite Through 12-31-82; 60/35/5 Composite Thereafter

SUPPLEMENTAL INVESTMENT FUND

GROWTH SHARE ACCOUNT

The Growth Share Account's principal investment objective is to generate above-average returns from capital appreciation. In order to attain this objective, the Growth Share Account's investment program focuses on common stocks. The long-run target asset allocation for the Account is 95% common stock, 5% cash equivalents. The small cash equivalents component represents the normal cash reserves held by the Account as a result of net contributions not yet allocated to stocks.

The SBI investment staff manages approximately one-third of the common stock portfolio; the balance is managed externally. The Growth Share Account's external equity component is achieved through its participation in the active common stock segment of the Board's Combined Investment Funds. The SBI investment staff manages the internal component of the equity portfolio with a long-term value-oriented approach. This approach is complemented by the external managers' more aggressive posture.

The September 30, 1987 market value of the Growth Share Account was $95 million.

The historical asset mix for the account is displayed on pages 41 and 42.

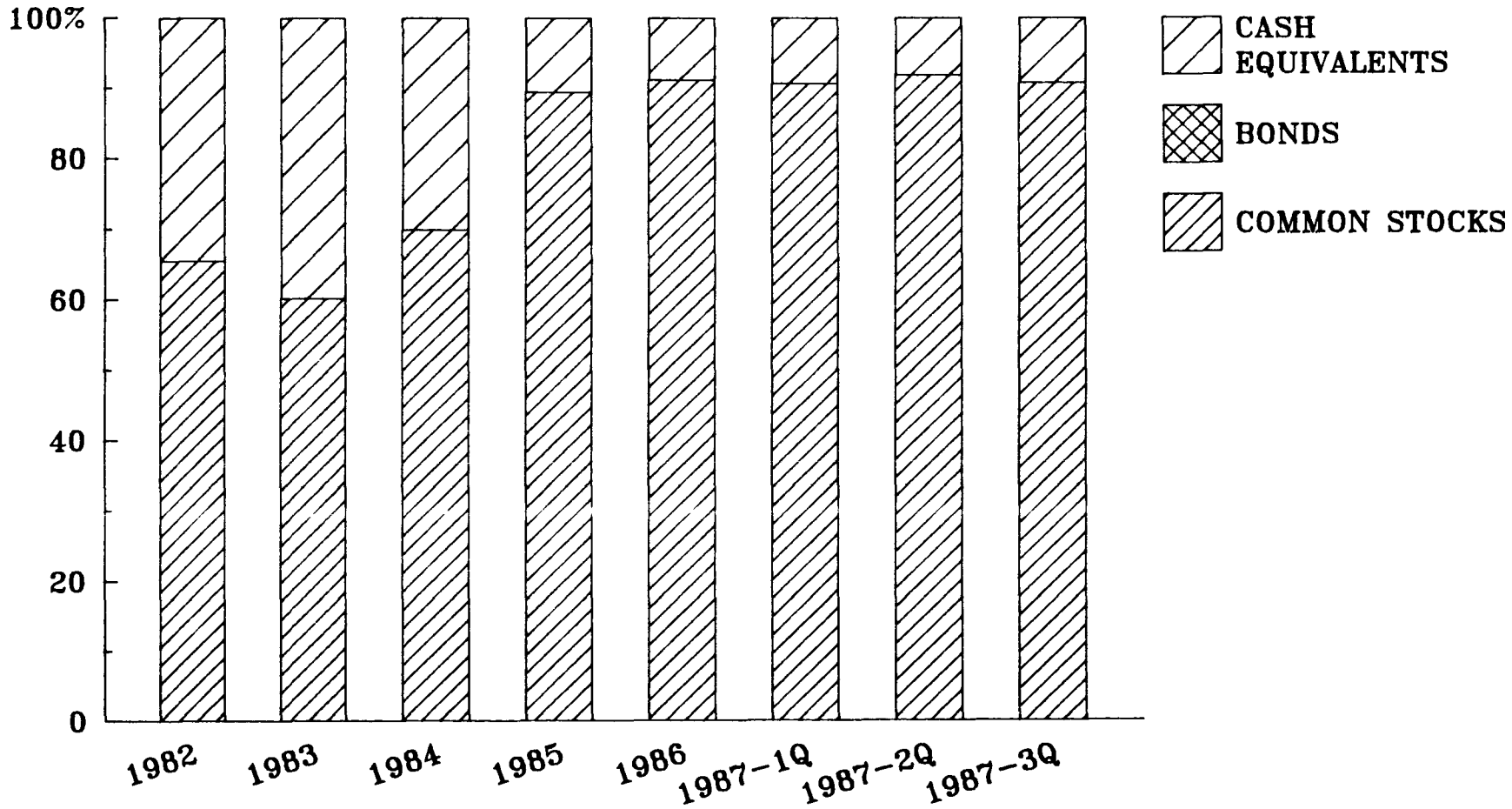
Total account and asset segment performance is presented on page 43. Individual common stock manager performance is listed on page 16.

FIGURE 11

SUPPLEMENTAL INVESTMENT FUND

(GROWTH SHARE ACCOUNT)

HISTORICAL ASSET MIX



CALENDAR YEAR

PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 13

SUPPLEMENTAL INVESTMENT FUND

(Growth Share Account)

ASSET MIX

PERCENT OF MARKET VALUE
(End Of Period Allocations)

Calendar Year		Common Stocks $Million	Common Stocks Percent	Bonds $Million	Bonds Percent	Cash* $Million	Cash* Percent
1982		32.5	65.6	----	----	17.0	34.4
1983		33.7	60.3	----	----	22.2	39.7
1984		41.8	70.0	----	----	17.9	30.0
1985		65.8	89.5	----	----	7.7	10.5
1986		68.5	91.2	----	----	6.6	8.8
1987	1Q	81.6	90.7	----	----	8.3	9.3
	2Q	83.1	91.8	----	----	7.4	8.2
	3Q	86.5	90.8	----	----	8.8	9.2

*Includes cash held by the external managers

TABLE 14

SUPPLEMENTAL INVESTMENT FUND

GROWTH SHARE ACCOUNT

INVESTMENT PERFORMANCE

Total Returns

	THIRD QUARTER 1987	YEAR ENDING 9/30/87
Total Account	6.0%	33.8%
Median Fund*	6.2	35.9
Composite**	6.0	36.5
Equity Segment	6.0	34.2
Wilshire 5000	6.2	38.2

* TUCS Median Managed Equity Portfolio

** 95/5 Wilshire 5000/T-Bills Composite

SUPPLEMENTAL INVESTMENT FUND

COMMON STOCK INDEX ACCOUNT

The Common Stock Index Account is a new investment option for the participants in the Supplemental Investment Fund. The Index Account accepted contributions effective July 1, 1986. The September 30, 1987 market value of the Account was $2,210,759.

The investment objective of the Common Stock Index Account is to generate returns that match those of the common stock market. This objective is achieved through the Account's participation in the SBI's existing index fund.

The SBI's index fund is a passively-managed portfolio of over 1,300 different stocks. The fund is designed to track the performance of the Wilshire 5000, a broad-based equity market indicator. The Wilshire 5000 represents virtually the entire domestic common stock market.

The performance of the Supplemental Common Stock Index Account is presented below. Performance from third quarter 1986 on reflects the returns earned by the newly created Index Account. Performance data prior to third quarter 1986 represents what the performance of the Common Stock Index Account would have been had it participated in the index fund during the time periods indicated.

Total Returns

CALENDAR YEAR	SUPPLEMENTAL COMMON STOCK INDEX ACCOUNT	WILSHIRE 5000
1985	32.5%	32.6%
1986	16.0	16.1
1987 1Q	20.7	21.2
2Q	3.6	3.3
3Q	6.0	6.2
1 Year Ending 9/30/87	37.9	38.2
2 Years Annualized Ending 9/30/87	34.2	34.2

SUPPLEMENTAL INVESTMENT FUND

BOND MARKET ACCOUNT

The Bond Market Account is another new investment option for the participants in the Supplemental Investment Fund. The Account accepted contributions effective July 1, 1986. The September 30, 1987 market value of the Account was $642,869.

The investment objective of the Bond Market Account is to earn a high rate of return by investing in fixed income securities. Account returns are generated in the form of interest income and capital appreciation. The Account invests primarily in high-quality, government and corporate bonds that have intermediate to long-term maturities, usually 3 to 20 years.

The entire Bond Market Account is invested externally. The Account participates in the bond component of the Combined Investment Funds. Through this participation, the Account uses the same six external bond managers as the Basic Retirement Funds.

The Board funded the external bond managers in early July, 1984. The six managers were selected for their blend of investment styles. Each of the managers emphasizes active investment decisions. However, the managers vary in their approach to interest rate anticipation, issue selection, and bond market sector weighting.

Performance of the Supplemental Bond Market Account is displayed below. Individual manager performance is presented on page 17.

As with the Common Stock Index Account, performance from third quarter 1986 on reflects the returns earned by the new Bond Market Account. The performance prior to third quarter 1986 represents what the performance of the Bond Market Account would have been had the account participated in the bond component of the Combined Investment Funds during the periods indicated.

Total Returns

CALENDAR YEAR	SUPPLEMENTAL BOND MARKET ACCOUNT	SALOMON BROAD BOND INDEX
1985	21.7%	22.3%
1986	15.4	15.5
1987 1Q	2.3	1.3
2Q	- 2.3	- 1.6
3Q	- 2.2	- 2.8
1 Year Ending 9/30/87	2.8	0.2
2 Years Annualized Ending 9/30/87	10.0	9.8

SUPPLEMENTAL INVESTMENT FUND

MONEY MARKET ACCOUNT

The Money Market Account is essentially a new option for participants in the Supplemental Investment Fund. The Account was formerly called the Fixed Return Account. However, its name has been changed to more accurately reflect its new investment focus. The September 30, 1987 market value of the Account was $80 million.

The investment objective of the Money Market Account is to purchase short-term, liquid fixed income investments that pay interest at rates competitive with those available in the money markets.

The Money Market Account is invested entirely in high quality short-term investments such as U.S. Treasury Bills, bank certificates of deposit, repurchase agreements, and high grade commercial paper. The maximum maturity of these investments is three years.

The Money Market Account is managed solely by State Street Bank and Trust Company of Boston, MA. State Street manages a major portion of the Board's cash reserves.

Fourth quarter 1986 was the first full quarter of performance for the Money Market Account under its new focus. The historical performance from previous periods for State Street's short-term account represents the investment returns that would have been generated by the Money Market Account had it been invested under the current approach.

	Total Returns (Annualized)	
CALENDAR YEAR	SUPPLEMENTAL MONEY MARKET ACCOUNT	90-DAY TREASURY BILLS
1985	8.2%	7.9%
1986	6.9	6.3
1987 1Q	6.1	5.7
2Q	6.6	5.7
3Q	7.0	6.1
1 Year Ending 9/30/87	6.5	5.7
2 Years Annualized Ending 9/30/87	6.8	6.3

SUPPLEMENTAL INVESTMENT FUND

GUARANTEED RETURN ACCOUNT

The Guaranteed Return Account is a new investment option for participants in the Supplemental Investment Fund. The investment objectives of the Guaranteed Return Account are to protect investors from any loss of their original investment and to provide a fixed rate of return over a three year period.

The Guaranteed Return Account is invested in guaranteed investment contracts (GIC's) offered by major U.S. insurance companies. Each year, the Board will accept bids from insurance companies that meet the financial quality criteria defined by State statute. The insurance company offering the highest three-year GIC interest rate will be awarded the contract. That interest rate will then be offered to participants who make contributions to the Guaranteed Return Account over the following twelve months.

Final bidding on the 1987 GIC contract occurred during October, 1987. Principal Mutual Life Insurance Company (formerly The Bankers Life of Iowa) submitted the winning bid of 8.45%. Principal Mutual was also the winner of the 1986 GIC bidding. The 1986 GIC contract rate was 7.72%.

The Guaranteed Return Account first accepted contributions in November, 1986.

SUPPLEMENTAL INVESTMENT FUND

BOND ACCOUNT

The Bond Account was established by the 1981 Legislature to provide a separate fixed return investment vehicle for police and firefighter organizations. Its objective is to generate high levels of current income by investing in high quality debt securities. The Account's sole source of return is the interest income produced by its holdings.

Contributions to the Bond Account are grouped by fiscal year (July 1 to June 30), referred to as a "class year". The established yield for each class year is the weighted average yield on all fixed income securities purchased for that year. This established yield is in effect for the life of the class. If a retirement organization chooses to withdraw contributions from the Bond Account prior to the expiration of the fixed period for the class, its withdrawal will be redeemed at market value. Organizations withdrawing from the Account will not affect the established yield of other participants in the class.

The Bond Account is managed entirely by Investment Board staff. Since all assets are held to maturity, staff provides very cost-effective management for the Account.

Participation in the Bond Account is structured much like a money market mutual fund. The Account maintains a uniform value of $5.00 per share. Annual income for the Account is determined at the close of each fiscal year (June 30).

Participating organizations may choose to receive their annual income at the close of each fiscal year, or they may elect to use the income to purchase new shares in the upcoming class year.

Returns for the Bond Account for recent years are presented below:

CLASS YEAR	FIXED PERIOD	ESTABLISHED YIELD (ANNUAL)
1983	6 yrs. (1983-88)	11.2%
1984	7 yrs. (1984-90)	13.0%
1985	7 yrs. (1985-91)	11.8%
1986	7 yrs. (1986-92)	10.5%
1987	7 yrs. (1987-93)	9.0%

MINNESOTA STATE BOARD OF INVESTMENT

MINNESOTA VARIABLE ANNUITY FUND

QUARTERLY INVESTMENT REVIEW

SEPTEMBER 30, 1987

MINNESOTA STATE BOARD OF INVESTMENT

MINNESOTA VARIABLE ANNUITY FUND

THIRD QUARTER 1987

Summary

The Minnesota Variable Annuity Fund is an investment option formerly offered to members of the Teachers' Retirement Association. The Fund was designed as an alternative to the regular teachers' retirement plan. The opportunity to enroll in the Fund is no longer offered to new Association members, although members enrolled prior to the cutoff date may retain their participation in the Fund and continue to make contributions. The September 30, 1987 market value of the Fund was $181 million.

The investment objective of the Minnesota Variable Annuity Fund is comparable to that of the Supplemental Investment Fund's Growth Share Account. The goal of the Variable Annuity Fund is to generate above-average capital appreciation. Like the Growth Share Account, the Variable Annuity Fund's long-term, policy asset allocation is 95% common stocks, 5% cash equivalents.

Management of the Variable Annuity Fund is split between internal and external management. The SBI staff manages approximately 25% of the common stock portfolio, while the balance is managed externally. The SBI staff provides a conservative value-oriented style of management, while the external managers complement the internal staff with a more aggressive investment approach.

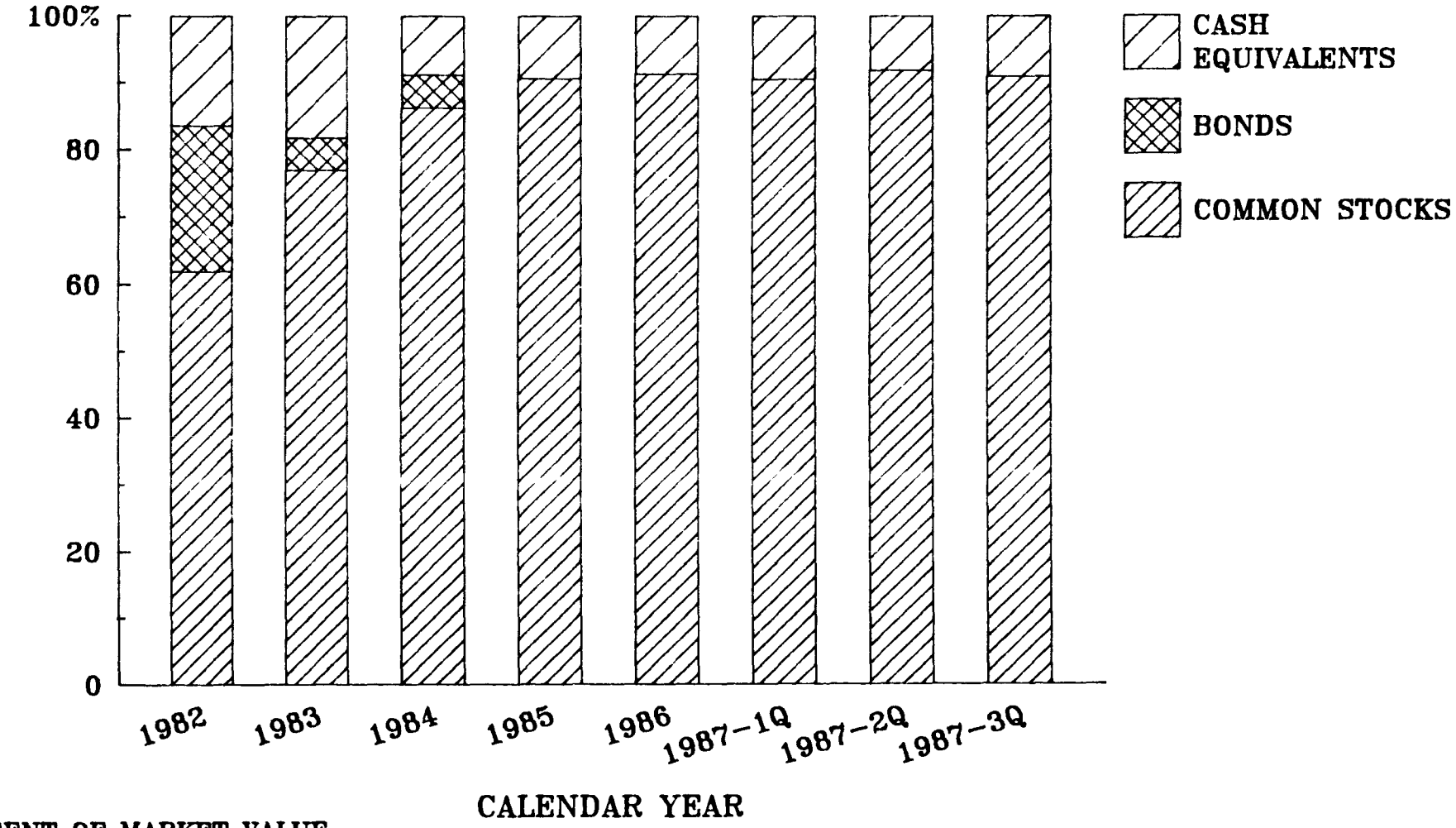
Historical asset allocation for the Minnesota Variable Annuity Fund is presented in the graph on page 53 and the accompanying table on page 54.

Total account and asset segment performance is presented in the table on page 55. Individual common stock managers performance is given on page 16.

FIGURE 12

MINNESOTA VARIABLE ANNUITY FUND

HISTORICAL ASSET MIX



PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 15

MINNESOTA VARIABLE ANNUITY FUND

ASSET MIX

PERCENT OF MARKET VALUE
(End Of Period Allocations)

Calendar Year		Common Stocks $Million	Common Stocks Percent	Bonds $Million	Bonds Percent	Cash* $Million	Cash* Percent
1982		56.7	62.0	19.8	21.6	15.0	16.4
1983		78.9	77.0	5.0	4.8	18.7	18.2
1984		89.4	86.3	5.1	4.9	9.1	8.8
1985		116.8	90.7	---	---	12.0	9.3
1986		127.6	91.4	---	---	12.0	8.6
1987	1Q	152.0	90.6	---	---	15.8	9.4
	2Q	156.6	91.8	---	---	14.0	8.2
	3Q	164.4	91.0	---	---	16.3	9.0

*Includes cash held by external managers

TABLE 16

MINNESOTA VARIABLE ANNUITY FUND

INVESTMENT PERFORMANCE

Total Returns

	THIRD QUARTER 1987	YEAR ENDING 9/30/87
Total Account	6.0%	34.0%
Median Fund*	6.2	35.9
Composite**	6.0	36.5
Equity Segment	6.0	34.3
Wilshire 5000	6.2	38.2

* TUCS Median Managed Equity Portfolio

** 95/5 Wilshire 5000/T-Bills Composite

MINNESOTA STATE BOARD OF INVESTMENT

PERMANENT SCHOOL FUND

QUARTERLY INVESTMENT REVIEW

SEPTEMBER 30, 1987

MINNESOTA STATE BOARD OF INVESTMENT

PERMANENT SCHOOL FUND

THIRD QUARTER 1987

Summary

ASSETS

The market value of the Permanent School Fund's assets declined 6.4% during the third quarter of the year. The decline was due to both net withdrawals from the Fund and the negative performance of the bond market. Withdrawals exceeded contributions to the fund by $1.1 million during the quarter. The third quarter decline in market value brought asset growth for the most recent year to -9.5%. The Fund experienced net withdrawals for the full year of over $28 million.

The asset growth history of the Permanent School Fund is presented below.

Calendar Year		Market Value (Millions)	Percent Change From Previous Period
1982		286	+ 21.2
1983		290	+ 1.4
1984		308	+ 6.2
1985		350	+ 13.6
1986		364	+ 4.0
1987	1Q	361	- 0.8
	2Q	361	0.0
	3Q	338	- 6.4

ASSET MIX

The asset mix of the Permanent School Fund changed significantly during the third quarter as the balance of the Fund's excess cash reserves was invested in bonds. The Permanent School Fund continues to hold only fixed income securities. Under current accounting limitations, common stocks are not appropriate vehicles for the Fund.

Asset mix for the Permanent School Fund for the last two quarters and year is displayed below.

ASSET MIX

	9/30/86	6/30/87	9/30/87
Common Stocks	0.0%	0.0%	0.0%
Bonds	75.8	82.2	92.3
Cash Equivalents	24.2	17.8	7.7
	100.0%	100.0%	100.0%

BOND PORTFOLIO

The composition of the Permanent School Fund's bond portfolio was altered slightly as a result of the third quarter investment of excess cash reserves. The cash reserves were used to create a more laddered distribution of bond maturities, thereby reducing the portfolio's exposure to reinvestment rate risk. With this rebalancing, the average maturity and duration of the portfolio were lengthened. The portfolio's current yield and yield to maturity were increased as well. Sector concentrations shifted modestly as a result of the new investments. The Utilities sector was increased in weighting, while the Mortgage sector position was trimmed. The average quality ranking remained at AAA.

TABLE 17

PERMANENT SCHOOL FUND

BOND PORTFOLIO STATISTICS

SEPTEMBER 30, 1987

Value at Market	$304,407,096
Value at Cost	329,534,968
Average Coupon	9.11%
Current Yield	9.81
Yield to Maturity	10.15
Current Yield at Cost	9.37
Time to Maturity	18.01 Years
Average Duration	7.57 Years
Average Quality Rating	AA
Number of Issues	129

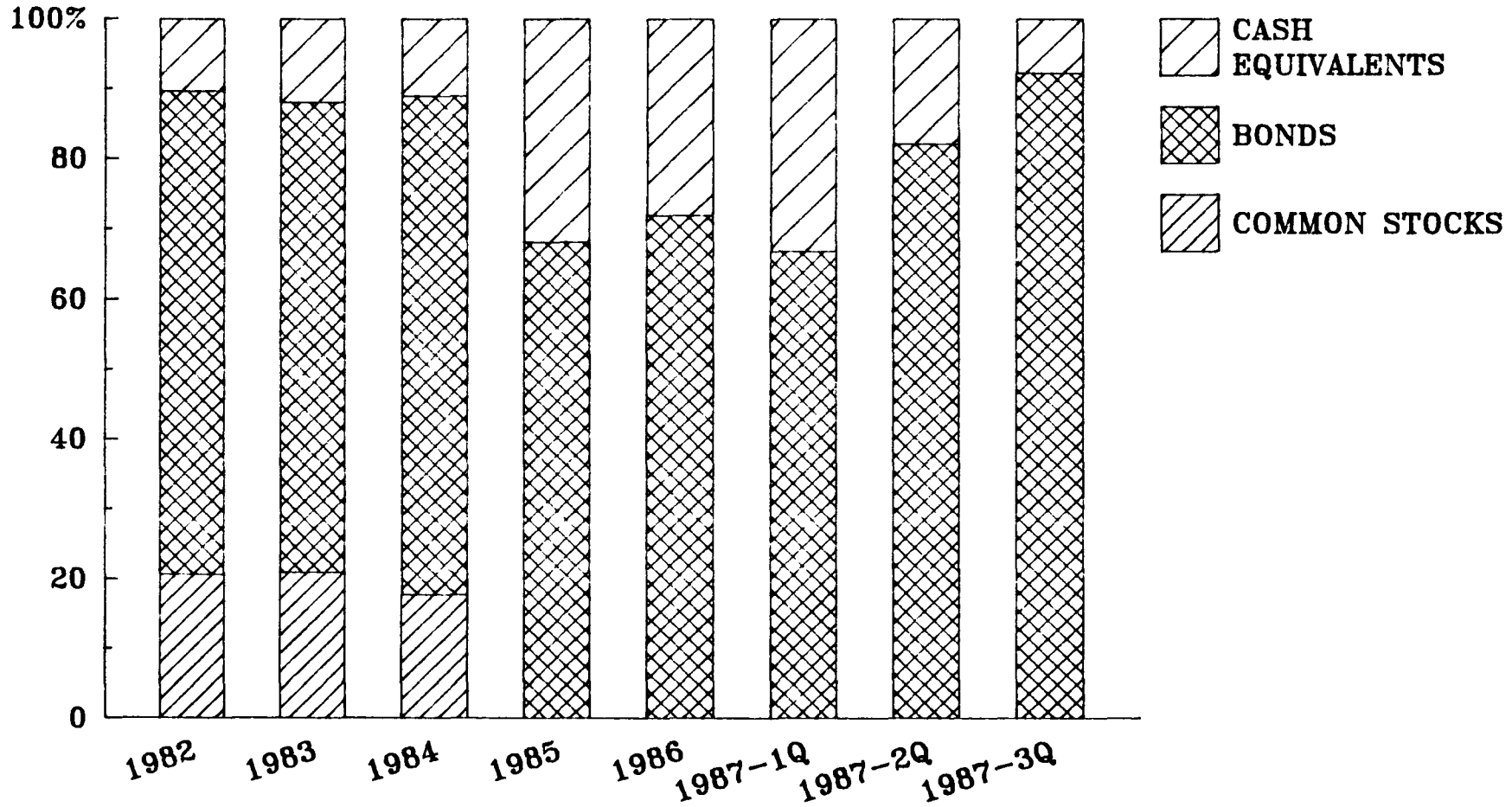
SECTOR WEIGHTINGS

Treasury	34.2%
Federal Agency	11.2
Industrial	10.5
Utilities	13.5
Finance	6.5
Transportation	3.2
Mortgages	19.9
Miscellaneous	1.0
	100.0%

FIGURE 13

PERMANENT SCHOOL FUND

HISTORICAL ASSET MIX



PERCENT OF MARKET VALUE
END OF PERIOD ALLOCATIONS

TABLE 18

PERMANENT SCHOOL FUND

ASSET MIX

PERCENT OF MARKET VALUE
(End Of Period Allocations)

Calendar Year		Common Stocks $Million	Common Stocks Percent	Bonds $Million	Bonds Percent	Cash $Million	Cash Percent
1982		59.1	20.7	197.6	69.0	29.5	10.3
1983		60.8	21.0	195.0	67.1	34.4	11.9
1984		54.9	17.8	219.4	71.2	33.8	11.0
1985		0.0	0.0	238.7	68.2	111.5	31.8
1986		0.0	0.0	262.3	72.0	102.1	28.0
1987	1Q	0.0	0.0	241.5	66.9	119.3	33.1
	2Q	0.0	0.0	296.8	82.2	64.1	17.8
	3Q	0.0	0.0	311.6	92.3	25.9	7.7

APPENDIX

This appendix contains historical portfolio data pertaining to the SBI's external equity and fixed income managers from the inception of the SBI's accounts with these managers. Any revisions of portfolio data reported in previous quarterly reviews are contained in this appendix.

EQUITY MANAGER PORTFOLIO STATISTICS GLOSSARY

In the following pages, summary descriptions of the individual equity managers' investment philosophy, risk characteristics, and performance data are displayed. Some of the statistics presented are technical in nature. This glossary is designed to aid in understanding the terms that are introduced.

The first five portfolio characteristics listed in the glossary are presented in the Quarterly Investment Review and Appendix on an absolute basis. The remaining portfolio statistics are reported relative to the stock market. The purpose of presenting these statistics in a relative fashion is to "normalize" them, or remove the impact of market-wide changes on the characteristics of a manager's portfolio. In calculating the relative values, the stock market is represented by the 1000 largest capitalization companies in the Wilshire 5000. The managers' portfolio characteristics are reported in standard deviation units relative to the average or mean of these 1000 companies. Thus, a positive (negative) value for a portfolio characteristic indicates a value higher (lower) than the market average.

# of Stocks - number of different issues held in the manager's stock portfolio.

Qtr. Port. Turnover - the manager's total equity asset sales during the quarter divided by the average value of the manager's equity assets over the quarter.

Equity Allocation - percent of the manager's total portfolio invested in common and preferred stocks and convertible securities.

Diversification (R2) - extent to which a manager's equity holdings statistically resemble the stock market. Low (high) diversification portfolios will experience returns which are not well (are well) correlated with those of the market. By definition, the market has a diversification measure of 1.0. The less a portfolio is diversified, the lower will be its diversification measure (referred to as R-squared). The SBI's managers are required, over the long-term, to hold portfolios with diversification levels less than .85.

Market Volatility (Equity Beta) - degree to which the returns on the manager's stock portfolio are sensitive to movements in the stock market's return. By definition the market has a market volatility measure (referred to as beta) of 1.0. Portfolios with values greater (less) than 1.0 have above (below) average sensitivity to market moves. The SBI's managers are required, over the long-term to hold portfolios with market volatility levels above 1.10. This measure does not include the impact of cash holdings on total portfolio volatility.

Price Variability (MVAR) - risk related to the historical variability of the prices of stocks in the manager's portfolio. The more variable are the portfolio's securities' prices, the more risky is the portfolio. Items such as current stock price, twelve month price range, trading volume, and beta make up this measure.

Earnings Variability (EVAR) - risk related to the variability of the earnings of those companies owned in the manager's portfolio. The more variable are the companies' earnings, the more risky is the portfolio. Items such as variance of accounting earnings, variance of cash flow, occurrence of extraordinary accounting items, and the correlation of companies' earnings with U.S. corporate earnings make up this measure.

12-Month Relative Return (REL RET) - the return on the stocks currently in the manager's portfolio over the last twelve months less the return on the S&P 500.

Price-to-Book Ratio (P/B) - the market value of the manager's portfolio divided by the latest available annual book value.

5 Year Earnings Growth (5 YR. EARN.) - the annualized growth of the average earnings per share of the manager's portfolio over the latest five fiscal years.

Size and Immaturity (SIZE)	- Risk related to the size and maturity of the companies held in the portfolio. The smaller and younger the companies, the more risky is the portfolio. Items such as total assets, market capitalization, gross plant/book value ratio, and company age make up this measure.
Growth (GROW)	- risk related to the growth orientation of companies owned by the manager. The more growth-oriented are the companies, the riskier is the portfolio. Items such as dividend yield, E/P ratio, and growth in total assets make up this measure.
Earnings-to-Price Ratio (E/P)	- the weighted average trailing four quarter earnings per share of the manager's common stock portfolio divided by the weighted average price per share of the manager's common stock portfolio.
Dividend Yield (YIELD)	- indicated annual dividend of the manager's stock portfolio divided by the portfolio market value.
Financial Leverage (FINL)	- risk related to the extent to which companies held in the portfolio have used debt to finance their operations. The more leveraged are the companies, the riskier is the portfolio. Items such as debt/asset ratio, current asset/current liability ratio, and uncovered fixed charges make up this ratio.
Industry Sector Overweightings	- those sectors of the economy in which the manager has invested a significantly larger percentage of the portfolio than is represented by the stock market.
Industry Sector Underweightings	- those sectors of the economy in which the manager has invested a significantly smaller percentage of the portfolio than is represented by the stock market.

TABLE A-1

EXTERNAL EQUITY MANAGERS
PORTFOLIO STATISTICS RELATIVE TO BENCHMARK PORTFOLIOS
QUARTER-END PORTFOLIO STATISTICS *

MANAGER		# OF STOCKS	EQUITY ALLOC.	MKT. VOLTY	DIVER.	YIELD	E/P	REL. RET.	P/B	5 YR EARN	MVAR	EVAR	SIZE	GROW	FINL
GROWTH MANAGERS															
Fred Alger	(A)	51	93	1.27	0.93	-0.62	-0.04	0.52	0.92	0.58	0.89	0.16	0.18	0.91	0.09
	(B)	569	95	1.16	N.A.	-0.37	-0.09	0.01	0.47	0.27	0.34	-0.01	0.35	0.53	0.02
Alliance	(A)	39	98	1.21	0.95	-0.55	-0.21	0.41	0.70	0.13	0.63	-0.04	-0.25	0.68	-0.07
	(B)	331	95	1.23	N.A.	-0.44	-0.14	-0.05	0.33	0.30	0.54	0.04	0.41	0.70	-0.03
SMALL GROWTH MANAGERS															
BMI Capital	(A)	35	98	1.28	0.90	-0.57	0.06	-0.33	-0.12	-0.39	0.54	0.52	1.97	0.60	0.10
	(B)	1,027	95	1.33	N.A.	-0.52	-0.24	-0.14	0.16	0.05	0.73	0.22	1.27	0.79	-0.08
Lieber & Co.	(A)	117	92	1.26	0.85	-0.25	0.15	-0.43	-0.14	0.26	0.26	0.04	2.29	0.67	-0.23
	(B)	1,118	95	1.29	N.A.	-0.42	-0.01	-0.44	0.02	0.09	0.41	0.08	1.95	0.83	-0.23
Waddell & Reed	(A)	60	74	1.26	0.92	-0.25	-0.38	0.16	0.05	-0.37	0.58	-0.02	1.63	0.89	-0.04
	(B)	1,187	80	1.26	N.A.	-0.45	-0.30	-0.07	0.13	-0.13	0.58	0.26	1.08	0.57	0.13
ROTATIONAL MANAGERS															
Forstmann Leff	(A)	37	56	1.04	0.93	-0.16	-0.09	0.36	0.16	0.02	0.20	0.22	-0.11	0.08	0.25
	(B)	1,369	70	1.17	N.A.	-0.13	-0.06	-0.19	0.12	0.06	0.30	0.06	0.61	0.43	0.07
Hellman Jordan	(A)	36	79	1.18	0.93	-0.35	0.26	-0.01	0.23	0.12	0.44	0.06	-0.10	0.62	-0.04
	(B)	847	83	1.05	N.A.	0.05	0.01	-0.11	0.14	0.09	0.07	0.01	-0.06	0.14	0.11
IDS	(A)	39	90	1.13	0.95	-0.34	-0.21	0.37	0.63	-0.20	0.45	0.13	-0.03	0.34	-0.04
	(B)	781	90	1.05	N.A.	0.13	0.03	-0.22	0.05	0.04	-0.01	-0.04	0.08	0.06	0.08
IAI	(A)	43	79	1.10	0.94	-0.28	-0.09	0.40	0.70	0.02	0.38	-0.04	-0.17	0.36	0.05
	(B)	330	85	1.02	N.A.	0.10	0.01	-0.09	0.13	0.03	0.05	-0.03	-0.25	-0.01	0.08
VALUE MANAGERS															
Beutel Goodman	(A)	30	86	1.15	0.85	0.01	-0.62	-0.42	-0.53	-0.30	0.05	0.08	0.74	0.30	0.33
	(B)	417	95	1.18	N.A.	-0.04	-0.03	-0.37	-0.44	-0.18	0.31	0.28	0.83	0.22	0.16
Peregrine Cap.	(A)	131	83	1.07	0.85	0.79	0.28	-0.85	-0.64	-0.21	-0.26	0.01	0.95	-0.09	0.12
	(B)	1,053	90	1.11	N.A.	0.05	-0.08	-0.32	-0.19	-0.21	0.06	0.02	0.46	0.14	0.12
Composite Active Ext. Managers		502	87	1.15	0.97	-0.15	-0.08	-0.08	0.12	-0.04	0.33	0.07	0.43	0.45	0.10
Index Fund Manager		1,525	100	1.06	0.98	0.07	-0.02	-0.16	0.05	-0.05	0.05	-0.03	0.36	0.10	0.00
Composite All Basic Eq. Managers		1,661	95	1.09	0.98	0.00	-0.04	-0.13	0.07	-0.05	0.14	0.00	0.38	0.21	0.03

(A) - Actual Portfolio
(B) - Benchmark Portfolio

TABLE A-2

EXTERNAL EQUITY MANAGERS

SECTOR WEIGHTINGS RELATIVE TO BENCHMARK PORTFOLIOS

SECTOR WEIGHTINGS

MANAGER		CAPITAL GOODS	CONSUMER DURABLES	CONSUMER NONDURABLES	ENERGY	FINANCIAL	MAT. & SERVICES	TECHNOLOGY	TRANS-PORTATION	UTILITIES
GROWTH MANAGERS										
Fred Alger	(A)	---	4.8%	54.1%	---	1.5%	13.1%	20.8%	5.7%	---%
	(B)	5.5%	1.8	35.4	2.2%	3.5	22.0	20.7	3.9	---
Alliance	(A)	5.8	4.6	35.2	2.6	14.3	15.4	19.1	3.1	---
	(B)	3.4	1.9	34.7	1.5	16.5	16.7	21.7	3.6	---
SMALL GROWTH MANAGERS										
BMI Capital	(A)	9.1	8.1	37.2	5.5	14.3	11.2	14.4	---	---
	(B)	5.2	5.5	30.2	3.6	11.0	19.7	19.1	4.8	0.9
Lieber & Company	(A)	4.0	6.9	31.4	1.6	32.3	6.3	11.0	5.9	0.6
	(B)	7.2	6.3	27.3	2.6	16.9	17.0	18.2	2.9	1.7
Waddell & Reed	(A)	0.6	8.5	15.1	7.0	2.3	21.0	30.9	6.2	8.3
	(B)	7.5	4.4	29.6	6.5	0.6	27.2	18.3	5.7	0.1
ROTATIONAL MANAGERS										
Forstmann Leff	(A)	1.8	1.7	33.1	---	4.5	30.5	17.4	3.0	8.0
	(B)	4.1	3.3	27.6	4.2	15.0	17.3	14.5	4.9	9.1
Hellman Jordan	(A)	---	11.7	20.0	1.2	15.5	13.1	32.9	3.9	1.9
	(B)	4.2	3.0	29.3	4.4	13.2	16.1	13.4	4.9	11.7
IDS	(A)	3.7	3.6	21.1	9.7	---	28.5	23.7	5.9	3.9
	(B)	3.9	2.6	26.8	5.2	13.9	15.2	13.5	4.5	14.5
Investment Advisers	(A)	8.2	2.8	32.9	3.2	---	29.3	14.7	3.8	5.1
	(B)	3.8	3.3	28.7	9.2	9.4	16.2	12.5	4.6	12.4
VALUE MANAGERS										
Beutel Goodman	(A)	5.7	2.8	14.6	14.4	26.4	7.1	22.7	---	6.3
	(B)	6.0	4.2	16.8	8.0	22.7	21.1	13.0	8.2	---
Peregrine Capital	(A)	2.8	7.1	21.1	2.7	19.4	8.2	14.7	2.6	21.4
	(B)	6.6	3.9	21.7	5.2	15.1	15.0	14.3	6.2	12.0
Composite External Managers		3.6	5.5	26.6	5.5	11.6	15.2	19.8	4.3	7.7
Index Fund Manager		5.2	3.8	27.5	9.0	12.3	13.8	13.6	3.3	11.6
Composite All Basic Managers		4.7	4.3	27.2	7.9	12.1	14.2	15.6	3.6	10.3
Wilshire 5000		4.9	3.9	28.1	8.9	12.4	13.8	13.5	3.2	11.3

(A) - Actual Portfolio
(B) - Benchmark Portfolio

TABLE A-3

EXTERNAL EQUITY MANAGERS

PERFORMANCE RELATIVE TO BENCHMARK PORTFOLIOS

Managers	Third Quarter 1987		Year Ending 9/30/87		Two Years Ending 9/30/87 (Annualized)		Three Years Ending 9/30/87 (Annualized)	
	Actual Portfolio	Benchmark Portfolio	Actual Portfolio	Benchmark Portfolio	Actual Portfolio	Benchmark Portfolio	Actual Portfolio	Benchmark Portfolio
Fred Alger	8.3%	7.1%	35.1%	43.3%	33.8%	35.4%	26.0%	27.6%
Alliance Capital	10.8	5.1	55.2	36.6	42.7	31.7	35.3	23.8
Beutel Goodman	8.6	6.9	32.8	39.1	27.2	34.0	22.7	28.3
BMI Capital	4.1	5.2	38.6	36.1	32.6	30.8	23.8	24.1
Forstmann Leff	8.4	4.2	36.4	27.2	35.3	24.9	29.5	20.4
Hellman Jordan	4.8	5.4	43.9	37.3	33.0	33.8	26.8	27.2
IDS	5.9	5.2	40.5	37.1	38.0	33.7	30.1	27.1
Investment Advisers	8.8	5.7	40.9	37.6	33.8	34.0	25.7	27.3
Lieber & Company	2.7	4.1	21.8	28.2	26.4	27.4	23.9	22.7
Peregrine Capital	3.9	5.9	29.1	32.2	22.7	28.9	N.A.	22.9
Waddell & Reed	9.8	6.0	40.0	38.1	31.1	34.2	24.3	27.4
Internal Manager	3.5	7.0	32.6	41.9	27.7	N.A.	N.A.	N.A.
Wilshire Associates (Index Fund)	6.0	6.2	37.6	38.2	33.9	34.2	27.3	27.5
Total Basic Retirement Funds' Common Stock Segment	6.3	6.0	37.6	37.2	33.3	N.A.	26.9	N.A.
Capital Markets Data								
Wilshire 5000	6.2	--	38.2	--	34.2	--	27.5	--
90-Day Treasury Bills	1.5	--	5.7	--	6.3	--	7.0	--
Inflation	1.3	--	4.3	--	3.0	--	3.1	--

TABLE A-4

EXTERNAL EQUITY MANAGERS

PORTFOLIO STATISTICS HISTORICAL SUMMARY

MANAGER NAME	DATE	QTR. PORT. T/O	EQUITY ALLOC.	R2	EQUITY BETA	MVAR	EVAR	REL RET	P/B	5 YR EARN	SIZE	GROW	E/P	YIELD	FINL
AVG. EXT. MANAGERS	9/30/87	29	84	0.91	1.18	0.39	0.10	0.02	0.18	-0.03	0.65	0.49	-0.08	-0.23	0.05
	6/30/87	29	88	0.92	1.17	0.38	0.12	-0.04	0.28	0.02	0.33	0.46	-0.11	-0.26	-0.02
	3/31/87	35	88	0.92	1.20	0.44	0.13	-0.07	0.23	-0.09	0.27	0.41	-0.06	-0.28	0.01
	12/31/86	28	89	0.91	1.20	0.43	0.15	0.06	0.20	-0.05	0.31	0.41	-0.05	-0.29	-0.01
	9/30/86	26	87	0.90	1.25	0.55	0.21	0.04	0.10	0.04	0.47	0.50	-0.06	-0.33	-0.05
	6/30/86	25	91	0.90	1.28	0.70	0.26	0.09	0.12	0.01	0.45	0.49	-0.06	-0.36	-0.07
	3/31/86	29	92	0.88	1.25	0.66	0.30	-0.04	0.07	0.02	0.41	0.41	-0.53	-0.27	0.08
	12/31/85	29	90	0.89	1.23	0.55	0.29	0.03	0.04	-0.02	0.43	0.33	-0.34	-0.23	0.14
	9/30/85	27	82	0.83	1.23	0.53	0.27	-0.29	0.04	0.07	0.41	0.31	-0.15	-0.25	0.07
	6/30/85	24	90	0.83	1.23	0.55	0.14	-0.23	0.07	0.20	0.46	0.27	-0.07	-0.18	-0.02
	3/31/85	33	90	0.82	1.23	0.53	0.02	-0.26	0.06	0.21	0.54	0.13	-0.01	-0.17	0.03
	12/31/84	24	86	0.81	1.25	0.56	0.08	-0.13	0.17	0.03	0.73	0.23	-0.03	-0.32	0.05
	9/30/84	33	84	0.82	1.26	0.56	0.09	-0.10	0.17	0.05	0.72	0.22	-0.08	-0.28	0.04
	6/30/84	27	81	0.81	1.29	0.36	0.04	-0.25	0.13	0.01	0.79	0.19	-0.02	-0.29	0.14
	3/31/84	25	83	0.82	1.25	0.38	0.03	-0.10	0.13	0.01	0.60	0.20	-0.15	-0.26	0.08
	12/31/83	36	84	0.80	1.23	0.44	0.07	-0.03	0.07	-0.19	0.80	0.26	-0.31	-0.27	0.06
FRED ALGER	9/30/87	40	93	0.93	1.27	0.89	0.16	0.52	0.92	0.58	0.18	0.91	-0.04	-0.62	0.09
	6/30/87	50	95	0.94	1.17	0.64	0.11	0.30	0.92	0.39	0.02	0.64	-0.25	-0.48	0.04
	3/31/87	82	79	0.95	1.16	0.48	0.21	0.01	0.37	0.13	0.16	0.32	-0.02	-0.35	-0.04
	12/31/86	49	93	0.95	1.17	0.45	0.13	0.26	0.73	0.01	0.19	0.39	-0.02	-0.34	-0.04
	9/30/86	38	88	0.91	1.28	0.84	0.32	0.44	0.56	0.03	0.40	0.49	-0.19	-0.58	-0.10
	6/30/86	21	94	0.92	1.31	0.88	0.35	0.74	0.40	0.09	0.02	0.39	-0.04	-0.56	-0.01
	3/31/86	40	98	0.91	1.29	0.94	0.48	0.31	0.23	0.12	-0.17	0.45	-0.40	-0.54	0.19
	12/31/85	28	95	0.90	1.25	0.69	0.45	0.11	0.13	0.25	0.14	0.19	0.02	-0.45	0.25
	9/30/85	28	95	0.83	1.23	0.64	0.33	-0.07	0.16	0.31	0.32	0.33	-0.17	-0.42	0.08
	6/30/85	41	92	0.79	1.23	0.77	0.39	-0.07	0.32	0.48	0.26	0.53	-0.05	-0.55	0.05
	3/31/85	36	96	0.85	1.27	0.84	0.24	0.03	0.39	0.69	0.05	0.38	-0.23	-0.64	0.08
	12/31/84	16	95	0.86	1.19	0.48	0.05	0.03	0.35	0.10	0.26	0.10	0.03	-0.47	-0.09
	9/30/84	20	94	0.86	1.22	0.44	0.14	0.10	0.34	0.00	0.42	-0.01	-0.04	-0.44	-0.08
	6/30/84	16	93	0.86	1.22	0.11	-0.01	0.06	0.06	-0.21	0.45	-0.13	-0.21	-0.31	0.07
	3/31/84	19	91	0.86	1.19	0.14	0.04	-0.13	0.08	-0.34	0.46	-0.12	-0.40	-0.32	-0.00
	12/31/83	23	95	0.88	1.18	0.38	0.08	0.26	-0.04	-0.37	0.31	-0.05	-0.50	-0.32	0.05

MANAGER NAME	DATE	QTR. PORT. T/O	EQUITY ALLOC.	R2	EQUITY BETA	MVAR	EVAR	REL RET	P/B	5 YR EARN	SIZE	GROW	E/P	YIELD	FINL
ALLIANCE CAPITAL	9/30/87	13	98	0.95	1.21	0.63	-0.04	0.41	0.70	0.13	-0.25	0.68	-0.21	-0.55	-0.07
	6/30/87	18	99	0.96	1.20	0.54	0.03	0.13	0.70	0.25	-0.18	0.67	-0.09	-0.50	-0.08
	3/31/87	29	92	0.95	1.20	0.55	0.06	0.09	0.93	0.20	-0.28	0.65	-0.08	-0.51	-0.10
	12/31/86	19	96	0.92	1.23	0.43	-0.04	0.28	0.66	0.34	-0.15	0.82	-0.06	-0.58	-0.08
	9/30/86	13	99	0.91	1.21	0.44	-0.14	0.20	0.64	0.35	-0.12	0.64	0.00	-0.50	-0.26
	6/30/86	11	97	0.89	1.21	0.88	0.35	0.30	0.75	0.48	-0.19	0.68	-0.02	-0.50	-0.26
	3/31/86	17	94	0.85	1.24	0.53	0.11	0.48	0.88	0.36	-0.10	0.57	-0.46	-0.49	0.09
	12/31/85	7	96	0.83	1.23	0.52	0.13	0.23	1.06	0.43	-0.14	0.56	-0.44	-0.54	0.00
	9/30/85	15	89	0.73	1.24	0.53	0.15	0.09	0.99	0.54	-0.02	0.64	-0.50	-0.61	-0.08
	6/30/85	7	95	0.76	1.21	0.52	0.03	0.04	0.96	0.66	0.08	0.68	-0.30	-0.56	-0.06
	3/31/85	10	96	0.76	1.19	0.48	-0.12	0.10	0.74	0.73	0.15	0.63	-0.27	-0.55	-0.20
	12/31/84	8	92	0.73	1.30	0.56	0.09	0.03	0.82	0.51	0.26	0.85	-0.29	-0.73	-0.15
	9/30/84	13	88	0.72	1.34	0.53	0.15	-0.02	0.72	0.52	0.33	0.83	-0.28	-0.65	-0.09
	6/30/84	8	92	0.73	1.39	0.46	0.13	-0.27	0.78	0.45	0.48	0.78	-0.40	-0.73	-0.04
	3/31/84	12	92	0.72	1.38	0.68	0.13	0.13	0.71	0.46	0.50	0.65	-0.47	-0.72	-0.04
	12/31/83	14	92	0.72	1.37	0.65	0.31	0.18	0.78	0.14	0.45	0.72	-0.50	-0.72	0.06
BEUTEL GOODMAN	9/30/87	15	86	0.85	1.15	0.05	0.08	-0.42	-0.53	-0.30	0.74	0.30	-0.62	0.01	0.33
	6/30/87	12	86	0.89	1.14	0.13	0.05	-0.30	-0.59	-0.30	0.22	0.18	-0.42	-0.08	0.24
	3/31/87	25	84	0.88	1.18	0.25	0.31	-0.57	-0.66	-0.23	0.25	0.34	-0.17	-0.02	0.27
	12/31/86	18	96	0.86	1.21	0.41	0.22	-0.79	-0.69	-0.24	0.22	0.40	-0.35	-0.04	0.39
	9/30/86	13	95	0.87	1.20	0.33	0.48	-0.68	-0.68	-0.35	0.38	0.09	-0.31	0.09	0.35
	6/30/86	10	87	0.89	1.20	0.22	0.54	-0.79	-0.67	-0.28	0.23	0.07	-0.41	0.10	0.28
	3/31/86	22	87	0.85	1.15	0.37	0.64	-0.66	-0.64	-0.33	0.19	0.23	-0.94	0.06	0.12
	12/31/85	18	89	0.83	1.22	0.30	0.58	-0.58	-0.61	-0.74	0.63	0.13	-0.88	0.25	0.35
	9/30/85	5	99	0.81	1.26	0.47	0.47	-0.40	-0.32	-0.52	0.90	0.12	-0.73	0.09	0.26
	6/30/85	6	94	0.83	1.24	0.55	0.22	-0.27	-0.26	-0.64	0.96	0.27	-0.55	-0.02	0.37
	3/31/85	14	93	0.83	1.18	0.38	-0.25	-0.38	-0.25	-0.71	1.19	0.14	-0.43	0.06	0.24
	12/31/84	8	94	0.81	1.19	0.27	-0.15	-0.41	-0.42	-0.87	1.14	0.04	0.21	0.06	0.63
	9/30/84	10	93	0.81	1.21	0.31	-0.17	-0.10	-0.41	-0.81	1.28	0.10	0.23	0.08	0.59
	6/30/84	11	92	0.79	1.18	0.05	-0.29	0.19	-0.44	-0.89	1.32	0.07	0.02	-0.05	0.58
	3/31/84	12	98	0.79	1.16	0.16	-0.19	0.27	-0.41	-0.85	1.34	0.01	-0.42	-0.04	0.37
	12/31/83	15	95	0.74	1.08	0.21	-0.08	0.22	-0.42	-0.61	1.18	0.03	-0.72	0.05	0.24
BMI CAPITAL	9/30/87	23	98	0.90	1.28	0.54	0.52	-0.33	-0.12	-0.39	1.97	0.60	0.06	-0.57	0.10
	6/30/87	14	99	0.91	1.28	0.62	0.61	-0.19	-0.02	-0.34	1.56	0.60	0.09	-0.64	0.14
	3/31/87	20	96	0.89	1.29	0.65	0.48	-0.02	0.00	-0.62	1.27	0.89	0.10	-0.63	0.25
	12/3186	21	96	0.91	1.21	0.67	0.47	0.13	-0.01	-0.43	1.15	0.76	-0.09	-0.74	-0.04
	9/30/86	7	97	0.89	1.31	0.78	0.49	0.14	-0.03	-0.28	1.50	1.07	-0.35	-0.85	-0.11
	6/30/86	20	96	0.90	1.37	1.10	0.31	0.23	0.23	-0.14	1.60	0.95	-0.08	-0.84	-0.17
	3/31/86	17	97	0.86	1.33	0.98	0.43	-0.13	0.37	0.03	1.48	0.96	-1.06	-0.59	0.08
	12/31/85	5	95	0.85	1.27	0.74	0.35	-0.30	0.22	0.13	1.14	0.59	-0.80	-0.40	-0.01
	9/30/85	28	28	0.72	1.40	0.89	0.32	-0.78	0.48	0.67	1.47	0.74	-0.42	-0.71	-0.25
	6/30/85	10	98	0.75	1.22	0.80	0.17	-0.52	0.80	1.06	1.42	0.63	-0.14	-0.56	-0.38
	3/31/85	2	99	0.55	1.26	0.84	0.10	-0.66	1.13	1.04	1.49	0.23	-0.20	-0.61	-0.33
	12/31/84	13	87	0.74	1.33	0.78	0.34	-0.20	1.05	0.56	1.41	0.11	-0.24	-0.57	-0.18
	9/30/84	29	82	0.75	1.33	0.78	0.17	-0.44	0.83	0.63	1.17	-0.05	0.01	-0.44	-0.23
	6/30/84	6	99	0.79	1.33	0.63	0.17	-0.37	0.67	0.32	1.51	0.22	-0.24	-0.48	-0.16
	3/31/84	18	95	0.80	1.32	0.77	0.20	-0.53	0.72	0.31	1.86	0.36	-0.40	-0.47	-0.14
	12/31/83	14	98	0.81	1.29	1.02	0.26	0.26	0.58	0.08	1.60	0.48	-0.52	-0.49	0.01

MANAGER NAME	DATE	QTR. PORT. T/O	EQUITY ALLOC.	R2	EQUITY BETA	MVAR	EVAR	REL RET	P/B	5 YR EARN	SIZE	GROW	E/P	YIELD	FINL
FORSTMANN-LEFF	9/30/87	50	56	0.93	1.04	0.20	0.22	0.36	0.16	0.02	-0.11	0.08	-0.09	-0.16	0.25
	6/30/87	63	68	0.94	1.11	0.47	0.10	0.50	0.53	-0.01	-0.20	0.23	-0.30	-0.29	0.05
	3/31/87	77	77	0.95	1.21	0.51	-0.09	0.29	0.55	-0.09	-0.16	0.30	-0.15	-0.45	0.00
	12/31/86	54	71	0.88	1.29	0.64	0.29	0.90	1.01	0.24	0.19	0.44	-0.09	-0.58	-0.16
	9/30/86	60	51	0.85	1.53	1.33	0.59	0.44	0.43	0.44	1.08	1.07	-0.02	-0.82	-0.12
	6/30/86	71	87	0.88	1.49	1.26	0.51	0.29	0.37	0.35	0.87	0.93	-0.04	-0.72	-0.25
	3/31/86	83	89	0.88	1.37	0.91	0.35	0.16	0.10	-0.35	0.64	0.59	-0.77	-0.39	0.27
	12/31/85	78	88	0.91	1.35	0.94	0.36	0.48	0.06	-0.38	0.03	0.45	-0.44	-0.46	0.35
	9/30/85	108	70	0.88	1.27	0.64	0.24	0.13	0.10	-0.42	0.00	0.25	-0.48	-0.43	0.25
	6/30/85	27	77	0.89	1.22	0.83	0.17	0.16	0.15	0.08	-0.20	0.35	-0.07	-0.33	0.09
	3/31/85	55	69	0.89	1.19	0.67	0.07	-0.15	-0.04	0.13	-0.03	0.16	0.14	-0.18	0.02
	12/31/84	12	87	0.84	1.22	0.39	-0.06	-0.14	-0.07	-0.44	0.39	-0.06	-0.01	-0.10	0.08
	9/30/84	40	83	0.86	1.26	0.49	0.03	-0.20	-0.25	-0.43	0.25	-0.17	-0.23	-0.09	0.14
	6/30/84	31	54	0.81	1.26	0.14	0.01	-0.27	-0.21	-0.22	0.16	0.07	-0.08	-0.16	0.15
	3/31/84	34	71	0.82	1.17	0.13	-0.04	-0.11	-0.14	-0.21	0.17	0.05	-0.18	-0.10	0.15
	12/31/83	41	81	0.70	1.10	0.02	-0.11	-0.25	-0.03	-0.25	-0.12	-0.03	-0.15	-0.07	0.05
HELLMAN JORDAN	9/30/87	55	79	0.93	1.18	0.44	0.06	-0.01	0.23	0.12	-0.10	0.62	0.26	-0.35	-0.04
	6/30/87	44	78	0.93	1.22	0.59	0.13	-0.02	0.56	0.27	-0.39	0.78	0.08	-0.45	-0.28
	3/31/87	18	96	0.93	1.33	0.83	0.10	0.08	0.64	-0.16	-0.17	0.84	-0.17	-0.65	-0.05
	12/31/86	16	96	0.91	1.29	0.72	0.11	0.05	0.36	-0.22	-0.24	0.65	0.02	-0.64	-0.05
	9/30/86	20	96	0.90	1.34	0.87	0.07	0.22	0.30	-0.21	-0.18	0.89	-0.02	-0.70	-0.06
	6/30/86	15	98	0.89	1.34	0.80	0.15	0.12	0.16	-0.29	-0.07	0.95	-0.02	-0.57	0.00
	3/31/86	35	97	0.88	1.26	0.79	0.34	0.26	0.06	0.19	-0.16	0.83	-0.71	-0.48	0.09
	12/31/85	36	95	0.93	1.14	0.32	0.23	-0.13	-0.17	0.04	-0.13	0.39	-0.22	-0.22	0.25
	9/30/85	36	96	0.89	1.07	0.26	0.09	-0.49	-0.29	-0.06	-0.54	0.03	0.02	0.00	0.27
	6/30/85	38	89	0.89	1.10	0.29	-0.04	-0.27	-0.21	-0.12	-0.47	-0.07	0.18	0.15	0.07
	3/31/85	52	81	0.88	1.13	0.28	-0.12	-0.20	-0.28	-0.07	-0.24	0.00	-0.07	0.06	0.30
	12/31/84	36	82	0.86	1.21	0.59	0.25	-0.36	-0.35	-0.36	0.15	0.12	0.14	-0.09	0.30
	9/30/84	10	80	0.84	1.22	0.64	0.38	-0.17	-0.26	-0.45	0.22	0.16	-0.08	0.05	0.33
	6/30/84	34	61	0.87	1.25	0.28	0.21	-0.34	-0.29	-0.33	0.10	0.10	-0.10	0.16	0.52
	3/31/84	30	58	0.87	1.16	0.25	0.15	0.03	-0.41	-0.22	0.01	0.19	-0.05	0.25	0.30
	12/31/83	43	51	0.74	1.23	0.16	0.09	-0.19	-0.23	-0.26	0.25	0.18	0.07	0.45	0.26
IDS ADVISORY	9/30/87	31	90	0.95	1.13	0.45	0.13	0.37	0.63	-0.20	-0.03	0.34	-0.21	-0.34	-0.04
	6/30/87	22	98	0.96	1.13	0.41	0.09	0.26	0.45	0.07	-0.09	0.38	-0.23	-0.30	-0.07
	3/31/87	38	97	0.96	1.14	0.44	0.05	0.42	0.65	0.07	-0.20	0.27	-0.15	-0.22	-0.15
	12/31/86	14	99	0.94	1.16	0.35	0.08	0.48	0.51	0.25	0.01	0.27	0.09	-0.21	-0.07
	9/30/86	28	95	0.92	1.19	0.45	0.22	0.58	0.35	0.32	0.18	0.23	0.10	-0.18	-0.03
	6/30/86	28	90	0.93	1.19	0.54	0.17	0.54	0.46	0.25	0.09	0.22	0.06	-0.23	-0.08
	3/31/86	16	92	0.91	1.20	0.53	0.21	0.44	0.50	0.34	0.11	0.29	-0.11	-0.22	0.11
	12/31/85	19	93	0.88	1.18	0.55	0.30	0.19	0.55	0.35	0.24	0.28	-0.12	-0.21	0.16
	9/30/85	21	98	0.86	1.15	0.37	0.28	-0.02	0.30	0.34	0.07	0.22	-0.17	-0.15	0.06
	6/30/85	13	98	0.87	1.11	0.37	0.21	0.17	0.16	0.41	-0.02	0.16	0.00	0.04	0.03
	3/31/85	39	87	0.85	1.08	0.24	-0.06	0.10	0.07	0.43	-0.09	-0.06	0.18	0.18	0.10
	12/31/84	21	89	0.83	1.05	0.04	-0.10	0.16	0.12	0.23	-0.07	-0.07	0.11	0.25	0.07
	9/30/84	40	92	0.89	1.08	0.17	-0.12	0.17	0.28	0.31	0.08	-0.04	0.19	0.23	0.03
	6/30/84	42	87	0.85	1.04	-0.08	-0.15	0.28	0.54	0.31	0.28	-0.11	0.18	0.21	0.17
	3/31/84	41	82	0.80	1.09	0.11	-0.01	0.23	0.15	0.19	0.17	-0.13	0.28	0.14	0.04
	12/31/83	45	89	0.86	1.17	0.24	0.23	0.27	0.15	-0.15	0.43	0.22	-0.34	-0.13	0.14

MANAGER NAME	DATE	QTR. PORT. T/O	EQUITY ALLOC.	R2	EQUITY BETA	MVAR	EVAR	REL RET	P/B	5 YR EARN	SIZE	GROW	E/P	YIELD	FINL
INVESTMENT ADVISERS	9/30/87	7	79	0.94	1.10	0.38	-0.04	0.40	0.70	0.02	-0.17	0.36	-0.09	-0.28	0.05
	6/30/87	9	82	0.95	1.06	0.19	0.05	0.29	0.85	0.01	-0.14	0.21	-0.13	-0.27	0.03
	3/31/87	8	82	0.95	1.08	0.27	0.06	0.18	0.72	0.08	-0.16	0.16	-0.06	-0.27	0.04
	12/31/86	15	77	0.93	1.07	0.24	0.12	0.29	0.45	0.02	-0.12	0.18	0.00	-0.23	-0.02
	9/30/86	12	77	0.94	1.12	0.31	0.06	0.27	0.34	0.07	0.00	0.35	-0.17	-0.39	-0.09
	6/30/86	22	84	0.94	1.17	0.55	-0.04	0.40	0.28	0.06	-0.03	0.28	-0.16	-0.44	-0.10
	3/31/86	13	84	0.95	1.12	0.48	0.10	0.07	0.02	-0.03	-0.11	0.40	-0.57	-0.29	0.02
	12/31/85	32	83	0.93	1.14	0.39	0.18	-0.22	0.04	-0.01	-0.12	0.29	-0.27	-0.24	0.02
	9/30/85	4	95	0.92	1.15	0.45	0.18	-0.40	-0.12	0.07	-0.02	0.28	0.02	-0.25	0.03
	6/30/85	10	90	0.90	1.17	0.60	0.10	-0.33	-0.26	0.14	-0.17	0.12	0.18	-0.19	-0.08
	3/31/85	28	89	0.91	1.17	0.51	0.05	-0.33	-0.26	0.16	0.08	-0.02	0.43	-0.11	-0.06
	12/31/84	9	97	0.88	1.19	0.39	-0.12	-0.20	-0.34	-0.15	0.09	-0.08	0.43	-0.01	0.04
	9/30/84	21	88	0.86	1.21	0.40	-0.13	-0.21	-0.23	-0.00	0.12	0.02	0.45	-0.02	0.06
	6/30/84	8	98	0.89	1.21	0.11	-0.23	-0.28	-0.22	0.09	0.08	0.02	0.48	0.00	0.21
	3/31/84	21	92	0.89	1.17	0.05	-0.22	-0.36	-0.17	0.14	0.14	0.07	0.25	-0.14	0.22
	12/31/83	16	89	0.86	1.13	0.06	-0.15	-0.30	-0.16	-0.05	0.01	0.15	-0.09	-0.17	0.17
LIEBER & COMPANY	9/30/87	16	92	0.85	1.26	0.26	0.04	-0.43	-0.14	0.26	2.29	0.67	0.15	-0.25	-0.23
	6/30/87	11	97	0.86	1.25	0.17	-0.01	-0.51	-0.04	0.27	1.50	0.74	0.19	-0.23	-0.27
	3/31/87	15	94	0.85	1.27	0.27	0.06	-0.25	-0.01	0.22	1.58	0.59	0.15	-0.34	-0.25
	12/31/86	14	96	0.88	1.28	0.35	0.11	0.01	-0.08	0.13	1.47	0.49	0.19	-0.32	-0.17
	9/30/86	11	99	0.89	1.31	0.44	0.10	0.06	-0.02	0.24	1.44	0.52	0.15	-0.32	-0.27
	6/30/86	7	99	0.90	1.32	0.59	0.12	0.12	0.05	0.15	1.50	0.55	0.14	-0.36	-0.33
	3/31/86	14	99	0.86	1.31	0.63	0.02	-0.06	0.03	0.16	1.49	0.48	0.00	-0.38	-0.27
	12/31/85	12	97	0.85	1.30	0.53	0.07	-0.01	0.04	0.27	1.56	0.48	0.02	-0.39	-0.21
	9/30/85	6	98	0.80	1.30	0.54	0.12	-0.04	0.03	0.35	1.64	0.50	-0.10	-0.40	-0.31
	6/30/85	14	96	0.80	1.27	0.55	0.04	-0.17	0.03	0.40	1.83	0.36	-0.05	-0.35	-0.43
	3/31/85	19	99	0.81	1.24	0.65	0.03	0.04	0.09	0.35	1.79	0.17	-0.02	-0.35	-0.21
	12/31/84	14	85	0.79	1.34	0.78	0.12	-0.25	0.03	0.39	1.94	0.48	-0.05	-0.47	-0.17
	9/30/84	17	87	0.80	1.31	0.74	0.07	-0.28	0.05	0.49	1.99	0.51	0.01	-0.48	-0.18
	6/30/84	10	95	0.81	1.33	0.76	0.05	-0.37	0.13	0.52	1.99	0.42	-0.02	-0.48	-0.10
	3/31/84	0	93	0.85	1.37	0.65	0.00	-0.16	0.18	0.57	1.99	0.45	0.03	-0.46	-0.12
	12/31/83	9	00	0.83	1.24	0.63	-0.01	0.30	-0.06	0.28	1.93	0.29	0.12	-0.38	-0.07
PEREGRINE CAPITAL	9/30/87	30	83	0.85	1.07	-0.26	0.01	-0.85	-0.64	-0.21	0.95	-0.09	0.28	0.79	0.12
	6/30/87	26	79	0.84	1.10	-0.15	-0.04	-0.91	-0.61	-0.25	0.67	-0.05	0.15	0.69	0.12
	3/31/87	41	79	0.84	1.12	-0.11	0.00	-0.90	-0.59	-0.19	0.54	-0.04	0.06	0.57	0.10
	12/31/86	50	81	0.86	1.18	0.12	0.04	-1.05	-0.57	-0.20	0.51	0.16	-0.15	0.42	0.12
	9/30/86	50	83	0.86	1.12	-0.07	0.06	-1.06	-0.66	-0.26	0.50	0.12	0.00	0.47	0.17
	6/30/86	37	83	0.79	1.18	0.09	0.27	-1.28	-0.75	-0.52	0.62	0.17	-0.06	0.56	0.22
	3/31/86	47	84	0.76	1.19	0.19	0.16	-1.53	-0.73	-0.41	0.73	0.20	-0.31	0.51	0.19
	12/31/85	53	82	0.81	1.21	0.26	0.18	-1.31	-0.77	-0.55	0.88	0.10	-0.54	0.33	0.27
	9/30/85	9	80	0.82	1.22	0.53	0.37	-1.26	-0.63	-0.36	0.36	0.15	-0.33	0.22	0.24
	6/30/85	58	75	0.78	1.48	0.25	0.00	-1.46	-0.60	-0.45	1.06	0.07	-0.34	0.27	-0.13
	3/31/85	49	89	0.79	1.41	0.32	0.07	-1.28	-0.53	-0.48	1.01	-0.07	-0.09	0.27	0.02
	12/31/84	37	87	0.81	1.37	1.11	0.39	-0.05	0.72	0.27	1.88	0.76	-0.79	-0.96	-0.11
	9/30/84	61	97	0.81	1.36	1.10	0.43	0.10	0.89	0.22	1.70	0.83	-0.82	-0.95	-0.17
	6/30/84	26	89	0.83	1.39	0.77	0.37	-0.59	0.49	0.23	1.45	0.71	-0.55	-0.77	-0.09
	3/31/84	66	87	0.82	1.28	0.76	0.26	-0.30	0.82	0.31	1.29	0.77	-0.59	-0.67	-0.07
	12/31/83	92	83	0.87	1.23	0.66	0.16	0.12	0.41	0.12	1.32	0.74	-0.59	-0.69	-0.09

MANAGER NAME	DATE	QTR. PORT. T/O	EQUITY ALLOC.	R2	EQUITY BETA	MVAR	EVAR	REL RET	P/B	5 YR EARN	SIZE	GROW	E/P	YIELD	FINL
WADDELL & REED	9/30/87	38	74	0.92	1.26	0.58	-0.02	0.16	0.05	-0.37	1.63	0.89	-0.38	-0.25	0.04
	6/30/87	45	86	0.92	1.25	0.54	0.16	0.03	0.28	-0.17	0.70	0.65	-0.30	-0.35	-0.09
	3/31/87	29	90	0.93	1.22	0.65	0.18	-0.07	-0.05	-0.41	0.67	0.16	-0.17	-0.18	0.03
	12/31/86	42	73	0.95	1.13	0.38	0.16	0.06	-0.14	-0.47	0.23	-0.02	-0.11	0.09	-0.01
	9/30/86	38	78	0.94	1.14	0.38	0.07	0.03	-0.13	-0.17	0.00	0.02	0.13	0.10	-0.06
	6/30/86	35	79	0.93	1.28	0.74	0.08	0.28	0.02	-0.04	0.30	0.23	-0.02	-0.35	-0.02
	3/31/86	20	88	0.93	1.29	0.87	0.42	0.22	-0.07	-0.19	0.36	0.11	-0.51	-0.16	0.11
	12/31/85	36	75	0.91	1.27	0.76	0.36	0.10	-0.12	0.02	0.48	0.22	-0.02	-0.20	0.15
	9/30/85	41	50	0.85	1.24	0.53	0.27	-0.02	-0.24	-0.13	0.36	0.15	0.17	-0.09	0.24
	6/30/85	34	74	0.79	1.19	0.55	0.21	0.14	-0.31	0.17	0.26	-0.17	0.41	0.11	0.27
	3/31/85	51	78	0.82	1.26	0.62	0.23	-0.12	-0.39	0.09	0.49	-0.09	0.43	0.01	0.34
	12/31/84	39	52	0.75	1.29	0.78	0.10	0.00	-0.05	0.05	0.54	0.27	0.13	-0.30	0.12
	9/30/84	76	35	0.76	1.27	0.53	0.07	-0.01	-0.04	0.08	0.35	0.22	0.21	-0.20	0.02
	6/30/84	81	21	0.52	1.56	0.71	0.22	-0.74	-0.05	-0.16	0.89	-0.03	0.72	-0.60	0.24
	3/31/84	35	31	0.74	1.31	0.43	0.03	-0.13	-0.12	-0.22	0.61	-0.08	0.28	-0.35	0.23
	12/31/83	103	31	0.72	1.36	0.86	0.03	-0.49	-0.23	-1.07	1.42	0.09	-0.24	-0.46	-0.14

TABLE A-5

EXTERNAL EQUITY MANAGERS

SECTOR WEIGHTING HISTORICAL PROFILE

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	EQUITY SECTOR WEIGHTS								
			CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
AVG. EXT. MANAGERS	9/30/87	---	3.8	5.7	28.7	4.4	11.9	16.7	20.2	3.6	5.0
	6/30/87	---	4.2	5.4	29.1	4.6	12.8	16.8	20.6	3.6	2.9
	3/31/87	---	3.5	5.7	28.5	4.8	17.3	15.6	18.1	3.9	2.6
	12/31/86	---	3.1	5.2	29.4	3.7	19.0	15.1	16.0	5.0	3.5
	9/30/86	---	3.6	5.6	29.4	3.6	19.2	14.5	15.6	5.5	3.0
	6/30/86	---	3.7	5.5	30.7	2.4	21.0	13.3	14.6	5.3	3.3
	3/31/86	---	2.8	5.5	25.6	5.1	20.7	13.4	14.6	6.4	5.8
	12/31/85	---	3.0	6.2	24.1	7.4	19.1	13.0	14.5	7.4	5.3
	9/30/85	---	2.8	6.6	27.5	4.2	18.4	12.7	16.8	7.6	3.4
	6/30/85	---	2.2	6.6	29.3	3.1	20.0	10.9	17.3	7.6	3.0
	3/31/85	---	2.4	6.8	26.4	3.6	17.5	11.4	22.2	6.8	3.0
	12/31/84	---	2.4	8.0	26.4	2.3	15.5	11.2	23.9	6.6	4.0
	9/30/84	---	2.9	7.9	27.9	3.8	14.1	9.6	26.3	4.8	2.7
	6/30/84	---	4.0	7.6	28.6	4.2	12.5	10.9	23.4	5.4	3.4
	3/31/84	---	5.2	7.6	24.0	5.7	13.2	13.3	22.7	5.1	3.1
	12/31/83	---	6.0	6.4	23.5	3.0	12.2	15.1	24.0	6.3	3.5
FRED ALGER	9/30/87	130,985,906	---	4.8	54.1	---	1.5	13.1	20.8	5.7	---
	6/30/87	120,786,460	1.0	1.7	45.5	3.6	2.4	10.2	28.7	5.3	1.6
	3/31/87	120,744,512	1.3	2.5	43.1	2.1	12.1	11.6	25.1	2.2	---
	12/31/86	101,957,413	2.0	3.0	44.1	6.5	10.8	12.2	20.4	0.9	---
	9/30/86	96,875,274	1.9	3.7	49.6	---	12.8	4.6	18.8	8.7	---
	6/30/86	112,733,180	1.9	7.5	52.9	---	11.6	6.2	15.8	4.0	---
	3/31/86	103,958,164	1.7	8.2	46.5	---	17.4	5.9	18.7	1.6	---
	12/31/85	86,744,768	1.7	11.7	38.7	---	18.2	3.1	17.0	6.6	2.9
	9/30/85	73,092,544	---	10.3	44.4	2.4	14.1	3.1	14.5	8.4	2.8
	6/30/85	63,144,042	---	17.6	36.0	1.4	9.3	3.5	15.7	16.6	---
	3/31/85	57,886,615	5.2	14.3	28.8	3.7	7.8	1.8	24.8	13.6	---
	12/31/84	54,018,782	5.2	16.1	36.1	---	4.1	7.9	25.2	5.4	---
	9/30/84	53,908,974	9.3	15.4	33.7	---	0.8	11.4	23.5	6.0	---
	6/30/84	49,936,760	14.0	8.0	30.7	---	3.8	11.5	29.5	2.6	---
	3/31/84	51,737,228	13.3	4.3	28.8	---	3.4	18.3	31.9	---	---
	12/31/83	55,644,200	13.2	6.6	21.7	---	6.4	18.1	33.9	---	---

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
ALLIANCE CAPITAL	9/30/87	150,466,291	5.8	4.6	35.2	2.6	14.3	15.4	19.1	3.1	---
	6/30/87	136,207,599	5.9	5.1	35.4	2.4	16.5	11.6	17.5	5.7	---
	3/31/87	130,165,259	5.8	5.5	33.9	3.5	20.8	9.5	16.5	4.5	---
	12/31/86	102,208,699	3.3	4.6	32.5	---	23.2	10.4	15.0	11.0	---
	9/30/86	97,177,251	3.0	3.9	42.5	---	24.2	4.7	13.0	8.7	---
	6/30/86	110,202,737	2.3	3.6	49.1	---	28.1	---	9.8	7.1	---
	3/31/86	104,093,860	2.4	4.5	46.6	---	30.2	2.5	8.2	5.6	---
	12/31/85	87,252,311	---	4.6	45.6	---	29.2	---	14.3	6.3	---
	9/30/85	74,094,296	---	7.5	52.0	---	21.8	---	11.1	7.6	---
	6/30/85	65,072,829	---	8.7	49.9	2.2	14.3	---	12.7	8.9	3.3
	3/31/85	58,738,405	---	9.9	47.9	2.4	12.6	---	15.8	8.0	3.4
	12/31/84	52,332,767	---	8.7	48.8	---	10.2	---	20.6	8.1	3.7
	9/30/84	51,653,441	---	8.8	49.7	---	9.6	---	19.3	9.2	3.5
	6/30/84	48,457,996	---	8.1	51.6	---	6.9	---	23.5	9.9	---
	3/31/84	47,427,119	---	8.3	48.0	2.7	5.6	---	25.1	10.4	---
	12/31/83	52,725,699	0.8	7.5	45.3	---	6.8	2.4	24.2	13.1	---
BEUTEL GOODMAN	9/30/87	144,431,591	5.7	2.8	14.6	14.4	26.4	7.1	22.7	---	6.3
	6/30/87	132,802,200	6.5	3.0	18.6	6.5	27.8	13.0	22.2	---	2.5
	3/31/87	126,160,277	2.4	3.1	15.4	3.4	25.5	17.8	25.9	3.5	3.1
	12/31/86	107,294,817	2.1	3.4	9.7	4.8	23.0	20.6	29.3	4.3	2.7
	9/30/86	86,368,324	2.7	4.4	11.1	4.2	24.6	23.4	19.4	5.9	4.1
	6/30/86	90,128,302	3.4	5.3	9.3	4.0	20.3	23.3	19.0	11.0	4.4
	3/31/86	90,652,277	4.2	4.2	9.2	3.8	18.6	22.9	20.9	11.5	4.6
	12/31/85	79,304,850	3.9	3.8	9.0	2.8	28.2	22.1	18.2	12.0	---
	9/30/85	70,821,795	2.7	3.7	15.7	---	26.0	24.0	16.6	11.3	---
	6/30/85	75,450,430	2.8	---	12.8	---	30.4	23.1	19.1	11.7	---
	3/31/85	70,177,266	2.1	---	19.2	---	28.4	33.1	13.6	3.6	---
	12/31/84	63,402,269	8.8	---	13.8	---	32.2	33.8	11.4	---	---
	9/30/84	60,461,938	6.5	---	14.0	---	37.1	35.6	6.8	---	---
	6/30/84	55,295,358	9.3	---	21.1	---	30.4	32.4	6.7	---	---
	3/31/84	56,896,258	8.9	---	18.6	---	27.2	39.3	6.0	---	---
	12/31/83	57,233,781	9.8	---	20.2	---	11.2	46.2	5.4	7.2	---
BMI CAPITAL	9/30/87	85,846,390	9.1	8.1	37.2	5.5	14.3	11.2	14.4	---	---
	6/30/87	82,736,116	12.4	5.8	42.3	7.5	13.5	8.5	10.1	---	---
	3/31/87	81,802,425	11.7	8.1	37.0	5.3	14.3	13.3	10.3	---	---
	12/31/86	65,559,574	8.7	10.5	35.9	---	20.1	8.9	15.9	---	---
	9/30/86	62,163,502	10.2	8.1	38.7	---	13.1	12.4	17.5	---	---
	6/30/86	68,576,473	8.5	6.4	43.4	---	19.8	2.9	19.1	---	---
	3/31/86	64,120,062	6.8	7.7	38.4	4.6	20.9	3.6	18.0	---	---
	12/31/85	54,452,525	9.9	4.0	32.2	14.6	19.3	4.3	12.3	3.4	---
	9/30/85	49,026,413	10.4	3.4	37.8	---	6.0	4.0	28.9	9.6	---
	6/30/85	9,759,880	5.4	9.7	34.9	---	5.7	4.0	30.3	9.9	---
	3/31/85	9,851,108	7.1	9.0	37.6	---	---	6.8	35.9	3.7	---
	12/31/84	9,015,974	6.5	5.8	40.0	---	---	7.4	35.9	4.4	---
	9/30/84	8,820,740	4.6	13.4	42.6	---	---	4.1	31.3	3.9	---
	6/30/84	8,533,642	3.2	16.4	37.4	---	---	11.5	31.5	---	---
	3/31/84	8,366,038	4.3	12.7	39.3	---	---	17.8	25.9	---	---
	12/31/83	9,784,767	7.4	12.1	28.4	---	6.6	19.0	26.4	---	---

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
FORSTMANN-LEFF	9/30/87	116,644,605	1.8	1.7	33.1	---	4.5	30.5	17.4	3.0	8.0
	6/30/87	107,438,093	---	---	25.2	0.9	2.3	42.1	25.0	4.4	---
	3/31/87	105,717,837	---	---	31.0	---	22.5	30.8	10.6	5.1	---
	12/31/86	88,281,072	---	1.4	44.6	---	16.7	20.5	9.6	5.9	1.3
	9/30/86	85,396,871	---	10.4	28.8	---	19.0	17.2	18.9	5.7	---
	6/30/86	95,703,997	2.6	6.6	25.2	---	22.4	13.2	23.7	5.2	1.1
	3/31/86	87,886,861	1.3	4.0	18.1	---	34.7	17.4	10.1	8.1	6.3
	12/31/85	73,996,082	1.4	7.9	25.7	2.1	25.2	22.1	8.9	6.7	---
	9/30/85	63,626,068	---	9.7	41.6	6.6	20.9	6.4	12.1	2.8	---
	6/30/85	66,383,632	1.1	7.4	40.1	---	25.1	10.3	11.0	5.1	---
	3/31/85	61,436,421	2.5	9.8	25.7	---	25.5	14.7	17.4	4.4	---
	12/31/84	55,396,358	1.4	10.5	30.9	---	23.3	15.1	13.3	5.5	---
	9/30/84	53,550,733	4.5	4.6	32.5	---	21.5	14.5	18.9	3.6	---
	6/30/84	51,218,131	3.7	3.6	40.2	---	7.0	10.3	24.3	7.2	3.7
	3/31/84	52,083,507	7.6	3.0	37.0	---	6.0	14.5	23.1	6.0	2.8
	12/31/83	55,421,154	5.7	13.6	35.5	5.8	3.9	8.4	18.7	5.3	3.1
HELLMAN JORDAN	9/30/87	107,083,180	---	11.7	20.0	1.2	15.5	13.1	32.9	3.9	1.9
	6/30/87	102,296,573	---	11.2	18.0	---	22.1	9.8	34.0	4.9	---
	3/31/87	101,035,689	---	6.0	24.9	---	25.6	5.8	31.3	6.3	---
	12/31/86	78,099,466	---	3.8	29.8	---	31.7	7.3	23.2	4.1	---
	9/30/86	74,466,800	---	6.4	25.6	---	33.5	8.1	23.3	3.2	---
	6/30/86	83,097,338	---	9.3	24.8	---	32.7	10.7	20.1	2.4	---
	3/31/86	82,829,526	---	12.1	22.3	2.2	29.8	13.6	18.4	1.7	---
	12/31/85	71,819,754	---	8.8	20.1	9.4	23.5	18.7	15.2	2.9	1.4
	9/30/85	60,551,842	---	5.6	17.1	6.9	26.9	17.2	13.8	4.7	7.7
	6/30/85	64,181,384	3.9	3.5	23.0	7.0	26.0	15.5	7.5	3.5	10.0
	3/31/85	59,732,797	1.3	---	21.9	5.9	25.3	13.6	16.1	6.7	9.2
	12/31/84	54,923,168	1.3	6.1	19.5	1.1	19.8	17.1	20.3	9.2	5.7
	9/30/84	52,497,049	1.5	10.7	11.3	0.8	14.0	15.3	29.3	12.0	5.0
	6/30/84	47,929,367	1.8	12.4	13.8	1.2	16.4	21.2	12.6	11.1	9.6
	3/31/84	49,895,127	---	12.4	19.5	6.4	15.7	15.7	4.3	8.8	17.2
	12/31/83	50,182,761	---	14.8	30.0	6.0	16.5	10.4	2.1	3.0	17.2
INVESTMENT ADVISERS	9/30/87	110,995,988	8.2	2.8	32.9	3.2	---	29.3	14.7	3.8	5.1
	6/30/87	101,936,871	6.4	3.1	31.9	3.6	1.1	30.7	14.4	3.4	5.4
	3/31/87	98,002,073	5.4	3.2	28.5	3.0	6.1	29.1	11.9	7.4	5.3
	12/31/86	81,868,013	4.5	2.2	31.0	2.9	6.9	25.8	10.1	9.7	6.7
	9/30/86	78,677,066	5.2	---	33.0	2.9	7.6	28.6	14.7	8.0	---
	6/30/86	86,330,923	8.2	---	33.0	1.0	9.6	26.5	13.2	8.6	---
	3/31/86	82,520,514	5.6	3.3	20.6	2.3	9.6	23.8	18.8	13.4	2.6
	12/31/85	73,389,199	4.0	6.6	15.7	3.0	12.6	18.5	24.4	12.2	2.9
	9/30/85	61,953,366	3.2	6.5	8.3	2.9	15.9	20.2	28.3	12.8	1.8
	6/30/85	66,785,302	3.4	8.8	6.5	3.2	18.8	17.1	29.0	13.2	---
	3/31/85	62,742,678	3.4	6.0	6.1	2.8	16.3	19.9	32.9	12.6	---
	12/31/84	58,967,426	3.3	6.4	13.6	5.9	20.5	19.2	19.9	10.8	0.6
	9/30/84	55,807,710	3.7	7.2	21.5	6.9	21.0	13.1	20.2	5.6	0.8
	6/30/84	50,388,386	5.5	5.9	26.3	6.2	18.8	9.1	20.6	3.7	3.9
	3/31/84	51,864,720	5.8	5.4	30.2	8.9	21.5	7.7	15.6	3.9	1.0
	12/31/83	54,533,402	6.3	6.3	25.0	5.8	21.9	9.7	15.7	6.1	3.2

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
IDS ADVISORY	9/30/87	122,497,788	3.7	3.6	21.1	9.7	---	28.5	23.7	5.9	3.9
	6/30/87	115,535,096	2.3	5.0	28.1	11.5	---	23.0	19.6	7.9	2.7
	3/31/87	111,432,245	2.6	3.1	25.7	12.5	5.5	23.8	18.5	4.7	3.6
	12/31/86	91,035,628	2.7	1.1	25.2	7.4	10.9	24.6	7.8	7.3	13.0
	9/30/86	87,085,769	2.3	1.2	29.7	8.2	10.4	23.4	5.8	5.0	14.0
	6/30/86	96,881,914	---	---	42.4	3.1	16.4	15.8	6.5	5.0	10.8
	3/31/86	90,164,763	---	1.7	32.6	1.1	17.7	15.6	8.9	12.1	10.2
	12/31/85	76,939,408	---	1.9	31.7	2.6	14.9	10.4	13.9	13.2	11.4
	9/30/85	64,292,295	3.0	2.2	27.1	5.1	13.6	12.7	13.9	12.7	9.7
	6/30/85	68,295,847	3.0	4.8	27.7	8.4	13.4	7.2	11.7	8.5	15.1
	3/31/85	62,021,800	---	5.2	27.5	9.8	11.0	7.3	14.0	7.7	17.6
	12/31/84	57,153,006	1.8	4.6	29.5	3.7	7.6	3.7	16.9	7.2	25.0
	9/30/84	55,468,185	3.4	6.6	25.4	7.6	7.9	5.6	19.6	4.6	19.4
	6/30/84	50,278,968	---	5.3	27.6	8.1	6.8	7.6	19.2	4.8	20.6
	3/31/84	50,085,955	4.8	10.1	12.4	9.6	8.7	14.3	15.2	9.5	15.4
	12/31/83	54,006,960	4.9	7.6	18.0	---	8.8	19.0	26.1	6.0	9.6
LIEBER & COMPANY	9/30/87	48,954,439	4.0	6.9	31.4	1.6	32.3	6.3	11.0	5.9	0.6
	6/30/87	47,687,801	3.3	6.1	31.6	1.7	37.4	7.3	8.9	3.1	0.7
	3/31/87	48,385,863	3.4	8.8	29.7	1.8	39.7	5.8	8.3	1.8	0.7
	12/31/86	40,294,436	3.0	8.0	26.5	2.4	41.1	8.6	7.7	1.7	0.7
	9/30/86	40,257,595	2.3	7.4	25.5	2.4	42.7	9.2	6.4	2.8	1.2
	6/30/86	44,505,476	1.7	7.3	22.4	3.1	41.8	10.3	7.5	3.7	2.1
	3/31/86	40,102,680	2.1	7.4	21.4	3.5	38.4	12.3	9.0	4.0	2.0
	12/31/85	35,197,559	1.8	8.7	20.1	3.5	34.3	11.9	12.2	5.4	2.0
	9/30/85	30,715,520	1.6	7.0	21.9	4.5	32.6	14.3	11.8	5.1	1.2
	6/30/85	31,313,770	2.1	7.8	21.4	4.6	30.3	16.0	11.0	5.5	1.2
	3/31/85	29,544,589	2.9	8.0	25.3	6.1	28.9	15.1	8.9	3.5	1.3
	12/31/84	26,473,866	3.2	5.3	27.0	3.2	24.2	18.4	15.3	3.4	---
	9/30/84	25,807,665	2.9	3.8	33.0	4.1	22.4	16.8	14.8	2.2	---
	6/30/84	23,927,529	2.6	3.3	34.8	3.5	21.1	16.7	15.3	1.8	0.8
	3/31/84	24,261,218	3.6	6.4	32.3	4.9	17.3	16.8	16.3	1.8	0.7
	12/31/83	11,159,936	7.7	4.5	33.7	3.5	16.7	22.3	6.1	5.6	---
PEREGRINE CAPITAL	9/30/87	109,568,922	2.8	7.1	21.1	2.7	19.4	8.2	14.7	2.6	21.4
	6/30/87	105,285,388	3.9	7.8	24.7	3.7	15.0	7.4	16.1	3.1	18.2
	3/31/87	103,857,724	5.2	8.2	24.7	4.9	13.0	8.3	16.7	4.0	15.0
	12/31/86	88,571,840	6.7	8.1	22.0	4.5	11.8	11.1	17.3	4.7	13.8
	9/30/86	84,825,995	8.6	8.0	16.8	9.6	10.7	13.7	14.8	5.5	12.2
	6/30/86	89,051,403	8.0	6.7	9.6	15.2	8.1	15.7	13.6	5.0	18.1
	3/31/86	87,406,272	7.4	5.5	15.6	16.2	5.3	15.7	14.8	3.8	15.8
	12/31/85	82,085,372	9.1	6.3	15.1	17.8	5.3	19.1	11.2	3.3	12.7
	9/30/85	72,758,648	8.3	8.5	18.3	12.6	4.5	15.7	18.0	3.0	11.2
	6/30/85	29,610,673	0.2	---	51.4	4.2	12.4	2.9	24.0	2.7	2.3
	3/31/85	27,145,424	---	2.3	44.2	6.3	9.2	6.2	28.0	1.9	1.9
	12/31/84	25,188,312	---	2.3	37.5	2.7	3.9	9.8	37.7	4.1	1.9
	9/30/84	25,685,954	---	3.7	38.0	0.6	2.3	11.9	39.7	1.3	2.4
	6/30/84	24,546,941	2.8	5.5	31.2	5.8	1.0	9.3	38.9	4.3	1.3
	3/31/84	10,385,041	3.6	4.4	23.1	8.5	1.1	7.2	45.5	5.4	1.1
	12/31/83	11,215,761	2.5	1.6	25.5	1.2	3.2	6.0	51.8	1.7	6.6

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
WADDELL & REED	9/30/87	127,554,770	0.6	8.5	15.1	7.0	2.3	21.0	30.9	6.2	8.3
	6/30/87	116,141,569	4.1	10.2	19.1	9.0	2.9	20.8	30.7	2.3	0.8
	3/31/87	113,451,543	1.1	13.6	19.7	16.1	5.2	15.3	24.0	3.8	1.1
	12/31/86	95,836,775	1.6	11.2	21.7	12.3	12.3	16.1	19.2	5.6	---
	9/30/86	91,162,262	2.9	8.5	21.7	12.4	12.9	14.6	18.9	6.6	1.5
	6/30/86	97,376,898	4.4	7.8	26.0	0.4	20.7	21.7	12.4	6.6	---
	3/31/86	95,498,169	4.3	7.3	13.0	2.9	23.3	24.9	16.9	7.3	---
	12/31/85	82,027,227	4.6	7.7	17.0	5.4	15.2	25.9	15.0	9.1	---
	9/30/85	74,328,144	2.0	7.7	18.8	5.1	19.7	22.5	15.6	5.2	3.3
	6/30/85	29,531,769	---	11.8	14.5	2.5	21.1	18.4	13.3	6.1	12.4
	3/31/85	27,604,382	---	12.8	11.9	2.7	21.5	15.8	16.3	7.9	11.2
	12/31/84	26,234,116	---	14.0	18.7	---	18.8	2.7	25.5	1.0	19.3
	9/30/84	25,856,251	1.4	13.9	28.0	3.3	14.3	0.5	30.9	1.6	6.1
	6/30/84	25,495,564	---	29.0	25.7	---	15.7	---	17.8	11.8	---
	3/31/84	25,833,644	5.2	32.1	21.4	---	25.0	---	11.7	4.5	---
	12/31/83	11,409,742	12.8	32.4	---	---	33.9	---	20.9	---	---
WILSHIRE 5000	9/30/87	---	4.9	3.9	28.1	8.9	12.4	13.8	13.5	3.2	11.3
	6/30/87	---	4.8	4.0	27.3	9.8	12.3	13.4	13.6	3.1	11.7
	3/31/87	---	4.6	3.9	27.5	9.4	13.0	13.6	12.9	3.0	12.1
	12/31/86	---	4.6	3.8	27.2	9.0	13.5	12.6	12.2	3.0	14.1
	9/30/86	---	4.4	3.8	26.9	9.0	14.0	12.1	12.4	3.1	14.3
	6/30/86	---	4.5	4.0	28.8	7.8	14.0	12.4	12.6	3.0	12.9
	3/31/86	---	4.8	4.7	27.0	8.0	14.1	11.8	13.4	3.3	12.9
	12/31/85	---	4.8	4.2	25.7	10.5	12.9	11.4	14.2	3.3	13.0
	9/30/85	---	4.7	4.1	26.2	10.6	12.3	11.4	14.0	3.4	13.3
	6/30/85	---	4.8	4.0	26.3	11.2	12.2	10.8	13.6	3.6	13.5
	3/31/85	---	4.9	3.9	25.3	13.0	11.4	10.9	14.4	3.3	12.9
	12/31/84	---	5.4	9.9	23.0	13.5	9.9	10.6	13.2	3.7	10.8
	9/30/84	---	5.2	4.3	24.9	13.2	10.3	11.5	15.5	2.9	12.2
	6/30/84	---	5.3	4.0	25.7	13.5	9.6	11.7	15.6	2.9	11.7
	3/31/84	---	5.4	3.9	23.6	16.1	9.8	12.1	15.3	2.9	11.1
	12/31/83	---	5.5	4.2	24.0	14.5	9.5	12.2	16.3	2.8	11.1

TABLE A-6

EXTERNAL EQUITY MANAGERS

HISTORICAL PERFORMANCE SUMMARY

	1Q 87	2Q 87	3Q 87	4Q 87	1Q 88	2Q 88	3Q 88	4Q 88	1Q 89	2Q 89	3Q 89	4Q 89
FRED ALGER												
Equity	22.3%	-0.6%	8.8%									
Total Fund	18.4	0.0	8.3									
ALLIANCE CAPITAL												
Equity	28.8	4.9	11.1									
Total Fund	27.4	4.6	10.8									
BEUTEL GOODMAN												
Equity	18.6	6.4	10.0									
Total Fund	17.6	5.3	8.6									
BMI CAPITAL												
Equity	25.8	1.2	4.3									
Total Fund	24.8	1.2	4.1									
FORSTMANN-LEFF												
Equity	25.7	2.1	12.0									
Total Fund	19.8	1.6	8.4									
HELLMAN JORDAN												
Equity	30.2	1.8	6.6									
Total Fund	29.4	1.3	4.8									
IDS ADVISORY												
Equity	23.1	3.9	6.0									
Total Fund	22.4	3.7	5.9									
INVESTMENT ADVISERS												
Equity	24.9	4.9	10.8									
Total Fund	19.7	4.0	8.8									
LIEBER & COMPANY												
Equity	21.2	-1.4	2.9									
Total Fund	20.1	-1.3	2.7									
PEREGRINE CAPITAL												
Equity	21.8	1.5	4.7									
Total Fund	17.3	1.4	3.9									
WADDELL & REED												
Equity	23.0	2.6	11.6									
Total Fund	18.4	2.4	9.8									
SBI AGGREGATE												
Equity	23.6	2.9	7.9									
Total Fund	21.0	2.6	6.9									
MARKET INDICES												
Wilshire 5000	21.2	3.3	6.2									
S&P 500	21.3	5.1	6.6									
91 Day T-Bills	1.4	1.4	1.5									

(Previous historical performance data can be found on the following page).

TABLE A-6

EXTERNAL EQUITY MANAGERS

HISTORICAL PERFORMANCE SUMMARY

	2Q 83	3Q 83	4Q 83	1Q 84	2Q 84	3Q 84	4Q 84	1Q 85	2Q 85	3Q 85	4Q 85	1Q 86	2Q 86	3Q 86	4Q 86
FRED ALGER															
Equity	13.9%	-3.5%	-1.0%	-8.1%	-4.1%	8.3%	0.2%	7.3%	10.1%	-4.7%	20.0%	21.2%	9.0%	-14.7%	5.7%
Total Fund	13.1	-3.4	-0.9	-7.0	-3.5	8.0	0.2	7.2	9.1	-4.6	18.7	19.8	8.5	-14.1	5.3
ALLIANCE CAPITAL															
Equity	14.3	-8.7	-0.6	-11.2	2.2	7.1	1.3	13.1	11.5	-3.6	19.2	20.0	6.1	-11.9	5.3
Total Fund	12.7	-8.0	-0.4	-10.1	2.2	6.6	1.3	12.2	10.8	-3.3	17.8	19.3	5.9	-11.8	5.2
BEUTEL GOODMAN															
Equity	13.9	3.4	3.5	-0.7	-2.8	10.1	5.1	12.1	8.1	-9.0	12.5	15.7	-0.9	-4.8	-1.2
Total Fund	8.7	1.1	3.3	-0.6	-2.8	9.3	4.9	10.7	7.5	-8.6	12.0	14.3	-0.6	-4.2	-1.3
BMI CAPITAL															
Equity	14.4	-7.8	-6.0	-14.4	2.1	3.6	2.3	10.5	-0.7	-9.9	19.4	18.6	7.2	-9.7	5.8
Total Fund	11.9	-7.7	-6.1	-14.5	2.0	3.4	2.2	9.3	-0.9	-2.4	11.1	17.8	7.0	-9.4	5.5
FORSTMANN-LEFF															
Equity	11.2	-1.7	-1.0	-8.3	-2.8	7.5	3.7	12.6	9.4	-5.4	21.5	20.8	10.1	-16.0	5.7
Total Fund	9.9	-1.2	-0.6	-6.0	-1.7	4.6	3.4	10.9	8.1	-4.2	16.3	18.8	8.9	-10.8	3.4
HELLMAN JORDAN															
Equity	10.0	-9.5	-0.9	-3.1	-4.8	8.6	4.3	10.0	9.5	-5.9	19.4	16.1	0.4	-10.7	5.2
Total Fund	5.8	-3.2	-1.0	-0.6	-3.9	9.5	4.6	8.7	7.5	-5.6	18.6	15.3	0.3	-10.4	4.9
IDS ADVISORY															
Equity	14.3	-6.6	-0.9	-8.4	0.0	11.4	3.2	9.2	10.7	-5.9	20.5	18.2	8.1	-10.6	4.8
Total Fund	13.6	-5.6	-0.6	-7.3	0.4	10.3	3.0	8.5	10.1	-5.9	19.7	17.2	7.5	-10.1	4.5
INVESTMENT ADVISERS															
Equity	11.6	-2.9	1.5	-5.8	-3.0	11.3	5.8	6.6	7.1	-7.8	20.5	14.7	5.3	-11.1	4.9
Total Fund	8.0	-1.8	1.3	-4.9	-2.8	10.7	5.7	6.4	6.4	-7.2	18.5	12.4	4.6	-8.9	4.1
LIEBER & COMPANY															
Equity	16.6	-2.4	1.7	-10.2	-1.3	8.9	2.9	13.8	6.3	-1.7	15.2	13.8	11.8	-9.5	0.3
Total Fund	11.6	-1.9	1.3	-7.3	-1.4	7.9	2.6	11.6	6.0	-1.9	14.6	13.9	11.0	-9.5	0.1
PEREGRINE CAPITAL															
Equity	19.6	-3.6	-6.0	-8.8	-3.2	5.3	-2.1	9.5	10.7	0.4	15.5	7.7	2.1	-5.7	5.2
Total Fund	16.4	-2.6	-5.1	-7.4	-2.7	4.7	-1.9	7.8	9.1	-1.9	12.8	6.5	1.9	-4.7	4.4
WADDELL & REED															
Equity	30.2	-4.7	-9.3	-14.0	-10.3	-1.6	0.7	8.1	8.7	-5.4	18.4	19.7	2.4	-8.3	6.2
Total Fund	24.0	-3.0	-5.3	-2.2	-1.3	1.4	1.5	5.2	7.0	-2.0	10.4	16.4	2.0	-6.4	5.1
SBI AGGREGATE															
Equity	12.1	-5.6	-1.5	-7.5	-2.7	8.0	2.4	9.5	8.8	-5.7	17.7	16.6	5.0	-1.4	4.4
Total Fund	10.5	-4.5	-1.2	-5.9	-2.2	7.2	2.4	8.4	8.0	-4.5	15.2	15.2	4.5	-8.6	3.9
MARKET INDICES															
Wilshire 5000	13.0	-0.9	-1.0	-4.2	-2.8	9.2	1.3	10.3	7.5	-4.3	16.8	14.4	5.8	-7.7	4.0
S&P 500	11.1	-0.1	0.4	-2.4	-2.5	9.7	1.8	9.2	7.4	-4.1	17.3	14.1	6.0	-7.0	5.4
91 Day T-Bills	2.2	2.4	2.3	2.4	2.6	2.7	2.3	2.1	1.9	1.9	1.8	1.8	1.6	1.4	1.3

BOND MANAGER PORTFOLIO STATISTICS GLOSSARY

Like the preceding equity manager portfolio statistics glossary, this bond manager portfolio statistics glossary is designed to define terminology used in evaluating a bond manager's investment philosophy, risk characteristics and performance data.

Qtr. Port. Turnover	-	the manager's total bond sales during the quarter divided by the average value of the manager's bond portfolio over the quarter.
# of Issues	-	the number of different bond issues held in the manager's portfolio.
Bond Allocation	-	the percent of the manager's total portfolio invested in bonds.
Coupon	-	the annual interest payment received on the manager's total portfolio stated as a percent of the portfolio's face value.
Current Yield	-	the annual interest payment produced by the manager's total portfolio stated as a percent of the portfolio's market value.
Yield to Maturity	-	the compounded annualized return that the manager's total portfolio would produce if it were held to maturity and all cash flows were reinvested at an interest rate equal to the yield to maturity.
Duration	-	a measure of the average life of the total portfolio. Duration is a weighted average maturity whereby the time in the future that each cash flow is received is weighted by the proportion that the present value of the cash flow contributes to the total present value (or price) of the total portfolio.
Term to Maturity	-	also a measure of the average life of the total portfolio. Term to maturity is the number of years remaining until the average bond in the portfolio makes its final cash payment.

Quality Weightings	-	refers to the average rating given the total portfolio's securities by Moody's Corp. A security's rating indicates the financial strength of its issuer and other factors related to the likelihood of full and timely payment of interest and principal.
Sector Weightings	-	refers to the sectors of the bond market in which the manager has positioned his/her bond portfolio.
TUCS Median	-	the median manager within a subsample of the TUCS universe that is restricted to fixed income managers investing in portfolios with quality and duration characteristics similar to those that are required of the SBI's bond managers.

TABLE A-7

EXTERNAL FIXED INCOME MANAGERS

PORTFOLIO STATISTICS HISTORICAL SUMMARY

MANAGER NAME	DATE	QUARTER PORTFOLIO T/O	# OF BONDS	BOND ALLOCATION	COUPON	CURRENT YIELD	YIELD TO MAT.	AVERAGE QUALITY	DURATION	TERM TO MAT.
AVG. EXT. MGRS	9/30/87	25	39	89	8.4	8.8	9.5	AAA	4.0	7.5
	6/30/87	44	44	93	8.4	8.4	8.9	AAA	4.4	7.5
	3/31/87	30	39	91	8.6	8.3	8.0	AAA	4.9	8.3
	12/31/86	30	40	94	9.2	8.6	8.2	AAA	5.4	9.5
	9/30/86	19	41	99	9.5	9.2	9.3	AAA	5.0	10.6
	6/30/86	47	40	96	9.8	9.3	9.0	AAA	4.6	10.0
	3/31/86	41	39	96	10.3	9.6	8.8	AAA	4.5	12.3
	12/31/85	41	33	95	10.5	10.0	9.6	AAA	4.4	8.7
	9/30/85	22	34	96	10.7	10.6	10.6	AAA	4.3	8.7
	6/30/85	48	29	95	10.4	10.2	10.4	AAA	4.5	8.5
	3/31/85	37	25	91	10.3	10.8	11.5	AAA	4.2	8.2
	12/31/84	38	22	93	10.3	10.8	11.4	AAA	4.5	8.8
	9/30/84	54	29	88	10.1	11.1	12.3	AAA	4.3	8.8
INVESTMENT ADV.	9/30/87	0	21	99	7.8	8.1	9.9	AAA	3.4	4.6
	6/30/87	15	19	92	7.7	7.6	8.3	AAA	3.5	4.5
	3/31/87	7	24	97	8.6	8.1	8.0	AAA	3.4	4.3
	12/31/86	11	25	93	8.9	8.4	8.1	AAA	3.5	4.4
	9/30/86	5	22	98	9.4	8.6	8.5	AAA	3.5	4.4
	6/30/86	9	21	96	9.6	8.8	8.3	AAA	3.3	4.1
	3/31/86	17	22	95	9.9	8.9	8.2	AAA	3.3	4.2
	12/31/85	10	16	95	9.4	8.8	8.7	AAA	3.4	4.3
	9/30/85	30	18	99	9.7	9.3	9.9	AAA	3.8	5.1
	6/30/85	50	17	99	8.4	8.1	10.1	AAA	4.7	6.2
	3/31/85	19	13	99	8.7	9.3	11.7	AAA	4.9	8.9
	12/31/84	25	10	99	8.4	9.3	11.5	AAA	5.6	12.1
	9/30/94	10	7	100	9.0	10.8	12.6	AAA	6.4	15.2
LEHMAN MGMT.	9/30/87	54	34	81	8.0	8.5	9.1	AAA	3.5	6.1
	6/30/87	36	46	92	7.9	8.1	8.2	AAA	3.7	5.0
	3/31/87	51	46	91	8.5	8.1	7.3	AAA	3.9	5.6
	12/31/86	40	45	94	9.6	8.9	7.5	AAA	4.3	6.7
	9/30/86	31	44	98	10.2	9.4	8.2	AAA	4.4	8.6
	6/30/86	16	48	97	10.8	9.8	8.3	AAA	4.0	8.1
	3/31/86	28	54	97	11.0	9.7	8.3	AAA	4.0	8.5
	12/31/85	40	32	89	11.1	10.2	9.2	AAA	3.7	6.5
	9/30/85	24	35	95	11.4	10.9	10.2	AAA	3.9	6.6
	6/30/85	49	27	92	11.4	10.8	9.9	AAA	3.8	6.3
	3/31/85	43	24	85	11.6	11.4	11.0	AAA	3.6	5.6
	12/31/84	44	19	85	11.6	11.4	10.8	AAA	3.3	5.3
	9/30/84	62	15	82	11.2	11.5	12.2	AAA	3.7	6.5

MANAGER NAME	QUARTER DATE	PORTFOLIO T/O	# OF BONDS	BOND ALLOCATION	COUPON	CURRENT YIELD	YIELD TO MAT.	AVERAGE QUALITY	DURATION	TERM TO MAT.
MILLER ANDERSON	9/30/87	36	58	93	9.2	9.4	9.6	AA	4.9	8.6
	6/30/87	52	76	95	9.0	8.8	8.9	AA	5.4	8.6
	3/31/87	70	43	82	8.4	7.9	7.8	AA	4.8	7.6
	12/31/86	30	57	96	9.5	8.8	8.2	AA	6.6	12.1
	9/30/86	15	68	99	9.3	9.3	9.8	AA	5.6	12.5
	6/30/86	57	60	97	9.4	9.3	9.5	AA	5.2	11.6
	3/31/86	73	37	92	10.5	9.7	8.8	AA	4.4	11.4
	12/31/85	71	42	99	10.4	9.9	9.6	AA	5.3	9.6
	9/30/85	23	52	98	9.6	10.2	10.6	AA	5.0	9.7
	6/30/85	75	48	95	9.3	10.0	10.4	AA	4.6	9.3
	3/31/85	35	41	92	9.0	10.0	11.1	AA	3.7	7.4
	12/31/84	50	43	99	9.1	10.1	11.3	AA	3.9	7.3
	9/30/84	83	59	71	9.8	11.1	11.9	AAA	3.3	6.7
MORGAN STANLEY	9/30/87	27	7	73	7.6	7.9	8.6	AAA	2.2	3.4
	6/30/87	107	9	93	7.8	8.0	8.2	AAA	3.4	5.1
	3/31/87	17	18	98	8.3	8.3	8.3	AAA	6.2	11.1
	12/31/86	42	19	100	7.7	8.5	8.3	AAA	6.5	11.0
	9/30/86	9	14	100	8.4	8.7	8.9	AAA	5.3	10.7
	6/30/86	89	13	100	8.6	8.9	9.1	AAA	5.4	10.8
	3/31/86	62	20	100	9.4	9.0	8.7	AAA	5.4	19.9
	12/31/85	58	17	100	10.4	10.1	9.9	AAA	5.0	10.6
	9/30/85	18	20	100	11.2	11.1	11.0	AAA	4.4	9.8
	6/30/85	38	17	100	11.4	10.8	10.5	AAA	5.0	9.7
	3/31/85	62	16	85	11.1	11.3	11.5	AAA	3.8	7.3
	12/31/84	30	12	100	11.5	11.5	11.5	AAA	5.3	9.4
	9/30/84	105	20	99	8.6	8.9	12.5	AAA	3.7	5.3
PEREGRINE	9/30/87	6	64	93	9.2	9.4	9.6	AA	4.6	9.2
	6/30/87	8	64	93	9.2	9.1	10.8	AA	4.4	8.7
	3/31/87	6	62	92	9.4	9.0	8.1	AA	5.2	9.5
	12/31/86	24	52	84	10.5	8.1	8.5	AA	4.7	8.9
	9/30/86	14	56	97	10.3	9.8	11.3	AA	4.5	11.0
	6/30/86	12	51	97	10.8	10.2	9.8	AA	4.3	9.7
	3/31/86	10	54	98	11.2	10.3	9.4	AA	4.1	11.0
	12/31/85	18	51	98	11.5	10.8	10.4	AA	3.7	9.3
	9/30/85	20	43	96	11.6	11.2	11.0	AA	3.3	7.8
	6/30/85	15	35	98	11.2	10.8	10.5	AA	3.4	7.6
	3/31/85	13	28	100	11.1	11.3	11.5	AA	3.7	7.6
	12/31/84	39	25	96	10.5	10.9	11.3	AA	3.5	7.5
	9/30/84	17	21	93	10.6	11.7	12.5	AA	3.6	7.6

MANAGER NAME	QUARTER DATE	PORTFOLIO T/O	# OF BONDS	BOND ALLOCATION	COUPON	CURRENT YIELD	YIELD TO MAT.	AVERAGE QUALITY	DURATION	TERM TO MAT.
WESTERN ASSET	9/30/87	25	47	93	8.7	9.5	10.0	AAA	5.6	13.1
	6/30/87	46	52	94	8.8	9.0	9.2	AA	6.2	13.2
	3/31/87	31	40	87	8.6	8.3	8.3	AA	5.7	11.6
	12/31/86	33	40	95	8.8	8.7	8.6	AA	6.7	13.9
	9/30/86	38	40	100	9.6	9.1	9.0	AA	6.4	16.4
	6/30/86	97	48	90	9.3	9.0	9.0	AA	5.6	15.7
	3/31/86	58	48	95	9.8	9.8	9.3	AA	5.5	18.9
	12/31/85	47	40	87	10.3	10.1	10.0	AA	5.2	11.9
	9/30/85	19	34	89	10.7	11.0	11.1	AA	5.6	13.0
	6/30/85	58	29	84	10.5	10.7	10.8	AA	5.4	12.1
	3/31/85	52	28	87	10.4	11.5	12.1	AA	5.3	12.2
	12/31/84	39	24	80	10.6	11.4	11.8	AA	5.2	11.3
	9/30/84	49	19	80	11.3	12.3	12.8	AA	4.8	11.3

TABLE A-8

EXTERNAL FIXED INCOME MANAGERS

SECTOR WEIGHTING HISTORICAL PROFILE

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	QUALITY WEIGHTINGS					SECTOR WEIGHTINGS									
			AAA	AA	A	BAA	OTHER	GOVT	AGCY	ZERO	IND	UTIL	FIN	TRAN	MTGS	MISC	CASH
AVG. EXT. MGRS.	9/30/87	---	77	5	12	5	1	36	2	2	7	2	16	1	20	3	11
	6/30/87	---	76	5	11	5	3	36	3	2	8	2	14	1	24	3	7
	3/31/87	---	77	5	11	4	3	32	2	2	10	2	7	1	32	3	9
	12/31/86	---	74	5	13	3	5	29	3	2	12	1	9	1	35	2	6
	9/30/86	---	76	6	12	3	3	29	3	2	11	2	9	1	39	3	1
	6/30/86	---	78	6	10	3	3	28	6	3	9	2	10	1	37	3	4
	3/31/86	---	79	6	9	3	3	35	2	2	9	2	9	0	34	3	4
	12/31/85	---	80	5	8	2	5	35	3	2	6	2	9	0	35	3	5
	9/30/85	---	81	5	8	1	5	33	3	2	7	2	9	0	39	1	4
	6/30/85	---	81	6	6	3	4	34	1	4	5	4	9	0	36	1	5
	3/31/85	---	78	10	6	2	4	27	5	4	5	6	12	0	31	1	9
	12/31/84	---	77	12	7	2	2	33	8	4	2	8	12	0	24	1	7
	9/30/84	---	79	12	7	2	0	30	10	7	3	8	9	1	19	1	12
INVESTMENT ADV.	9/30/87	41,169,671	96	0	4	0	0	67	5	13	0	0	6	0	8	0	1
	6/30/87	42,121,121	96	0	4	0	0	56	9	13	0	0	6	0	8	0	8
	3/31/87	42,655,770	86	4	10	0	0	51	5	12	11	0	9	0	9	0	3
	12/31/86	42,094,854	80	7	13	0	0	40	5	11	13	0	15	0	9	0	7
	9/30/86	40,731,041	78	8	14	0	0	45	5	12	23	0	13	0	0	0	2
	6/30/86	39,301,944	81	8	11	0	0	34	18	12	23	0	10	0	0	0	4
	3/31/86	38,938,391	84	8	8	0	0	52	0	12	25	0	6	0	0	0	5
	12/31/85	36,766,845	96	4	0	0	0	68	0	12	8	0	7	0	0	0	5
	9/30/85	34,573,707	96	4	0	0	0	70	0	13	9	0	7	0	0	0	1
	6/30/85	33,794,148	96	4	0	0	0	62	0	23	10	0	4	0	0	0	1
	3/31/85	30,942,776	85	15	0	0	0	53	0	18	11	13	4	0	0	0	1
	12/31/84	30,397,636	74	26	0	0	0	52	0	18	0	25	4	0	0	0	1
	9/30/84	27,932,974	72	28	0	0	0	59	0	10	0	31	0	0	0	0	0
LEHMAN MGMT.	9/30/87	230,295,486	89	4	6	0	1	55	0	0	8	1	7	0	10	0	19
	6/30/87	235,159,610	88	6	5	0	1	63	0	0	9	1	7	0	12	0	8
	3/31/87	238,911,690	85	9	4	0	2	63	0	0	12	2	5	0	9	0	9
	12/31/86	236,321,758	81	6	11	0	2	58	0	0	14	3	7	0	12	0	6
	9/30/86	229,994,337	80	6	12	0	2	53	0	0	14	8	7	0	16	0	2
	6/30/86	223,483,722	89	4	6	1	0	60	0	0	11	2	7	0	18	0	3
	3/31/86	220,998,995	89	4	6	1	0	65	2	0	9	0	6	0	15	0	3
	12/31/85	207,462,430	89	5	6	0	0	51	10	0	7	2	7	0	12	0	11
	9/30/85	194,774,253	87	6	7	0	0	54	12	0	9	2	7	0	11	0	5
	6/30/85	190,808,742	91	5	4	0	0	64	8	0	5	2	4	0	9	0	8
	3/31/85	177,383,853	95	3	2	0	0	65	13	0	2	0	2	0	3	0	15
	12/31/84	173,831,628	98	0	2	0	0	64	13	0	3	0	0	0	5	0	15
	9/30/84	162,737,117	96	1	2	0	0	60	13	5	4	0	0	0	0	0	18

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	QUALITY WEIGHTINGS					SECTOR WEIGHTINGS									
			AAA	AA	A	BAA	OTHER	GOVT	AGCY	ZERO	IND	UTIL	FIN	TRAN	MTGS	MISC	CASH
MILLER ANDERSON	9/30/87	239,261,941	71	5	19	5	0	44	0	1	6	0	17	1	24	0	7
	6/30/87	248,119,545	67	5	7	6	15	37	0	1	9	0	17	1	30	0	5
	3/31/87	252,209,582	75	2	3	5	15	42	0	0	5	0	3	1	30	1	18
	12/31/86	245,302,600	68	2	6	3	21	38	0	0	7	0	6	0	44	1	4
	9/30/86	222,348,832	72	3	5	6	14	24	0	0	6	0	6	0	61	2	1
	6/30/86	217,656,629	71	5	4	5	15	25	0	0	2	0	8	0	60	2	3
	3/31/86	217,291,031	74	0	5	5	16	45	0	0	2	0	8	0	37	0	8
	12/31/85	208,552,908	71	0	6	4	19	45	0	0	2	0	8	0	44	0	1
	9/30/85	191,849,284	68	1	9	4	18	24	0	0	5	0	9	0	60	0	2
	6/30/85	183,857,869	69	3	8	4	16	19	0	2	5	0	12	0	57	0	5
	3/31/85	173,961,916	54	13	11	2	20	2	0	4	7	0	27	0	52	0	8
	12/31/84	169,696,156	55	17	14	5	9	0	0	7	5	0	36	0	51	0	1
	9/30/84	159,574,376	81	12	5	2	0	0	0	0	2	0	17	0	52	0	29
MORGAN STANLEY	9/30/87	197,851,213	100	0	0	0	0	47	0	0	0	0	9	0	17	0	27
	6/30/87	198,820,186	100	0	0	0	0	54	0	0	0	0	10	0	29	0	7
	3/31/87	246,865,703	100	0	0	0	0	25	0	0	0	0	0	0	75	0	2
	12/31/86	239,857,185	100	0	0	0	0	27	0	0	0	0	0	0	73	0	0
	9/30/86	229,631,966	100	0	0	0	0	35	0	0	0	0	0	0	65	0	0
	6/30/86	222,763,940	100	0	0	0	0	33	9	0	0	0	0	0	58	0	0
	3/31/86	225,686,690	100	0	0	0	0	41	0	0	0	0	0	0	59	0	0
	12/31/85	208,381,895	100	0	0	0	0	42	0	0	0	0	0	0	58	0	0
	9/30/85	193,513,567	100	0	0	0	0	41	0	0	0	0	0	0	59	0	0
	6/30/85	188,907,479	100	0	0	0	0	49	0	0	0	0	0	0	51	0	0
	3/31/85	173,106,782	100	0	0	0	0	38	9	0	0	0	0	0	38	0	15
	12/31/84	170,547,941	100	0	0	0	0	74	18	0	0	0	0	0	8	0	0
	9/30/84	159,109,110	100	0	0	0	0	45	27	27	0	0	0	0	0	0	1
PEREGRINE	9/30/87	111,294,267	39	19	32	7	3	0	0	0	11	0	40	0	26	16	7
	6/30/87	112,206,244	41	18	34	5	2	0	0	0	14	0	31	1	29	18	7
	3/31/87	114,089,715	47	12	32	7	2	0	0	0	15	1	24	1	34	17	8
	12/31/86	111,810,642	47	14	29	4	6	0	0	0	22	0	20	0	31	11	16
	9/30/86	108,237,995	49	14	32	2	3	0	0	0	12	0	26	0	47	13	2
	6/30/86	104,606,143	48	19	31	0	2	0	0	0	9	0	30	0	41	17	3
	3/31/86	104,370,666	48	18	32	0	2	0	0	0	9	0	31	0	40	17	2
	12/31/85	100,139,659	55	13	29	0	3	0	0	0	5	0	29	0	48	16	2
	9/30/85	95,186,493	61	12	25	0	2	0	0	0	4	2	31	0	52	7	4
	6/30/85	92,417,709	56	15	20	7	2	0	0	0	4	5	33	0	49	7	2
	3/31/85	86,259,088	55	23	19	3	0	3	0	0	0	5	38	0	47	7	0
	12/31/84	84,387,890	65	13	18	4	0	6	7	0	0	5	30	0	48	0	4
	9/30/84	79,887,650	58	14	24	4	0	12	7	0	10	0	31	0	33	0	7

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	QUALITY WEIGHTINGS					SECTOR WEIGHTINGS									
			AAA	AA	A	BAA	OTHER	GOVT	AGCY	ZERO	IND	UTIL	FIN	TRAN	MTGS	MISC	CASH
WESTERN ASSET	9/30/87	245,548,700	64	4	14	16	2	6	10	0	13	8	15	3	38	0	7
	6/30/87	253,510,478	64	3	15	18	0	5	7	0	19	10	11	3	39	0	6
	3/31/87	262,481,416	69	2	16	11	2	8	6	1	16	10	4	3	36	3	13
	12/31/86	255,942,435	69	2	17	10	2	8	11	0	20	5	5	3	42	1	5
	9/30/86	244,004,935	75	2	11	11	1	16	13	2	9	7	4	4	43	2	0
	6/30/86	238,657,259	80	2	8	9	1	13	9	3	7	7	2	4	45	0	10
	3/31/86	235,514,306	76	4	5	14	1	7	9	3	12	9	2	1	52	0	5
	12/31/85	220,363,561	73	5	8	7	7	5	8	1	15	9	2	1	48	0	11
	9/30/85	201,666,058	74	6	5	4	11	11	3	0	14	10	0	1	49	0	12
	6/30/85	197,929,627	73	9	4	8	6	10	0	0	8	15	0	1	51	0	15
	3/31/85	181,426,695	76	9	4	7	4	4	11	0	8	16	0	1	47	0	13
	12/31/84	177,328,832	69	15	7	5	4	3	11	0	6	19	2	2	33	4	20
	9/30/84	165,957,816	68	15	9	5	3	4	16	0	3	18	4	5	26	4	20

TABLE A-9

EXTERNAL FIXED INCOME MANAGERS

HISTORICAL PERFORMANCE SUMMARY

	3Q 87	2Q 87	1Q 87	4Q 86	3Q 86	2Q 86	1Q 86	4Q 85	3Q 85	2Q 85	1Q 85	4Q 84	3Q 84
INVESTMENT ADVISERS													
Fixed Income	-2.0%	-0.9%	1.0%	2.8%	2.5%	0.9%	6.2%	6.5%	2.5%	9.4%	1.9%	8.8%	11.8%
Total Fund	-1.9	-0.9	1.0	2.7	2.4	0.9	5.9	6.3	2.3	9.2	1.8	8.8	11.8
LEHMAN MANAGEMENT													
Fixed Income	-2.7	-1.7	1.0	2.8	3.0	1.2	6.7	6.9	2.1	8.7	2.0	7.7	9.6
Total Fund	-2.1	-1.6	1.1	2.8	2.9	1.1	6.5	6.5	2.1	7.6	2.1	6.8	8.7
MILLER ANDERSON													
Fixed Income	-3.8	-2.0	3.2	10.6	2.2	0.2	4.4	8.8	4.4	6.0	2.5	7.5	7.7
Total Fund	-3.6	-1.6	2.8	10.3	2.2	0.2	4.2	8.7	4.4	5.7	2.5	6.3	6.7
MORGAN STANLEY													
Fixed Income	-0.9	-5.6	3.1	4.3	3.1	-2.1	8.2	7.7	2.5	9.3	1.5	7.3	6.1
Total Fund	-0.5	-3.1	2.9	4.5	3.1	-1.3	8.3	7.7	2.4	9.1	1.5	7.2	6.3
PEREGRINE CAPITAL													
Fixed Income	-0.9	-1.9	2.2	3.4	3.6	0.2	4.3	5.4	3.1	7.3	2.3	6.0	7.7
Total Fund	-0.8	-1.7	2.0	3.3	3.5	0.2	4.2	5.2	3.0	7.1	2.2	5.6	6.9
WESTERN ASSET													
Fixed Income	-3.7	-3.9	2.6	5.0	2.3	0.9	7.4	10.7	1.9	10.7	2.4	8.0	11.8
Total Fund	-3.1	-3.4	2.6	4.9	2.2	1.3	6.9	9.3	1.9	9.1	2.3	6.8	10.8
SBI FIXED INCOME AGGREGATE													
Fixed Income	-2.7	-2.8	2.4	5.3	2.8	1.7	6.4	8.1	2.8	8.5	2.1	7.5	8.8
Total Fund	-2.2	-2.3	2.3	5.2	2.7	0.4	6.2	7.7	2.7	7.8	2.1	6.8	8.1
MARKET INDEX													
Salomon Broad Bond Index	-2.8	-1.6	1.3	3.3	2.5	1.1	7.9	7.8	2.0	8.9	2.2	7.5	8.6

Tab B

PORTFOLIO STATISTICS

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
COMPOSITION OF STATE INVESTMENT PORTFOLIOS BY TYPE OF INVESTMENT
MARKET VALUE SEPTEMBER 30, 1987
(in 000's)

	CASH AND SHORT TERM SECURITIES	BONDS		STOCKS		ALTERNATIVE ASSETS	TOTAL
		INTERNAL	EXTERNAL	INTERNAL	EXTERNAL		
BASIC RETIREMENT FUNDS:							
TEACHERS RETIREMENT FUND	$ 122,950 5.51%	$ -0-	$ 445,935 19.98%	$ -0-	$ 1,418,674 63.57%	$244,059 10.94%	$ 2,231,618 100%
PUBLIC EMPLOYEES RETIRE. FUND	47,058 3.43%	-0-	280,285 20.42%	-0-	891,682 64.97%	153,409 11.18%	1,372,434 100%
STATE EMPLOYEES RETIRE. FUND	38,623 3.43%	-0-	230,091 20.42%	-0-	731,998 64.97%	125,944 11.18%	1,126,656 100%
PUBLIC EMP. POLICE & FIRE FUND	17,153 3.86%	-0-	90,231 20.33%	-0-	287,057 64.68%	49,383 11.13%	443,824 100%
HIGHWAY PATROL RETIRE. FUND	2,904 3.43%	-0-	17,296 20.42%	-0-	55,024 64.97%	9,466 11.18%	84,690 100%
JUDGES RETIREMENT FUND	158 3.43%	-0-	941 20.43%	-0-	2,993 64.98%	514 11.16%	4,606 100%
POST RETIREMENT FUND	185,991 4.66%	3,241,837 81.22%	-0-	563,551 14.12%	-0-	-0-	3,991,379 100%
MINNESOTA SUPPLEMENTAL FUNDS:							
INCOME SHARE ACCOUNT	12,101 5.47%	72,892 32.98%	-0-	31,884 14.42%	104,169 47.13%	-0-	221,046 100%
GROWTH SHARE ACCOUNT	79 0.08%	-0-	-0-	21,421 22.48%	73,806 77.44%	-0-	95,306 100%
MONEY MARKET ACCOUNT	80,153 100%	-0-	-0-	-0-	-0-	-0-	80,153 100%
BOND ACCOUNT	9,605 100%	-0-	-0-	-0-	-0-	-0-	9,605 100%
COMMON STOCK INDEX ACCOUNT	-0-	-0-	-0-	-0-	2,211 100%	-0-	2,211 100%
BOND MARKET ACCOUNT	-0-	-0-	643 100%	-0-	-0-	-0-	643 100%
GUARANTEED RETURN ACCOUNT	-0-	-0-	4,819 100%	-0-	-0-	-0-	4,819 100%
MINNESOTA VARIABLE ANNUITY	15 0.01%	-0-	-0-	42,718 23.63%	138,015 76.36%	-0-	180,748 100%
TOTAL RETIREMENT FUNDS	$ 516,790 5.25%	$3,314,729 33.65%	$1,070,241 10.86%	$659,574 6.70%	$3,705,629 37.62%	$582,775 5.92%	$ 9,849,738 100%

PERMANENT SCHOOL FUND	25,948 7.69%	311,610 92.31%	-0-	-0-	-0-	-0-	337,558 100%
TREASURERS CASH	1,395,631 100%	-0-	-0-	-0-	-0-	-0-	1,395,631 100%
TRANSPORTATION FUNDS	72,384 100%	-0-	-0-	-0-	-0-	-0-	72,384 100%
HOUSING FINANCE AGENCY	168,282 100%	-0-	-0-	-0-	-0-	-0-	168,282 100%
MINNESOTA DEBT SERVICE FUND	98,149 100%	-0-	-0-	-0-	-0-	-0-	98,149 100%
MISCELLANEOUS ACCOUNTS	39,554 100%	-0-	-0-	-0-	-0-	-0-	39,554 100%
TACONITE AREA ENVIR. PROTECTION	3,130 100%	-0-	-0-	-0-	-0-	-0-	3,130 100%
N.E. MINNESOTA PROTECTION	28,194 100%	-0-	-0-	-0-	-0-	-0-	28,194 100%
MINNESOTA STATE BUILDING FUNDS	122,829 100%	-0-	-0-	-0-	-0-	-0-	122,829 100%
GRAND TOTAL	$2,470,891 20.40%	$3,626,339 29.93%	$1,070,241 8.83%	$659,574 5.44%	$3,705,629 30.59%	$582,775 4.81%	$12,115,449 100%

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
NET CASH FLOW AVAILABLE FOR INVESTMENT

For period of
July 1, 1987 - September 30, 1987

Teachers Retirement Fund	$ 48,055,000.00
Public Employees Retirement Fund	(83,000,000.00)
State Employees Retirement Fund	(26,000,000.00)
Public Employees Police & Fire	(5,000,000.00)
Highway Patrol Retirement Fund	-0-
Judges Retirement Fund	-0-
Post Retirement Fund	142,574,502.00
Supplemental Retirement Fund - Income	771,070.00
Supplemental Retirement Fund - Growth	(641,408.00)
Supplemental Retirement Fund - Money Market	1,900,993.00
Supplemental Retirement Fund - Bond Fund	(2,500,000.00)
Supplemental Retirement Fund - Index	187,130.00
Supplemental Retirement Fund - Bond Mkt.	(140,623.00)
Supplemental Retirement Fund - Guaranteed	259,926.00
Minnesota Variable Annuity Fund	$ (125,412.00)
Total Retirement Funds Net Cash Flow	$ 76,341,178.00
Permanent School Fund	(1,147,624.00)
Total Net Cash Flow	$ 75,193,554.00

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT

TRANSACTION AND ASSET SUMMARY
RETIREMENT FUNDS

	Net Transactions			Asset Summary (at market)				
	Bonds (000,000)	Stocks (000,000)	Total	Cash Flow	Short-term % of Fund	Bonds % of Fund	Equity % of Fund	Total (000,000) (at market)
June	284	118	402	408	6.8	41.2	52.0	6801
July	84	68	153	40	5.2	41.8	53.0	6812
August	79	4	83	30	4.3	43.3	52.4	6867
September	32	(10)	22	31	4.6	44.6	50.8	6751
October	50	52	102	26	3.3	44.8	51.9	6986
November	(29)	(22)	(51)	41	4.4	43.1	52.5	7299
December	(3)	(76)	(79)	16	5.5	43.1	51.4	7583
January 1986	(7)	13	6	13	5.5	42.9	51.6	7618
February	36	(8)	28	34	5.3	42.9	51.8	8049
March	1	(3)	(2)	27	5.4	42.9	51.7	8429
April	(3)	(131)	(134)	20	7.3	42.9	49.8	8384
May	(2)	8	6	44	7.7	40.8	51.5	8450
June	226	326	552	625	8.3	41.4	50.3	8715
July	175	2	177	33	6.8	44.8	48.4	8488
August	147	59	206	39	4.6	45.5	49.9	8884
September	14	(67)	(53)	(48)	4.9	47.0	48.1	8490
October	4	(117)	(113)	10	6.2	46.5	47.3	8724
November	(17)	(3)	(20)	40	6.8	46.0	47.2	8864
December	(51)	44	(7)	12	7.0	46.0	47.0	8772
January 1987	34	21	42	15	6.2	44.4	49.4	9283
February	120	(9)	111	50	5.4	44.4	50.2	9576
March	76	(15)	61	18	4.9	44.5	50.6	9614
April	100	(7)	93	4	4.1	45.0	50.9	9383
May	3	(136)	(133)	33	5.9	44.6	49.5	9403
June	(42)	(22)	(64)	141	7.8	42.6	49.6	9706
July	283	(119)	164	52	6.4	44.9	48.7	10028
August	181	(14)	167	40	5.2	44.7	50.1	10020
September	50	10	60	59	5.3	44.5	50.2	9850

Tab C

EXECUTIVE DIRECTOR
HOWARD J. BICKER

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 13, 1987

TO: Members, State Board of Investment
Members, Investment Advisory Council

FROM: Administrative and Asset Allocation Committees

SUBJECT: Committee Report

The Administrative and Asset Allocation Committees met jointly during the quarter to review the following items:

1. Information Items

a) Schedule of Board and IAC Meetings for 1988

The schedules for the quarterly meetings of the Board and the IAC for 1988 are included as attachments to this report.

b) Fiscal Year 1987 Retirement Benefit Increase

The benefit increase effective January 1, 1988 is estimated at approximately 8%. Final calculation will not be made until all required data is available.

c) Update on 1987 Annual Report

A draft of the Board's annual report for fiscal year 1987 will be sent to Board and IAC members in December. Final printing of the report will occur in January 1988.

d) Update on Local Plan Consolidation with PERA

The 1987 Legislature passed a bill allowing local police and fire retirement plans to merge with PERA. Since its enactment, two plans have approved mergers (Buhl police, Duluth police).

SBI staff are working with the effected plans; PERA and the Legislative Commission on Pensions and Retirement to ensure the transition is carried out. Assets of the plans referenced above are expected to transfer to the State Board of Investment on January 1, 1988.

2. Action Items

a) 1988 Legislative Package

The Committees reviewed several proposals for changes to the Board's statutory authority. The proposals are attached.

The Committees recommend the Board support the proposals and seek legislative approval for all the changes discussed in the attachments.

b) Part IV of the Basic Retirement Funds Policy Paper

The Committees reviewed the staff position paper on performance evaluation in the Basic Retirement Funds. The paper is included as an attachment to this report. The Committees recommend the Board adopt the paper as presented.

Attachments

State Board of Investment
1988 Quarterly Meeting Schedule

The State Board of Investment meets on Wednesday during the first week of the last month in the calendar quarter. The schedule for 1988 is:

Wednesday, March 2, 1988
Wednesday, June 8, 1988
Wednesday, September 7, 1988
Wednesday, December 7, 1988

The SBI, the Executive Council and the Land Exchange Board will meet consecutively on the days listed above between 8:00 A.M. and 12:00 P.M.

Investment Advisory Council
1988 Quarterly Meeting Schedule

The Investment Advisory Council meets on Tuesday during the first week of the last month in the calendar quarter. The schedule for 1988 is:

Tuesday, March 1, 1988
Tuesday, June 7, 1988
Tuesday, September 6, 1988
Tuesday, December 6, 1988

All meetings will begin at 2:00 P.M.

EXECUTIVE DIRECTOR
HOWARD J. BICKER

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT

Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 6, 1987

TO: Members, Administrative Committee

FROM: SBI Staff

SUBJECT: Proposed Statutory Changes for 1988 Legislative Session

We have prepared several potential statutory changes for your review. A section-by-section summary of the draft language is attached. The changes can be highlighted as follows:

1) New authority for international investments.

During the 1987 Legislative Session, the Board requested several new investment authorities. All requests were approved with the exception of international investing. Despite its failure to obtain final approval, international investing gained substantial support among legislators. Therefore, we recommend the Board renew its request for authority to purchase international securities as an alternative investment.

Currently, the Board's investments are limited to U.S. and Canadian securities. The ability to make selected international investments may allow the Board to enhance investment returns without adding to investment risk.

If the change is adopted, the IAC and the Board would use the normal asset allocation process to determine when and where international investments would be used.

2) Elimination of the Bond Account in the Supplemental Investment Fund.

In 1981, the Legislature added the Bond Account to the Supplemental Investment Fund in order to provide a separate fixed income investment option for local police and firefighter retirement plans.

The Bond Account has not been widely used. In July 1987 the account had a balance of $12 million from four local plans. By October 1987, all participants had withdrawn their assets leaving a current balance of zero. As a result, we recommend the Bond Account be eliminated.

If this change were approved, local plans would retain their ability to invest in the other six accounts in the Supplemental Fund. Three of these six options provide fixed income alternatives (i.e. Bond Market Account, Guaranteed Return Account, Money Market Account). The elimination of the Bond Account will have a negligible effect on the investment flexibility of local plans.

3) Addition of the Guaranteed Return Account as an investment option for other participants in the Supplemental Investment Fund.

The Guaranteed Return Account was added to the Supplemental Investment Fund in 1986. This account is currently used by two groups:

- o Deferred Compensation Plan
- o Local police and fire plans

Three other plans are now interested in offering the Guaranteed Return Account to their participants:

- o Unclassified Employees Retirement Plan (sponsored by MSRS)
- o Teachers Supplemental Retirement Plan (sponsored by TRA)
- o Ambulance Service Personnel Retirement Plan (under development by PERA)

The Guaranteed Return Account provides an attractive alternative to other accounts in the Supplemental Fund that rely on stock and bond investments. We recommend the Board support the addition of this investment option for the three groups listed above.

4) Housekeeping Changes.

We recommend the Board initiate two housekeeping changes:

- o Remove an obsolete reference to dividend requirements for stock holdings in the Variable Annuity Fund.

  Several years ago, the Legislature removed a restrictive dividend requirement in Minnesota Statutes, Chapter 11A.24 subdivision 5. The

corresponding reference for the Variable Annuity Fund was overlooked.

- o Eliminate State Board of Investment review and approval of rules and contracts for the Deferred Compensation Plan.

  The Deferred Compensation Plan offers participants a variety of investment alternatives through three vendors:

  - The Supplemental Investment Fund managed by the State Board of Investment.
  - Fixed and variable annuity options through Minnesota Mutual Life/Northwestern National Life.
  - Fixed and variable annuity options through Great West Life Assurance Company.

  The Minnesota State Retirement System (MSRS) has administered the Deferred Compensation Plan since its inception in 1971. At that time the only investment vehicle available to participants was the Supplemental Investment Fund. In 1977, the Legislature approved the addition of insurance company annuity products to the plan and specified that the Board should approve resulting contracts with insurance company vendors. The State Board of Investment was involved in the initial selection of Minnesota Mutual Life and Great West. Removing references to the Board regarding rules and contracts is consistent with MSRS's on-going responsibilities for administration of the program.

Attachments

State Board of Investment
Proposed Statutory Changes
1988 Legislative Session

Section by Section Summary

Sections 1-3. Supplemental Investment Fund
(11A.17 subdivisions 1,4, and 9)

Deletes references to Bond Account in the Supplemental Fund.

Section 4. Supplemental Investment Fund Prospectus
(11A.17 subdivision 11)

Changes requirements for information included in the prospectus of the Supplemental Fund. Amends language to conform with current practice.

Section 5. Supplemental Investment Fund Income Distribution
(11A.17 subdivision 14)

Deletes references to Bond Account.

Section 6. Variable Annuity Fund
(11A.19 subdivision 4)

Deletes an obsolete reference to dividend requirements.

Section 7. Authorized Investments for the State Board
(11A.24 subdivision 6)

Adds authority to purchase international securities as an authorized investment subject to certain restrictions.

Section 8. Teachers Supplemental Retirement Program Investment Options
(136.81 subdivision 3)

Adds the Guaranteed Return Account in the Supplemental Investment Fund as an investment option for plan participants.

Establishes requirements for contributions, transfers and withdrawals from the Guaranteed Return Account.

Section 9. Deferred Compensation Plan Administration (352.96 subdivision 3)

Removes the State Board of Investment from bidding process on Deferred Compensation Plan options offered by insurance companies.

Section 10. Deferred Compensation Plan Rules (352.96 subdivision 4)

Removes the State Board of Investment from the rule-making process in the Deferred Compensation Plan.

Section 11. Unclassified Employees Retirement Plan Investment Options (352D.04 subdivision 1)

Adds the Guaranteed Return Account in the Supplemental Investment Fund as an investment option for plan participants.

Establishes requirements for contributions, transfers and withdrawals from the Guaranteed Return Account.

Section 12. Ambulance Service Personnel Retirement Plan Investment Options (353D.05 subdivision 2)

Adds the Guaranteed Return Account in the Supplemental Investment Fund as an investment option for plan participants.

Establishes requirements for contributions, transfers and withdrawals from the Guaranteed Return Account.

Section 13. Repealers (11A.17 subdivision 11 and 12)

Repeals two subdivisions pertaining to the Bond Account in the Supplemental Investment Fund.

Section 14. Effective Dates

All sections are effective the day following enactment. New participants in the Guaranteed Return Account may not make contributions to the account until November 1, 1988.

BASIC RETIREMENT FUNDS
INVESTMENT POLICY

PART IV
PERFORMANCE EVALUATION

Staff Position Paper
November 1987

EXECUTIVE SUMMARY

Performance evaluation is the process of understanding the investment results produced by a portfolio of financial assets. It is a short-term feedback and control process carried out within the context of investment policy. Properly conducted, performance evaluation assists in keeping a pension plan's investment program on track toward implementation of the plan's investment policy.

Meaningful performance evaluation is predicated on the comparison of investment results to expectations. Because expectations for pension plan performance are defined by the plan's investment policy, that policy should serve as the base against which to evaluate the effectiveness of the plan's investment performance.

A clear and concise framework for conducting performance evaluation greatly facilitates an understanding of the analysis. The Board's consultant, Richards & Tierney, has developed one of the most comprehensive and intelligible performance evaluation frameworks available. This paper provides a detailed example of the Richards & Tierney methodology.

Effective performance evaluation requires appropriate benchmarks and a sufficiently long time interval. Appropriate benchmarks are needed because they reflect the plan sponsors risk-return expectations for individual money managers, the aggregate of the plan's managers within an asset class, or the plan's total portfolio.

A sufficiently long evaluation time interval is necessary to overcome the "noise" resulting from the inherent random variability of investment results. In fact, performance evaluation carried out over short time intervals can actually be counterproductive. It can foster a pervasive focus on short-run results to the possible long-run detriment of the plan.

RECOMMENDED INVESTMENT POLICY STATEMENT: PART IV

The Board believes that performance evaluation is an integral part of the investment policy established for the Basic Retirement Funds. The Board recognizes that performance evaluation is predicated on the comparison of investment results to expectations.

Expectations for the Basic Fund's performance are represented by benchmarks developed on total fund, asset class, and individual manager levels. Thus, the Board attaches great importance to the design of appropriate benchmarks.

The Board also recognizes that performance evaluation conducted over short time intervals has little meaning due to the inherent "noise" of investment results. Therefore, the Board intends to apply performance evaluation over intervals of at least three-to-five years.

ROLE OF PERFORMANCE EVALUATION

Performance evaluation is the process of measuring and understanding the investment results produced by a portfolio of financial assets. Properly conducted, performance evaluation provides the plan sponsor with valuable information that can be used to more effectively implement and refine the pension plan's investment program.

Performance evaluation should address a number of issues, including:

- Rate of return and the sources of return earned by the plan's total portfolio and the components of its investment management structure.
- Risk incured by the plan's total portfolio and the components of its investment management structure.
- Impact of the plan's investment policy on plan assets.
- Effectiveness of active and passive management within the plan's investment management structure.
- Contributions made by the plan sponsor and money managers to investment results.

Performance evaluation should be distinguished from the purely mechanical process of performance measurement. The latter is a part of performance evaluation. Performance measurement entails calculating the change in value of a portfolio over time, taking into account interim cash flows. [1] Performance evaluation, on the other hand, uses the information produced by performance measurement to develop an understanding of the sources of investment returns and the quality of those returns relative to expectations.

As a simple example of the performance evaluation process, consider a pension plan that employs a common stock index fund as part of its investment management structure. The objective of the index fund is to closely track the performance of the specified common stock asset class target. An evaluation of the index fund's performance first involves measuring the return earned on both the index fund and the common stock asset class target. These returns are then compared to identify any "tracking error" on the part of the index fund. If tracking error exists, it must be determined whether that tracking error is significant and persistent enough to be of concern. Further, the causes of the tracking error should be identified. Finally, a judgment must be made whether the sources and the size of the tracking error merit a corrective action on the part of the plan sponsor and/or the index fund manager.

Performance evaluation is a short-term feedback and control process that is carried out within the context of investment policy. It is not meant to judge the appropriateness of investment policy. The appropriate investment policy is a long-term decision made by the plan sponsor. The question of whether a given policy is "correct" is one for which there is no definitive answer. [2] Performance evaluation is designed to keep the pension plan's investment program on track toward achieving the goals of the plan's investment policy, whatever that policy may be. Thus, it is reasonable to expect performance evaluation to answer a question such as, "Was XYZ bond manager's return last year acceptable?" Conversely, it is not reasonable to expect performance evaluation to answer the question, "Is our investment policy too aggressive?"

CONTRIBUTION OF THE PLAN SPONSOR

Performance evaluation almost invariably is conducted by the plan sponsor. For obvious reasons the performance evaluation process frequently focuses entirely on the contributions made by the plan's money managers. The importance of the money managers in the production of total portfolio returns is clear. These organizations are directly responsible for investing the plan's assets. However, the plan sponsor often fails (either consciously or unconsciously) to recognize that how it allocates assets among the various asset classes and money managers also will materially impact the effectiveness of investment policy implementation.

For example, suppose that the plan sponsor permitted the plan's actual asset mix to differ significantly from the policy asset mix. The result could be actual total fund performance that deviates noticeably from the return that would have been earned had investment policy been precisely implemented. If the deviation from the policy asset mix was intentional, then the plan sponsor's market timing efforts should be explicitly recognized and graded. If the deviation was unintentional, then the plan sponsor should be criticized for introducing unproductive additional risk into the plan's total portfolio. In either case, effective performance evaluation should recognize the importance of the plan sponsor's actions on fund performance, just as it considers the contribution of the plan's money managers.

POLICY AS THE BASE FOR PERFORMANCE EVALUATION

Meaningful performance evaluation is predicated on the comparison of investment results to expectations. If results are in line with expectations (for the right reasons, of course) then the investment program has been successful. If results fail to meet expectations, then corrective measures are called for, particularly if these failures are persistent and significant.

Expectations for pension plan performance are defined by the plan's investment policy. The investment policy represents the configuration of asset classes, asset class targets, and individual money manager investment styles that the plan sponsor believes is most capable of achieving the plan's investment objectives. Therefore, investment policy should serve as the base against which to evaluate the effectiveness of the plan's investment performance.

The expression of investment policy through specific and appropriate investment benchmarks permits the performance evaluation process to be both measurable and objective. For example, individual manager investment styles are represented by benchmark portfolios, often referred to as normal portfolios.[3] A plan's investment policy will allocate a certain percentage of the plan's assets to a particular investment style or normal portfolio. In evaluating the performance of the manager pursuing this style, the manager's investment results should be analyzed in relation to the manager's normal portfolio.

To carry the example further, investment policy establishes an asset class target for each asset class. It is the plan sponsor's obligation to ensure that funds are allocated among

managers (both active and passive) within an asset class so that the combination of the managers' investment styles is consistent with the asset class target. In evaluating the performance of the plan sponsor, the aggregate investment results of the combined benchmarks of all managers within an asset class should be analyzed relative to the asset class target.

From the preceding discussion, it should be clear that performance evaluation is highly dependent on the construction of appropriate benchmarks. For this reason, SBI staff has devoted considerable attention to the benchmark building process. Unfortunately, the subject of benchmark building is relatively new and unrefined. As more efficient techniques are developed, performance evaluation will become more meaningful and useful.

FRAMEWORK FOR PERFORMANCE EVALUATION

A clear and concise framework for conducting performance evaluation greatly facilitates an understanding of the analysis. In recent years SBI staff has reviewed a number of performance evaluation methodologies. Staff has concluded that one of the most comprehensive and intelligible frameworks available has been developed by Richards & Tierney, the Board's consultant.

Table 1 presents a condensed sample of an R & T performance evaluation report. The data presented are actual results for the Basic Retirement Funds during the first quarter of 1987. An explanation of this report provides useful insights into the way in which investment policy and investment benchmarks are used to evaluate pension plan performance.

TABLE 1

PERFORMANCE EVALUATION REPORT
BASIC RETIREMENT FUNDS
FIRST QUARTER, 1987

LINE		ITEM	INCREMENTAL CONTRIBUTION	ITEM	ENDING VALUE
1	Beginning Market Value	A	$4,474,053,231		
2	Net Contributions	B	3,770,000	C	$4,477,823,231
3	Risk-free Asset	D	69,340,189	E	4,547,163,420
4	Investment Policy	F	485,236,763	G	5,032,400,183
5	Benchmark Misfit	H	15,012,604	I	5,047,412,787
6	Managers' Contribution	J	14,927,680	K	5,062,335,467
7	Allocation Tactics	L	12,723,562	M	5,075,059,029
8	Ending market Value	N	$5,075,059,029		

Source: Richards & Tierney, Inc.

As a first step to understanding the R&T analysis, consider the information contained in lines 1 and 8. Item A lists the market value of the Basic Funds at the beginning of the quarter as $4,474,053,231. Item N shows that the Basic Funds were worth $5,075,059,029 at the end of the quarter. The difference, $601,005,798, represents the results of the Basic Funds' investment management program for the quarter. The task of performance evaluation is to identify and explain the sources of those investment results.

Line 2 of the R&T analysis identifies the first source of change in the Basic Funds' assets. Net contributions of $3,770,000 (Item B) were made during the quarter. As shown in Item C, if no further action were taken (i.e., the Basic Funds' assets were placed "under the mattress"), the net contributions would have produced total end-of-quarter assets of $4,477,823,231.

But of course the Basic Funds' assets were invested. One investment option was to place all of the Basic Funds' assets in the lowest risk asset class available, namely Treasury bills. Line 3 calculates the effect of such a policy. Investing the beginning value plus the first quarter's net contributions in the risk-free asset would have added $69,340,189 to the Basic Funds' total market value (Item D), producing a total end-of-quarter market value of $4,547,163,420 (Item E).

The Basic Funds' investment policy entails more than simply investing in Treasury bills. In fact, the Basic Funds' investment policy calls for pursuing an aggressive, high expected return policy. (See Parts I and II of the investment policy

paper.) This policy involves exposing the total portfolio to capital market risk, including a large common stock component. Line 4 indicates the contribution of that policy to the Basic Funds' investment results. Item F shows that the policy asset mix added $485,236,763 to the amount that would have been earned by investing the Basic Funds' beginning value plus net contributions only in the risk-free asset. Item G shows that standing alone, the Basic Funds' policy asset mix would have led to a total portfolio market value of $5,032,400,183 at the end of the first quarter.

Note that Item G is very similar to Item N. That is, the market value of the Basic Fund's total portfolio produced by the policy asset mix is very close to the portfolio's actual ending value. The remaining three sources of investment results (including active management) add relatively small amounts to the Basic Funds' total value. This observation serves to emphasize a point made at several times in the previous three parts of this investment policy paper. Namely, that the choice of an investment policy (embodied in the policy asset mix) represents the single most important decision that the plan sponsor can make. Particularly over an extended period of time, the policy asset mix decision will have the biggest impact on the plan's bottom line.

If all of the Basic Funds' assets were passively managed according to the policy asset mix, lines 5, 6, and (largely) 7 would be irrelevant. But active management is an element of the Basic Funds' investment management structure. Performance evaluation therefore should account for the contribution of active management decisions to investment results.

Line 5 indicates the contribution that money managers' investment styles, in aggregate, made to investment results. Within each asset class, the plan sponsor attempts to allocate funds among manager styles (as represented by their normal portfolios) so that in aggregate they match the asset class target. In practice, making a perfect match is difficult. Item 4 indicates that $15,012,604 was added to Basic Funds' market value by the fact that the policy allocations to the managers' benchmarks, in aggregate, produced returns that did not match the returns on the asset class targets. Item I shows what the Basic Funds' would be worth $5,047,412,787 if passive investments in the managers' benchmarks had been made according to policy allocations.

This incremental value produced by the managers' aggregate benchmark misfit is unintentional. Further, it can be negative just as often as it is positive. Therefore, the benchmark misfit is a source of unproductive risk that should be minimized by the plan sponsor. [4]

Another source of investment results is the efforts of active managers to outperform their benchmarks. Item J on Line 6 shows that during the quarter active managers added $14,927,680 to the Basic Funds by outperforming their benchmarks. The goal of active management, of course, is to consistently make this incremental contribution positive and large. Item K shows that the Basic Funds would have grown to $5,062,335,467 if assets had been assigned to the managers based on policy allocations.

Line 7 contains the effect of not allocating assets precisely according to policy guidelines. For example, in the Basic Funds

stocks may not always be at their targeted 60% policy weighting. Or a manager may be above or below his targeted allocation. These allocation effects may be due to conscious decisions on the part of the plan sponsor to temporarily deviate from policy. Or, in the case of the Basic Funds, the deviations are due to market movements that cause shifts in allocations too small to warrant rebalancing back to policy allocations. In any event, Item L indicates that $12,723,562 was contributed to the Basic Funds' market value by these allocation deviations. Item M shows that this last source of investment results is the final reconciliation to the Basic Funds' ending value.

Table 2 of the R&T analysis takes the information presented in Table 1 and converts it from dollar to percentage terms. For example, an investment in the risk-free asset (Item A) generated a 1.46% return during the quarter. Similarly, the managers' benchmarks at their policy allocations, (Item B) produced, in aggregate, a 12.70% return for the quarter.

TABLE 2
PERFORMANCE EVALUATION REPORT
BASIC RETIREMENT FUNDS
FIRST QUARTER, 1987

	INVESTMENT RETURNS	ITEM
RISK-FREE ASSETS	1.46%	A
INVESTMENT POLICY	12.35%	
POLICY BENCHMARKS	12.70%	B
MANAGERS AT POLICY	13.04%	
ACTUAL RATE OF RETURN	13.33%	

The R&T performance evaluation format can be applied on three distinct levels: the total fund; the various asset classes; and, individual money managers. Conducting the R&T analysis on these three levels allows those issues of primary importance to performance evaluation, presented at the beginning of this paper, to be dealt with directly.

Additional methods of performance evaluation can extend the analysis performed under the R&T format. For example, performance attribution techniques have been developed that attempt to categorize the sources of stock and bond portfolio returns. These performance attribution techniques are based on models of investment risk whereby returns on stocks or bonds are related to particular financial factors.

Performance attribution and other additional performance evaluation methods can provide interesting insights into the risk-return performance of individual managers or groups of managers. But generally those insights are ancillary to the basic and more important information derived from the R&T analysis.

TIME FRAME FOR ANALYSIS

Indisputably, the longer the time period over which performance evaluation is conducted, the more meaningful are the resulting conclusions. Investment performance is inherently uncertain, exhibiting a large amount of random variability. Performance evaluation attempts to look through that variability in order to isolate the contributions that the plan sponsor and money managers make to a pension plan's investment results. Two

primary elements make this analysis effective: appropriate benchmarks and a sufficiently long performance evaluation interval. The need for appropriate benchmarks was discussed earlier. To repeat, a properly constructed benchmark will reflect the risk-return expectations for an individual money manager, the aggregate of the plan's managers within an asset class, or the plan's total portfolio. As a result, appropriate benchmarks eliminate a portion of the "noise" surrounding investment performance by focusing on those factors truely relevant to the results of a manager's or plan's investment program.

The importance of the performance evaluation period's length is based on the statistical principal that outcomes due to random events will tend to cancel out over time. That is, the random component of investment performance has an expected value of zero. But in any given short time period, that variability can be very large relative to the returns generated by "true" investment skill. The longer is the evaluation period the more random variability will be removed and the more true investment skill will become apparent.

The difficulty that performance evaluators face is that the amount of time necessary to isolate investment skill with a high degree of confidence is quite long, on the order of decades. Naturally, that period is far too long for most interested parties to accept. As a result, the tendency among plan sponsors has been to evaluate performance over three-to-five year intervals. Evaluation periods of this length are certainly preferable to quarterly analysis. Nevertheless, three-to-five

year performance evaluation analyses are still likely to be hampered by considerable random variability in results.

As a related and final comment, it should be noted that performance evaluation viewed over a short time frame (i.e., a quarter-to-quarter or even year-to-year) is of little use. In some circumstances it can serve to control extreme downside performance. But in general, performance evaluations conducted over short intervals are overwhelmed by the random variability of investment results, hence, providing little or no useful information.

In fact, performance evaluation carried out over short intervals can actually be counterproductive to a pension plan's goals. It can produce a pervasive attitude in the plan's management that focuses on short-term results. Decisions in response to short-term evaluations may be made to the long-run detriment of the plan. If there has been one primary theme of the four parts of this investment policy paper, it is that the investment policies of most pension plans (including the Basic Funds) are long-term in nature. Performance evaluation conducted under these policies should be similarly long-term.

FOOTNOTES

1. The mathematics involved in performance measurement are straightforward. However, the difficulty of establishing a reliable and flexible system for collecting accurate transactions and holdings data should not be underestimated.

2. An investment policy is "correct" if it is consistent with the plan sponsor's risk-return expectations. That consistency is a highly subjective determination. Further, an investment policy is "correct" if it is internally consistent. That is, the various components of the investment policy (i.e., investment objectives, policy asset mix, investment management structure) are consistent.

3. See Part III, Section 4 of the investment policy paper for a more detailed discussion of normal portfolios.

4. See Part III, Section 4 for a discussion of reconciling aggregate manager investment styles with an asset class target.

Tab D

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 17, 1987

TO: Members, State Board of Investment
Members, Investment Advisory Council

FROM: Equity Manager Committee

SUBJECT: Committee Report

The Committee reviewed staff's recent evaluations of the Board's equity managers. After reviewing each manager the Committee recommends that the investment management agreements of Hellman Jordan, Investment Advisers and Peregrine Capital be terminated effective December 31, 1987.

The Committee also discussed the disposition of assets currently under supervision by the managers recommended for termination. The Committee recommends that the assets of the three affected managers be distributed as follows:

1) $30 million to be distributed in kind to each of the following managers: Alliance Capital, IDS Advisory and Forstmann Leff. These three managers ranked high in the recent staff evaluations.

2) The remainder of the assets to be placed into the index fund.

The Committee adopted a staff recommendation to establish a more formal manager continuation policy. The staff proposed a policy which focuses on the level and consistency of performance as well as qualitative considerations regarding the manager's organization and investment approach. The Committee will bring specific recommendations regarding acceptable levels of manager performance, and the time frames over which manager performance should be reviewed, to the Board at its March meeting.

The Committee also heard a progress report regarding the implementation of a completeness fund. A staff analysis of the

existing equity management structure indicates that the current level of misfit is not material. The Committee recommends that the implementation of a completeness fund be postponed.

The Committee also recommended that the staff continue its efforts in the completeness fund area. Staff will provide an analysis of the impact of the proposed manager terminations on the level of misfit. Staff will report the results of its analysis along with a recommendation to the Committee as part of a completeness fund position paper scheduled to be presented to the Board at its next meeting.

Tab E

EXECUTIVE DIRECTOR
HOWARD J. BICKER

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 17, 1987

TO: Members, State Board of Investment
Members, Investment Advisory Council

FROM: Fixed Income Committee

SUBJECT: Committee Report

The Fixed Income Committee met during the quarter to review the following items:

1. Information Items

a) External Bond Managers Performance

The Committee reviewed the performance of the Board's external active bond managers. The Committee recommends that no immediate changes be made to the manager group.

The Committee intends to provide the Board with comprehensive recommendations regarding the total Basic Funds' fixed income program by the Board's June, 1988 meeting. The recommendations will focus on the selection of a bond index fund manager for the Basic Funds fixed income program and the re-allocation of funds from the six active managers to the passive bond index manager. A summary of the current performance of the managers accompanies this report.

b) 1987 GIC Bid Process

The Committee reviewed the bidding for the second guaranteed investment contract (GIC) for the Supplemental Investment Fund's Guaranteed Return Account. The 1987 GIC was awarded to Principal Mutual Life (formerly Bankers Life of Iowa) at a rate of 8.45%. A summary of the bidding process is included as an attachment to this report.

2. Action Items

a) Contract with Bankers Trust to Rebalance the Dedicated Bond Portfolio

The Post Retirement Fund's dedicated bond portfolio must be rebalanced periodically to insure that the portfolio meets its objectives. For the last three years, the Board has contracted with Bankers Trust Company to provide the computer support necessary to accomplish the rebalancing.

The Committee recommends that the contract with Bankers Trust be extended for one year at a cost of $100,000 (This is the same cost as the previous year's contract.) The Committee further recommends that a review of alternative vendors be undertaken prior to next year's Bankers Trust contract evaluation.

b) Bond Index Fund Position Paper

The Committee reviewed the staff position paper on the addition of a passive bond component to the Basic Funds' investment program. The paper is included as an attachment to this report. The Committee recommends the Board adopt the paper as presented.

c) State Fund Mutual Insurance Company Surplus Notes

The Committee reviewed the terms of a $10,000,000 surplus note to be issued by the State Fund Mutual Insurance Company. The Committee recommends the Board accept the terms specified in the attachment and purchase the issue.

The State Fund Mutual Insurance Company will use the proceeds to finance underwriting activity in worker's compensation insurance.

Attachments

BOND MANAGER UPDATE INTERVIEWS
THIRD QUARTER 1987 SUMMARY

I. STAFF COMMENTS AND RECOMMENDATIONS

In aggregate, the Board's fixed income managers have outperformed the bond market in four of the last five quarters. The strong relative performance by the managers in recent periods has essentially offset their previous underperformance. Consequently, the managers as a group have roughly matched the performance of the bond market since the inception of the bond accounts in mid-1984.

Staff recommends that no action be taken with respect to the Board's fixed income managers during the current quarter. Staff intends to provide the Board with comprehensive recommendations regarding the total Basic Funds' fixed income program by the June 1988 meeting. The recommendations will focus on the selection of a bond index fund manager for the Basic Funds' fixed income program and the re-allocation of funds from the six active managers to the passive bond index manager.

II. THIRD QUARTER MEETING DATES

MANAGER	DATE OF MEETING
Investment Advisers	November 23
Lehman Management	November 23
Miller Anderson, Sherrerd	November 24
Morgan Stanley	November 20
Peregrine Capital	November 25
Western Asset	November 20

III. ORGANIZATION

Only one minor organizational change occurred since the last series of bond manager meetings in May, 1987. Western Asset Management moved its offices from downtown L.A. to Pasadena, California. The firm completed the move in August without a significant disruption in the firm's operations.

IV. ASSETS UNDER MANAGEMENT

	JUNE 30, 1984		MARCH 1987		SEPTEMBER 1987	
	NUMBER	MARKET VALUE (MILL.)	NUMBER	MARKET VALUE (MILL.)	NUMBER	MARKET VALUE (MILL.)
Investment Advisers	48	$ 275	68	$1,058	70	$1,083
Lehman Management	36	3,000	38	4,500	39	4,512
Miller Anderson	37	2,184	65	6,746	73	7,551
Morgan Stanley	29	1,040	26	1,716	35	2,655
Peregrine Capital	5	170	7	345	7	344
Western Asset	30	1,599	30	2,801	35	3,221

Account growth has slowed during recent months for most of the Board's fixed income managers. However, the rapid growth in Morgan Stanley's fixed income accounts continues to be of concern to staff. The firm accepted nine new fixed income accounts in the last half year. Staff is concerned that the rapid account growth will create administrative burdens and will continue to monitor the account growth.

Miller Anderson was the only other SBI bond manager to add a significant number of new accounts since the last review. Miller gained eight new accounts since March, 1987. The firm has been aggressively adding new staff members to handle the increased account load. Staff will review growth targets with the firm and monitor future account activity.

V. STAFF

Miller Anderson, Sherrerd recently added two fixed income portfolio managers, one client service representative, and a quantitative research director. These staff members were added to assist in the management of the current accounts and to expand the products and services provided by the firm.

Western Asset Management added a client service representative to its staff. The new staff member will direct the firm's administrative operations.

VI. INVESTMENT APPROACH

Staff continues to review the investment style of each of the six active bond managers. A primary objective of the style review is to facilitate the design of benchmark or normal portfolios. Several of the managers (Western Asset, Lehman and Peregrine) have substantially completed their benchmark portfolios. Others have benchmark portfolios in progress.

A second objective of the style review is to evaluate the manager's style relative to the Board's investment objectives. These evaluations will figure prominently in the active manager recommendations to be submitted to the Board by June 1988. The active manager recommendations will be made in conjunction with the recommendation for the hiring of a bond index fund manager for the Basic Funds' bond portfolio.

EXECUTIVE DIRECTOR
HOWARD J. BICKER

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 9, 1987

TO: Members, Fixed Income Manager Committee

FROM: SBI Staff

SUBJECT: Results of 1987-1990 GIC Bidding

On October 28, 1987, the State Board of Investment bid its second 3-year guaranteed investment contract (GIC) for the Guaranteed Return Account in the Supplemental Investment Fund. The winning bid was submitted by Principal Mutual Life of Des Moines, Iowa, at an annual effective rate of 8.45%, net of expenses:

Contract Period: November 1, 1987-October 31, 1990 (3 years)
Contract Window: November 1, 1987-October 31, 1988 (1 year)

Estimated Lump Sum:	$15.7 million
Estimated Flow :	1.0 million
Estimated Total :	$16.7 million
Bid Awarded To:	Principal Mutual Life
Net Effective Annual Interest Rate:	8.45%

Principal Mutual Life (formerly Banker's Life) is headquartered in Des Moines, Iowa. The company manages over $17 billion in assets and ranks among the 25 largest tax-exempt money managers in the U. S. The company is rated AAA by Standard and Poors and A+ by AM Best. Both these rankings reflect the highest possible rating awarded to an insurance company by nationally recognized rating organizations. Principal Mutual was also the winning bidder for the Board's first GIC in October 1986.

The 1987-1990 GIC drew many more participants from the Deferred Compensation Plan than the previous GIC. In addition, local police and firefighters retirement plans also were allowed

to make lump sum deposits to the new GIC for the first time. As a result, the 1987-1990 GIC was significantly larger than the 1986-1989 GIC ($16.7 million vs. $4.5 million). Future GIC's may be larger as new employee groups become eligible to participate in the Guaranteed Return Account and current participants become more familiar with this new investment option in the Supplemental Investment Fund.

The 1987-1990 GIC was structured very much like the 1986-1989 GIC. Its characteristics are outlined below:

- The GIC carries a fixed interest rate for three years. No blending of rates with past or future GIC's will occur.

- For Deferred Compensation Plan participants, lump sums were pledged to the GIC prior to the start of the contract. On-going contributions may be made during the first year of the three year contract by payroll deduction.

- For local police and firefighter plans, lump sums were pledged to the GIC prior to the start of the contract.

As an adjunct to their master trustee relationship with the SBI, State Street Bank and Trust assisted the SBI in the GIC bid process.

Several documents summarizing the bid process are attached:

Attachment A - GIC Bidding Day Review
Attachment B - Bids on the 1987-1990 GIC
Attachment C - Responses to Bidding Specifications

Attachment A

GIC BIDDING DAY REIVEW

As outlined in the GIC bidding specifications, indicative, but not binding, interest rate bids from insurance companies were required on October 23, 1987. Binding bids were required on October 28, 1987 by 10:30 A.M. A final bid was accepted at approximately 1:00 P.M. on October 28, 1987.

Actual events on October 28, 1987 are as follows:

PHONE BIDS 10:30 A.M. - 12:30 P.M.

Bids were phoned in to the SBI from the insurance companies. Nine of the eleven companies that provided indicative bids submitted binding bids. Two companies raised the rate offered in the indicative bid, two companies remained unchanged, and five lowered their bids. Bids for the entire package (Deferred Compensation and local police and fire plans) ranged from 7.66% to 8.45%. Principal Mutual Life had the high bid at 8.45% with the next highest bid at 8.27% from Metropolitan Life. (See Attachment B).

FINAL BID 12:30 P.M. - 1:00 P.M.

While Principal Mutual had the highest rate, bids were being held open to allow Hartford to offer a final rate. It was felt Hartford might be able to submit a competitive final bid since their indicative bid was 8.41%.

While waiting for a response from Hartford, some companies indicated their bids would begin to expire. (Due to the recent volatility in interest rates several companies were unwilling to hold their bids open for the entire bid day.) In order to avoid the potential loss of Principal Mutual's bid, it was decided to close bidding without a bid from Hartford.

Principal Mutual's bid of 8.45% was accepted by phone at approximately 1:00 P.M.

Attachment B

BIDS ON THE 1987-1990 GIC

	Entire Package	Deferred Compensation Plan Only	Police & Fire Plans Only
Estimated Lump Sum	$15.7 Million	$12.6 M	$3.1 M
Estimated Flow	1.0	1.0	0.0
Estimated Total	$16.7 M	$13.6 M	$3.1 M

NET EFFECTIVE ANNUAL INTEREST RATE BIDS*

Company	Entire Package	
	Indicative**	Final***
Aetna	7.96%	7.66%
Executive Life	8.40	8.28
John Hancock	8.00	8.00
Hartford	8.41	--
Metropolitan Life	--	8.27
Mutual of America		
Compounded	8.45	8.10
Simple	8.50	8.05
Principal Mutual	8.35	8.45
Provident	8.28	8.26
Prudential	7.94	8.16
Bid Range		
High	8.45%	8.45%
Low	7.94%	7.66%
3-year Treasuries on 10/28/87	7.94%	

*All figures are compounded rates unless noted otherwise

**Indicative bids as of 10/23/87
***Final bids taken 10/28/87

Attachment C

RESPONSES TO BIDDING SPECIFICATIONS

Bidding specifications were sent to 35 insurance companies. The 25 responses are summarized below:

Bidders - 11 indicative, 9 final
(*did not submit final bid)
(**did not bid on entire package)

Aetna
Executive Life
John Hancock
* Hartford
Metropolitan Life
*,** MONY
Mutual of America
Principal Mutual
Provident
Prudential
** Trans America

Non-Bidders - 14, reasons for lack of bid indicated

- Will not bid on non-qualified plans (4)

  All State
  CNA
  Connecticut Mutual
  Virginia Life

- No capacity at present time (6)

  CIGNA
  Confederation Life
  General American
  Mutual Benefit
  Phoenix
  Travelers

- Market conditions too volatile (2)

  New York Life
  Pacific Mutual

- Miscellaneous (2)

  Great West - competes with annuity options already offered to Deferred Compensation Plan

  Lincoln National - will not bid on contracts that allow any withdrawals or benefit payments

ALLISON-WILLIAMS COMPANY

INVESTMENT BANKERS

TELEPHONE (612) 333-3475

ESTABLISHED — 1919

2300 IDS CENTER

MINNEAPOLIS, MINNESOTA 55402

November 10, 1987

Mr. Robert Barman
Minnesota State Board of Investment
M.E.A. Building, Room 105
55 Sherburn Avenue
St. Paul, MN 55155

Dear Bob:

Pursuant to our telephone conversation yesterday, I am pleased to advise you that State Fund Mutual Insurance Company accepts the terms we proposed to you earlier and discussed on the telephone last week. The basic terms are as follows:

1.	Type of Security:	Surplus note
2.	Amount:	$10,000,000
3.	Call Feature:	Non-redeemable for 5 years with principal reduction of $2,000,000 in each year beginning at the end of the 6th year
4.	Base Interest Rate:	9 1/4% per annum, paid semi-annually
5.	Total Adjusted Income:	Will equal base interest rate plus 6(a) and 6(b) (below)
6.	Additional Compensation:	(a) ½ of 1% participation in written premium income per annum (b) 1¼% participation in first $5,000,000 of investment income per annum with additional 3/4 of 1% on each $1,000,000 thereafter (per annum) (c) Maximum total adjusted income in any one year cannot exceed 16% of the outstanding principal balance (d) If, in any year, any portion of the total adjusted income earned for that year, up to the maximum allowed under the formula (in 6(a) and 6(b)), cannot be paid, the difference between the amount of total adjusted income earned and the amount of total adjusted income paid will be accumulated and paid in the subsequent year or years to the extent available

(e) The cumulative portion of total adjusted income described in point 6(d) is on a non-compounding basis
(f) The participation portion of total adjusted income is paid annually in arrears

7. Legal Opinion: Lindquist & Vennum

We are pleased to have been able to present this attractive investment opportunity to you. We would hope that your commitment letter will be forthcoming shortly inasmuch as the receipt of some of these funds is critical to the ongoing business of the insurance company.

Yours very truly,

ALLISON-WILLIAMS COMPANY

Robert C. Tengdin
Chairman

RCT/jah

BASIC RETIREMENT FUNDS

PASSIVE BOND COMPONENT

Staff Position Paper
Prepared by: Daralyn Peifer

November 1987

EXECUTIVE SUMMARY

At its June, 1987, meeting, the Minnesota State Board of Investment approved a proposal by staff to modify the investment management structure of the Basic Retirement Funds. The proposal for the structure was included in Part III of a four-part series of staff position papers regarding the long-run management of the Basic Funds' assets.

Under the proposed investment management structure, the Board will utilize both passive and active management for the common stock and bond segments of the Basic Funds. The policy allocation to passive/active management will be flexible rather than fixed.

The common stock segment of the Basic Funds already includes both passive and active components. However, at the present time the fixed income segment of the Basic Funds uses only active management. The adoption of the revised investment structure will require that a passive component be added to the fixed income segment of the Basic Funds.

This paper examines the issues involved in adding the passive bond component to the Basic Funds' fixed income program. In particular, the focus of the paper is on the implementation issues:

- Bond asset class target
- Bond indexation strategy
- Bond index fund construction

The selection of an appropriate bond asset class target is the most important of the implementation issues. The asset class target will be used as the performance benchmark for the entire Basic Funds' fixed income program. In addition, it will serve as the base index for the bond index fund.

Bonds are included in the Basic Funds' long-term policy asset mix to provide deflation hedge and diversification benefits rather than for total return maximization. The asset class target selected for the Basic Funds' bond segment should reflect these two investment objectives.

The Board may select either a standard, published broad market index or a custom-designed bond index as the Basic Funds' bond asset class target. Staff recommends that the Board adopt a custom bond index for the target. Staff believes that, properly designed, a custom bond index will be superior to conventional bond market indices in terms of reflecting the Basic Funds' bond objectives.

A custom bond target must specify four primary characteristics:

- Duration
- Duration Strategy
- Sector Composition
- Quality

Duration measures the average life of a bond. As the primary indication of a bond index's sensitivity to changes in interest rates, duration is the key risk characteristics of any bond target. Longer duration targets provide greater deflation benefits but also reduce diversification potential.

There are two possible duration strategies for a bond target. In a floating duration strategy, the duration of the custom bond target is allowed to fluctuate with interest rate changes. As interest rates change, the target's duration moves in the opposite direction. In contrast, in a constant duration strategy, the duration of the bond asset class target is maintained at a level consistent with long-term investment policy. To implement a constant duration strategy, the actual composition of the custom target is altered slightly over time as needed to maintain the specified duration.

The sector composition of the target and the overall quality rating are the subject of the remaining target recommendations. In aggregate, the duration, duration strategy, and sector/quality recommendations produce a custom bond target that provides greater deflation hedge capacity than conventional broad bond market indices and approximately the same diversification benefits. The resulting custom target deviates from broad market characteristics in relatively small but significant ways. Specific recommendations for each of the characteristics are contained in Table 1.

The second implementation issue is the selection of a bond indexation strategy. The index strategies can be grouped into three major categories:

- Passive
- Enhanced - Semi-passive
- Enhanced - Semi-active

Passive and semi-passive strategies are conservative approaches. A semi-active strategy, conversely, is much closer

on the investment management continuum to pure active management. Staff recommends that the Board adopt a semi-passive strategy for the Basic Funds' bond index fund. The semi-passive approach, although slightly less conservative than the passive approach, is still a relatively low-cost, low-risk strategy. Within fairly tight risk constraints, the semi-passive index manager attempts to exceed the performance of the asset class target by exploiting mispricing opportunities as they appear in the market over time.

The final implementation issue addressed in this paper is the bond index fund construction technique. Since it is not feasible for a bond index fund manager to purchase each of the 4,000 to 5,000 bonds in the broad bond market indices, the manager must use a sampling technique to select a limited number of bonds for the index fund. Most bond index managers use some form of a stratified sampling strategy. Staff recommends this approach.

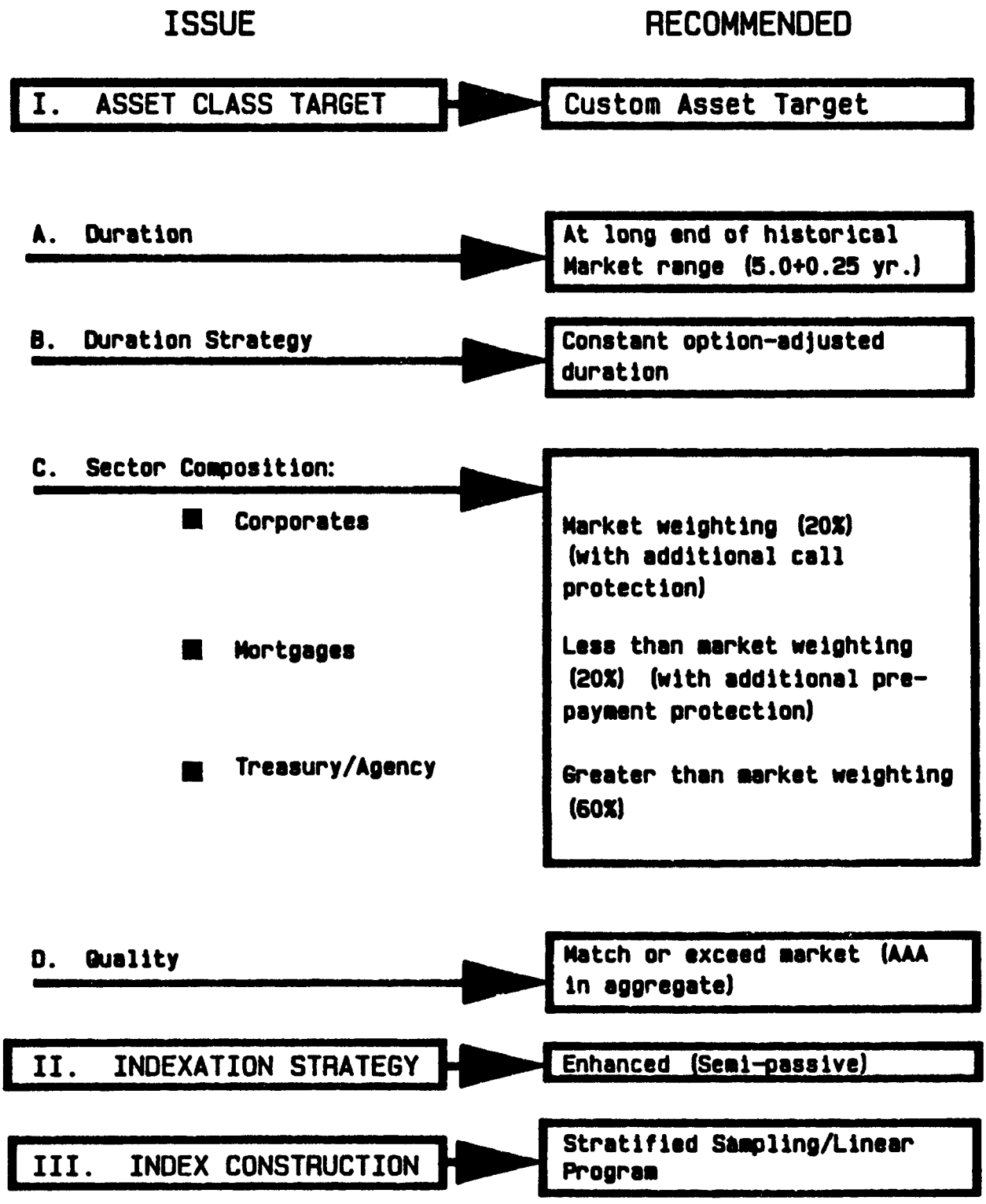
The table on the following page summarizes staff's recommendations on all of these implementation issues. This paper is organized as follows:

- Section 1-Investment Policy Review
- Section 2-Implementation Issues
- Section 3-Bond Asset Class Target
- Section 4-Basic Funds' Custom Bond Target
- Section 5-Indexation Strategy
- Section 6-Index Construction
- Appendix -Duration
  -Embedded Options

TABLE 1

BASIC RETIREMENT FUNDS

Implementation of Passive Bond Component



SECTION 1: INVESTMENT POLICY REVIEW

Before the issues involved in the implementation of the passive bond component are presented, it is helpful to review the investment policy established for the Basic Funds as it relates to the long-run management of the Basic Funds' bond segment, particularly with respect to the passive bond component.

The two key concepts presented in the policy position papers from this perspective are:

- the specified role of bonds in the Basic Funds' long-run policy asset mix;
- the definition of a bond asset class target.

The long-term policy asset mix for the Basic Funds was detailed in Part II of the recent investment policy position papers. The policy asset mix represents the allocation to broad asset classes that best achieves the investment objectives established for the Basic Funds and is consistent with the Board's attitudes toward risk and return.

Each asset class represented in the policy asset mix plays a clearly defined role in the Basic Funds' total portfolio. The most important point in the policy papers from the perspective of the passive bond component is that the investment objectives established for the Basic Funds' bonds are different from those set for common stocks. The objective of the common stock component is to maximize returns. Bonds, on the other hand, are included in the Basic Funds' total portfolio for distinctly different purposes. Specifically, bonds act as a hedge against a

severe economic depression. In the event of a significant decline in interest rates, high-quality, long-term bonds can be expected to appreciate in value. This appreciation would cushion the market value decline likely to be experienced by the remaining Basic Funds' assets. Bonds are also expected to provide portfolio diversification. Because bonds do not move in perfect synchronization with common stocks, the addition of bonds to a stock portfolio has the effect of reducing the year-to-year variability of portfolio returns.

The concept of an asset class target was also introduced in the Part II position paper. The purpose of establishing an appropriate asset class target for each asset class in the Basic Funds' policy asset mix is to ensure that the defined investment role established by the Board for each asset class will be met.

An asset class target is a diversified collection of securities within a particular asset class. It represents the set of investment opportunities that best achieve the purposes for which the asset class is included in the policy asset mix. Over time, the risk-return characteristics of a specified asset class target should be matched by that of the Basic Funds' aggregate investments in the asset class.

In the absence of unique or special circumstances, the most suitable selections for asset class targets are broad market indices. A broad market index represents the full range of investment opportunities available within a particular asset class. However, if an asset class is included in the policy asset mix for reasons other than total return maximization, it may not be appropriate simply to use a market index as the

target. A plan sponsor may need to deviate from the market index in some way to reflect the defined role of the asset class in the policy mix.

For the Basic Funds' bond component, the target should reflect the deflation hedge and diversification objectives set for the asset class. It is at this point, with the special role of the Basic Funds' bonds in mind, that the consideration of the implementation of the passive component of the bond segment should begin.

SECTION 2: IMPLEMENTATION ISSUES

The implementation of the passive component of the Basic Funds' bond segment represents a direct application of the long-term investment policies established by the Board. In the context of the policy statements presented in the series of position papers, staff has identified five primary issues involved in the passive component implementation. The issues are indicated by the following hierarchy of questions:

- What is the appropriate asset class target for the Basic Funds' bond segment?
- What indexation strategy should be adopted by the Board for the Basic Funds' bond index fund?
- What index fund construction technique should be used for creating the bond index fund?
- Which investment manager should be selected by the Board to construct and manage the bond index fund?
- How should funds be reallocated within the Basic Funds' bond segment from the current six active managers to the bond index fund manager?

The first three of the implementation issues and staff's recommendations regarding them are presented in Sections 3 through 6 of this paper. Recommendations concerning the remaining two issues will be presented to the Board at its March, 1988, meeting.

SECTION 3: BOND ASSET CLASS TARGET

The specification of the appropriate asset class target for the Basic Funds' bond segment is the most important of the five implementation considerations. The asset class target selected for the bond segment will serve two on-going functions in the Basic Funds' investment program. First, it will be used as a performance benchmark for the bond asset class as a whole. The effectiveness of the entire Basic Funds' bond program will be measured by comparing the performance of the program with that of the asset class target. (The use of asset class targets in the Board's performance evaluation system is addressed in Part IV of the staff investment policy paper.) Second, the bond asset class target will serve as a base for the passive component of the Basic Funds' bond program. The Basic Funds' bond index fund will be designed to track the performance of the bond asset class target.

Broad market indices are the appropriate selections for asset class targets, unless a target-restricting case applies. For the Basic Funds' bond asset class target, the important target-restricting consideration is the role bonds are expected to play in the Basic Funds' total portfolio. Because bonds are included in the Basic Funds' portfolio for deflation hedge and diversification purposes rather than for total return maximization, the selected target should deviate from broad bond market indices to the extent necessary to reflect these objectives.

Recently, plan sponsors have shown increasing interest in creating performance benchmarks and index funds that deviate from conventional broad bond market indices in order to reflect special investment considerations. In response to this interest, Salomon Brothers, Shearson Lehman and other prominent bond index publishers have begun working with investment managers and plan sponsors to construct custom bond indices tailored to their individual needs. The availability of this customization service gives the Board the opportunity to create a bond asset class target that is superior to conventional broad bond indices in terms of meeting the two Basic Funds' bond objectives.

GENERAL CUSTOMIZATION PROCESS

The general process utilized by a plan sponsor in constructing a custom bond asset class target is as follows:

1. The plan sponsor defines the investment objectives to be reflected by the custom asset class target.

2. The sponsor selects a broad bond market index to serve as a base universe of bonds from which the custom asset class target will be built. For example, the sponsor might select as a base index the Salomon Broad Investment-Grade Index (Salomon BIG). The Salomon BIG is a universe of nearly 4000 bond issues, weighted in proportion to their market value relative to the value of the entire index.

3. The plan sponsor then translates the investment objectives into specifications for the desired financial characteristics (i.e., coupon, sector, maturity) of the asset class target. That is, the sponsor specifies how the custom target should deviate in composition and characteristics from the underlying broad market index to reflect the defined investment objectives.

4. The sponsor communicates the specification of desired financial characteristics of the asset class target either directly to the publisher of the underlying broad index (i.e., Salomon Brothers, Shearson Lehman, etc.) or indirectly through an investment manager.

5. The index publisher divides the broad index by financial characteristics into a large number of cells. Each cell represents all of the bonds in the index with a particular combination of characteristics. The publisher then screens through the total broad bond universe. The publisher builds the custom target by combining various market cells until a target with the desired characteristics is created. The custom target may contain anywhere from several hundred to several thousand individual bond issues, depending upon the sponsor's specifications.

6. The index publisher monitors the asset class target, making alterations as needed to reflect changes in the broad bond market or changes in sponsor objectives. The publisher provides the sponsor with a listing of all of the bond issues in the target and calculates its performance on a monthly basis. The custom asset class target is then ready to be used as a performance benchmark for a fixed income program or as a base for a custom index fund.

CUSTOM TARGET VS. CONVENTIONAL TARGET COSTS

All bond index funds, whether conventional or custom, must be rebalanced on an ongoing basis to reflect changes in the overall bond market. Custom bond index funds can be designed specifically to keep monthly rebalancing costs in line with those of conventional index funds. The "cash throw off" of a bond index fund facilitates the rebalancing effort. A bond index manager receives coupon and principal payments each month that must be reinvested. The parameters of bond index funds can be set such that monthly rebalancing is accomplished efficiently

with the cash inflows from portfolio income and maturities rather than through security sales.

Moreover, it should be noted that the costs associated with passive bond management in general are much lower than those associated with active bond management. The Board will experience a significant reduction in overall bond management costs in either case as the funds are shifted from active to passive bond management within the Basic Funds' bond segment.

SECTION 4: BASIC FUNDS' CUSTOM BOND TARGET

To create an organized framework for designing a custom bond asset class target, staff evaluated a broad bond market index along several dimensions or characteristics and considered how the broad index should be altered along those dimensions to meet the established objectives for Basic Funds' bonds. The Salomon Broad Investment-Grade Bond Index, (Salomon BIG) was used as the base index in the analysis. Staff believes that the Salomon BIG is the best representation of the overall bond market. However, the Shearson Lehman Aggregate Index or the Merrill Lynch Master Index could have been substituted as the base index with similar results.

The recommendations for a custom asset class target for Basic Funds' bonds necessarily involve trade-offs between the two bond objectives. For example, the change required along one dimension of the initial broad market index to meet the deflation hedge objective may be counter to that required for the diversification objective. In addition, the recommendations must be internally consistent. The recommendation for each dimension must be attainable given the recommendations along the remaining dimensions.

A listing of the bond market dimensions considered in the customization process and staff's recommendations for the Basic Funds' bond asset class target for each of the dimensions are presented in the table below. A discussion of the rationale for the recommendations follows.

BASIC FUNDS' BOND ASSET CLASS TARGET RECOMMENDATIONS

TABLE 2
BASIC RETIREMENT FUNDS
Recommended Bond Asset Class Target

Market Characteristic		Recommendation
1.	Duration	Long end of historical market range (5.0 yrs. + 0.25 yrs.)
2.	Duration strategy	Constant option-adjusted duration
3.	Sector Composition:	
	Corporates	Market weighting (20%) (with additional call protection)
	Mortgages	Less than market weighting (20%) (with additional prepayment protection)
	Treasury/Agency	Greater than market weighting (60%)
4.	Quality	Match or exceed market (AAA)

DURATION

Duration is a measure of the average life of a bond. It is defined as the weighted average term-to-maturity of a bond's cashflows. The time period each cash flow is received is weighted by the present value of the cash flow. Duration is a more useful measure of the life of a bond than term-to-maturity because it considers not only the time until the bond's principal payment is received but also the timing and amounts of the coupon cashflows.

Duration is the primary measure of the sensitivity of the market value of a bond to changes in interest rates. All other

things remaining the same, the longer a bond's duration the more sensitive will be the market value of the bond to a given change in interest rates. Since the performance of a diversified portfolio of high-quality bonds is determined primarily by its responsiveness to interest rate changes, the overriding risk characteristic of a bond portfolio is the duration. As such, the specification of the duration of a bond asset class target is clearly the most important of the target decisions. This decision will "swamp" the remaining decisions in terms of its impact on the future performance of the target.

Ideally, to fulfill the deflation hedge requirement for bonds in the Basic Funds' portfolio, the Board should create a very long duration asset class target. For example, 30-year zero coupon Treasuries would provide substantial protection in the event of a severe decline in interest rates. These securities would experience greater price appreciation in the event of a severe decline in rates than shorter-duration securities. However, longer-duration bonds produce returns that are more volatile than intermediate- and shorter-duration bonds. Further, the returns of longer-duration bonds are more highly correlated with common stock returns. Thus, although longer-duration bonds are expected to behave differently than common stocks under severe deflationary conditions, the diversification potential provided by longer-duration bonds under normal market conditions is less than that of shorter-lived securities.

The recommendation for the duration of the custom asset class target represents a subjective balancing of the two objectives. The duration of the Salomon BIG ranged from

approximately 3.5 years to 5.0 years over the last interest rate cycle. Staff recommends that the duration of the custom target be set at the long end of this historical range. A custom bond asset class target with a duration of approximately 5.0 years would provide some deflation protection for the Basic Funds without a significant loss of diversification benefits.

This duration recommendation is consistent with the long-term investment time horizon of the total Basic Funds. There is a growing awareness on the part of plan sponsors that the duration of a plan's assets should relate in some purposeful way over the long-term to the duration of the plan's liabilities. Just as a plan's assets can be considered as a distribution of expected cash inflows, a plan's liability stream can be thought of as a distribution of expected cash outflows. The determination of the amounts and timing of the liability cashflows involves a number of actuarial assumptions and is impacted by a number of factors. At the present, there is considerable research being undertaken regarding the nature and behavior of plan liability streams relative to the behavior of asset cashflow streams.

In the future, as the Board gains a better understanding of the behavior of the Basic Funds' liability stream, it will be able to specify more closely a desired duration for the aggregate Basic Funds' bond portfolio. For the present, staff believes that the recommended duration for the bond asset class at the longer end of the historical market range appropriately relates to the duration of an active lives pension fund liability stream. Although a longer-than-market duration target ultimately may be

desirable, staff is concerned about the additional return volatility a longer duration target would generate. Until the characteristics of pension plan liability streams are better understood, the recommended target duration of 5.0 years represents a reasonable trade-off between the deflation hedge and diversification objectives and is consistent with the financial characteristics of the Basic Funds. (For additional discussion of duration issues, see the Appendix.)

DURATION STRATEGY

"Duration slippage" refers to the natural movement of the duration of a bond market index with changes in interest rates. As interest rates decline, the duration of a bond market index increases. Conversely, as interest rates rise, the duration of a broad market index decreases. Over the course of an interest rate cycle, the duration of a broad bond market index such as the Salomon BIG may vary by more than a full year. There are two possible duration strategies a plan sponsor can take with regard to this "duration slippage":

- o Floating duration strategy
- o Constant duration strategy

To implement a floating duration strategy, a plan sponsor specifies the composition of the custom target and allows the duration of the index to "float" freely with interest rate changes, as described above. To implement a constant duration strategy, the duration of the asset class target is kept fixed at the point specified by the sponsor. The precise composition of

the asset class target is allowed to change as needed to maintain the fixed duration. One way of implementing a constant duration strategy is for a plan sponsor to specify a fixed core percentage of corporate and mortgage securities. As the duration of the core corporate/mortgage position moves with both the passage of time and changes in interest rates, the composition of the Treasury sector is altered to maintain the target duration. The Treasury sector, the most liquid of the sectors, is used as the duration "swing" sector to minimize transactions costs.

Constant vs. Floating Duration

The natural movement of a floating duration target is a problem for plan sponsors who wish to fix the duration of a custom asset class target and hence, the duration of the sponsor's bond index fund so that it is consistent with stated investment policy.

To the extent that a plan sponsor allows the duration of an asset class target to "float" from a policy duration target, the sponsor is making an implicit bet relative to his/her long-term policy portfolio. That is, the sponsor is allowing the risk composition of the asset class target to deviate from that which is consistent with the sponsor's long-term investment objectives. The deviation of a year or more in the duration of a floating custom target from a sponsor's objective represents a fairly significant "bet" away from established policy.

This implicit bet away from established investment policy is troublesome for several reasons. First, duration is the primary measure of the interest-rate sensitivity of a bond asset class

target and, consequently, is the single most important risk characteristic of the target. Second, the floating movement of a target's duration is impacted by the actions of investors and issuers whose investment objectives may differ significantly from the sponsor's. In accepting a floating duration approach for a bond target, a plan sponsor allows the critical risk characteristic of the target to be established not by his/her own investment policy but by the actions of others.

The "duration slippage" problem for a bond asset class target and bond index fund can be minimized by utilizing a constant duration strategy. In contrast to the floating strategy, a constant duration strategy would allow the Board to effectively implement its long-term investment policy and maintain a consistent risk posture over time.

Constant Duration Implementation Issues

If a constant duration asset class target is used as the base for a bond index fund, the plan sponsor must specify a range within which the duration of the bond index fund can move before the index fund manager must rebalance back to the constant target. This range reflects the sponsor's trade-offs between implementing long-term investment policy and incurring additional transactions costs. If the duration range is set very wide, the sponsor's stated long-term policy will not be implemented effectively. On the other hand, if the range is set very narrow, the bond index fund manager may be forced to incur excessive rebalancing costs.

Staff believes a duration range of one-fourth year around a constant duration target of 5.0 years is sufficiently narrow to allow the Board's investment policy to be implemented effectively without causing excessive turnover within the Board's bond index fund. With this range the Board's future index fund manager should be able to use the normal cash inflows from portfolio income and maturities for necessary rebalancing, keeping overall transactions in line with those of bond index funds which track "floating duration" market indices.

SECTOR COMPOSITION

Like the choice of a target duration, the choice of the sector composition of the bond asset class target involves a balancing of the two bond component objectives. To fully reflect all the available opportunities in the bond market and realize maximum diversification benefits, a custom asset class target should include representation in the three major sectors of the bond market: Treasury/agencies, mortgages, and corporate bonds. However, because of the prepayment and call characteristics of mortgages and corporates, representation in these two sectors limits the deflation hedge capacity of the asset class target. As is explained in the Appendix, these characteristics may severely curtail the price appreciation experienced by mortgages and corporate securities when interest rates decline.

If deflation protection were the only concern, corporates and mortgages could be eliminated entirely from the Basic Funds' bond asset class target. However, this move would entail a

substantial give-up in the diversification benefits and in the overall yield for the portfolio. Therefore, staff recommends that the asset class target retain some exposure to these two sectors but be structured to obtain additional call and prepayment protection. Staff recommends that the corporate sector in the custom target match the weighting of the Salomon BIG. Additional call protection, and hence deflation protection, can be built into the custom target by setting acceptable ranges for bond coupons or by specifying a desired mix of noncallable/callable securities. Generally, mortgages offer less of a yield advantage over Treasuries/agencies. Therefore, staff recommends that the mortgage sector be underweighted slightly in the target relative to the Salomon BIG, and prepayment protection be built in a manner similar to the call protection. These two recommendations are made in conjunction with the constant duration recommendation. The constant duration approach allows the deflation capacity of the target to be maintained during interest rate declines despite the call and prepayment features of the corporate and mortgage sectors.

QUALITY

The Salomon BIG includes bonds rated BBB or better and has an average quality rating of AAA. This high-quality rating is consistent with the needs of the Basic Funds' bond asset class target. Lower quality or "junk bonds" are not appropriate for inclusion in the bond asset class target. In the event of a severe economic depression, lower quality bonds would have a much

greater probability of default than higher quality instruments. In addition, lower quality bonds act more like equity substitutes than fixed income instruments and consequently, provide less diversification benefits than do higher quality bonds. Staff's recommendation for the quality dimension of a custom asset class target is to maintain or exceed the average quality rating of the Salomon BIG.

RECOMMENDATIONS:

Staff recommends that the Board adopt a custom asset class target for the Basic Funds' bond segment. Staff believes that a custom asset class target will be superior to conventional, published broad market indices in terms of meeting the Basic Funds' bond objectives. The intended result of the combined recommendations for duration, duration strategy, sector composition, and quality is to produce a custom asset class target with greater deflation hedge capacity than the Salomon BIG and approximately the same diversification benefits. The combined recommendations produce a target with a duration at the longer end of the market's normal range, (5.0 years) a quality level that meets or exceeds that of the market (AAA), and a sector composition that deviates slightly from the market to obtain greater call protection. The sector recommendations reflect a subjective balancing of investment objectives and are intended as a general indication of the desired target characteristics. The constant duration approach is designed to allow the Board to maintain an appropriate and consistent risk posture over time, despite market movements to the contrary. In

aggregate, the recommendations produce a custom target that deviates from the market in small but significant ways. The table below summarizes the recommended deviations from the current market characteristics.

TABLE 3
CUSTOM TARGET VS. MARKET CHARACTERISTICS

	Market*	Recommendations
o Duration	4.5 Yrs.	5.0 Yrs.
o Duration Strategy	Floating Duration	Constant Duration
o Sector		
Treasury/Agency	56%	60%
Corporates	18	20
Mortgages	26	20
o Quality	AAA+	AAA+

* Salomon BIG-September 30, 1987

SECTION 5: INDEXATION STRATEGY

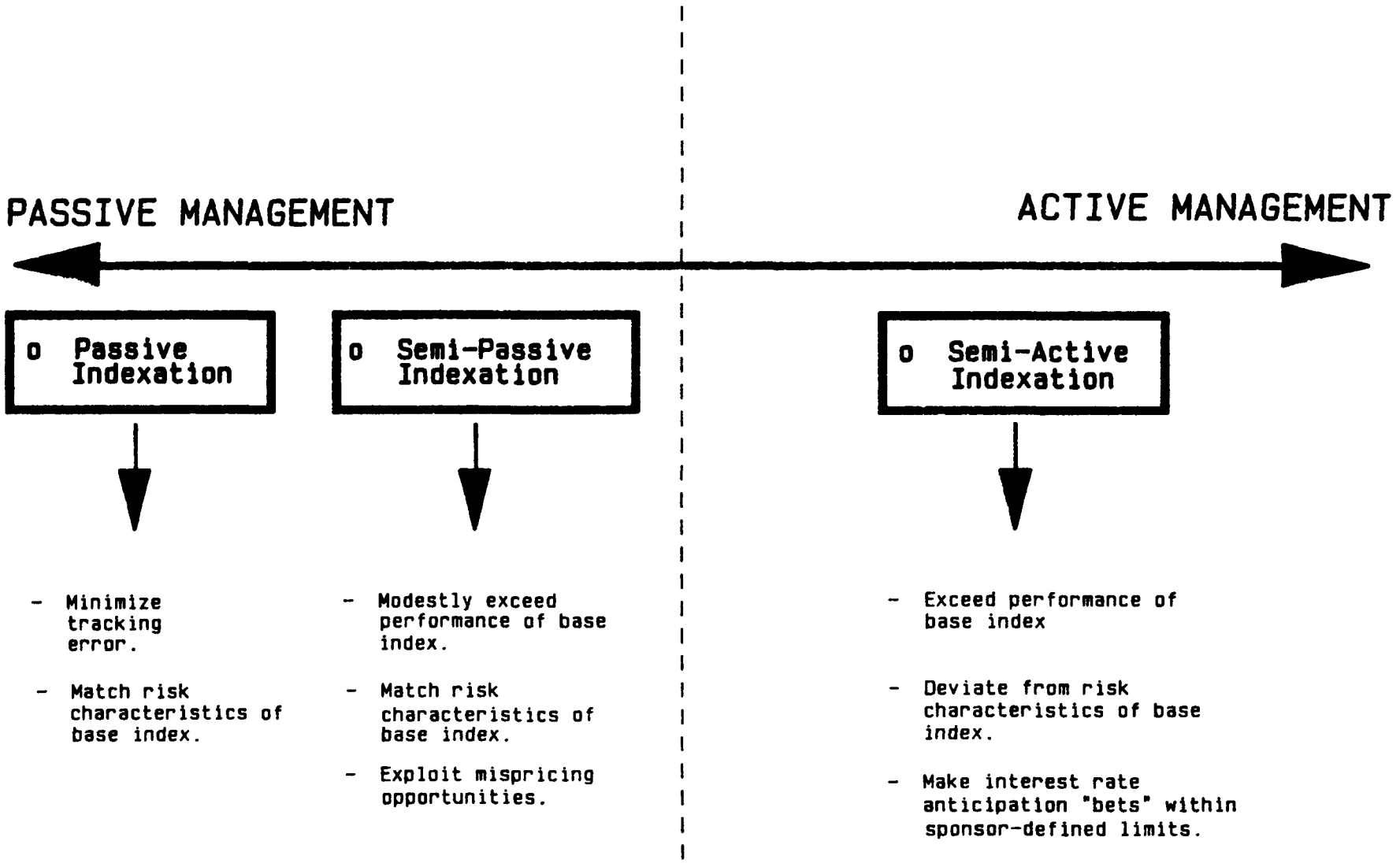
Once the Basic Funds' bond asset class target has been determined, the second implementation issue to be considered is the selection of a bond indexation strategy. Although bond indexation generally is considered to be a form of passive management, there are a wide variety of approaches that bond index fund managers take to the construction and management of bond index funds. Bond indexation approaches can be classified along a continuum from passive to fairly active management. The figure on the following page illustrates this manner of evaluating various bond indexation approaches. Although the approach of an individual bond index manager can fall anywhere along the line from passive to active management, bond indexation approaches can be grouped into three broad categories:

- Passive Bond Indexation
- Enhanced Bond Indexation (semi-passive)
- Enhanced Bond Indexation (semi-active)

Each of the three indexation categories corresponds to a different approach to the selection of the actual bonds that will constitute an index fund. Because it is not feasible for an index fund manager to hold all of the bonds in a specified bond market index, the manager must use a sampling technique to select among the bonds in the universe. The overwhelming majority of all bond index fund managers use the same broad sampling technique, but differ in the investment objectives they set for the final selection phase of the sampling.

FIGURE 1

BOND INDEXATION STRATEGIES



PASSIVE BOND INDEXATION - MINIMIZE TRACKING ERROR

The most passive of bond indexation strategies is often termed "plain vanilla" indexation by bond index managers. The goal of a "plain vanilla" bond indexation approach is to replicate the performance of the underlying base universe of bonds with the highest degree of consistency. (For the Basic Funds' passive bond component, the underlying universe of bonds is the bond asset class target.) The "plain vanilla" indexer achieves this consistency by minimizing the variance of the monthly tracking error between the index fund and the base bond universe.

Tracking error is defined as the difference in performance between the index fund and the bond universe. Tracking error in a single time period may be either positive or negative. The factors causing tracking error are random. Consequently, over time the positive and negative errors tend to "wash out" and the expected value of the average monthly tracking error is zero.

The passive indexer minimizes the variance of the monthly tracking error by carefully matching the characteristics of the bonds in the index fund with those of the overall bond universe. There are a variety of strategies for matching bond characteristics. At the most detailed level, a passive indexer matches very tightly the entire cash flow structure of the bonds in the index fund to that of the bond universe.

ENHANCED BOND INDEXATION - SEMI-PASSIVE

The goal of an enhanced bond indexer (semi-passive) is to add value to the indexation process through the superior selection of bonds for the index fund. Whereas the goal of a passive indexer is simply to match the performance of the base market index with a high level of consistency, the enhanced bond indexer attempts to exceed the performance of the base index by a modest amount through the use of relatively low-risk valuation strategies.

The underlying index that an index fund will track is categorized by risk characteristics (i.e., coupon, sector, maturity, etc.) into a large number of cells. A cell is comprised of all of the bonds in the underlying base index with a particular combination of risk characteristics. Each cell can be considered as a separate distribution of expected cash flows.

Typically, the index manager need select only a few of the available bonds in each target cell for the index fund itself. A passive manager will select the bonds that most closely match the aggregate target cell cashflows. A semi-passive manager, on the other hand, will consider not only the cell cashflow characteristics but also the relative values of the bonds within the cell. The manager will select bonds that are selling "cheap" or are mispriced relative to the other bonds in the cell.

Generally, the semi-passive manager stays very closely within the cellular constraints of the base index. The manager matches the duration and maturity of the index fund to that of the base index. In addition, the manager likely matches quality

characteristics as well. If the manager "loosens" the index cellular constraints at all, it will be to make minor alterations in sector weightings of the index fund.

Depending upon the strategies employed by the individual index manager, the expected value to be added above the performance of the base universe from a semi-passive enhanced approach may range from 5 to 30 basis points (b.p.) per year. The variance of the monthly tracking error for a semi-passive index fund will be slightly greater than that of a purely passive approach. Although the semi-passive manager's goal is for the index fund to exceed the performance of the base index, the possibility exists that the index fund will slightly underperform the target during some periods as well.

ENHANCED SEMI-ACTIVE

The semi-active index fund manager falls much closer to the active end of the spectrum between passive and active management. A semi-active manager might more aptly be termed a "structured active" manager than a true "indexer". In contrast to the passive and semi-passive approaches, the semi-active index manager does not stay within the tight cellular matrix of the target index in constructing and managing an index fund. Typically, the manager not only employs valuation strategies but also makes interest-rate anticipation "bets". The manager achieves this by allowing the key risk characteristics of the index fund to vary from those of the base index. The manager might allow the duration, sector, and/or quality characteristics

to vary substantially from those of the target index, depending upon the manager's outlook for interest rates. The primary difference between a semi-active and an active manager is that the semi-active manager operates within pre-established ranges around the characteristics of the market. Generally, limits are established by the plan sponsor beyond which the key risk characteristics of the index fund may not be allowed to move.

As a semi-active manager deviates from the risk composition of the target index, the opportunity to both outperform and underperform the target increases. The expected value to be added above the base index might range from 50 to 100 b.p. per year. The variance of the monthly tracking error would be expected to exceed that of the other two approaches, reflecting the higher-risk strategies employed by the manager.

RECOMMENDATION:

Of the three indexation approaches, only the passive and semi-passive approaches are appropriate for the Basic Funds' passive bond component. The semi-active approach is more suitable for the active component of the Basic Funds' bond component. The passive approach is a very conservative one. It is the easiest of the approaches to implement and has the lowest cost. It also offers consistency of performance, with the index fund designed to track closely the monthly performance of the designated asset class target.

The semi-passive approach, although slightly less conservative than the passive approach, is still a relatively low-cost, low-risk strategy. The semi-passive index manager

carefully matches the primary risk characteristics of the index fund with those of the asset class target. Within these fairly tight risk constraints, the manager attempts to exploit mispricing opportunities as they appear in the market over time. Staff recommends that the Board adopt the semi-passive approach to bond indexation. Staff believes that the semi-passive approach has the potential to add modest value to the Basic Funds at very low risk and at a reasonable cost relative to the other strategies.

SECTION 6: INDEX CONSTRUCTION

The third passive implementation consideration is the index fund construction technique. This subject concerns the manner in which the index manager actually builds and rebalances the index fund over time. The section does not require a decision on the part of the Board. Rather, it is intended simply to describe the general construction process followed by an index fund manager.

Broad bond market indices contain 4,000 to 5,000 individual bond issues. Full replication of the market, or purchase of each issue, is not a feasible approach for bond index fund managers. Therefore, a bond index manager must employ some type of sampling technique to select a limited number of bonds for an index fund.

STRATIFIED SAMPLING TECHNIQUE

The overwhelming majority of bond index fund managers use some variation of a stratified sampling technique for the construction and ongoing rebalancing of bond index funds. The stratified sampling technique is comprised of two separate phases: a categorization (stratification) phase and a sampling phase. In the first phase, the base market index is characterized by its key risk attributes: sector, coupon, maturity, quality, and callability. The categorization can be thought of as a large multi-dimensional matrix, with each bond in the base market index fitting into only one cell. Each cell contains all of the bonds in the base index with a particular combination of the five risk attributes. Some cells in the

matrix may be completely empty. Others will contain very few issues and will be dropped from the final base index matrix.

Once the categorization process is finished, the index fund manager begins the sampling phase. The goal of the sampling phase is to select one or two of the available bonds from each base index cell for the index fund. The completed index fund will be comprised of the same number of cells as the base market index but will contain substantially fewer bond issues.

The sampling phase lends itself to a linear programming approach. A linear programming model consists of an objective function and a series of linear constraints. A linear programming model is designed to minimize or maximize a particular investment objective, subject to the constraints. Investment objectives specified by bond index fund managers include minimizing tracking error variance or maximizing yield. Typically, the primary model constraints control the matching of cashflows within each index fund cell to those of the respective base market cell. Secondary constraints can be added by the manager to control turnover and transactions costs. In addition, the basic linear programming model can incorporate various valuation models to achieve index enhancements, as described in the previous section.

The combined categorization/sampling technique is a relatively straightforward method of building an index fund from a large universe of bond issues. Most importantly, it is a flexible system to use. It allows plan sponsors and investment managers to construct bond index funds to reflect special investment needs.

APPENDIX

Duration

Two additional topics must be addressed regarding the duration of the Basic Funds' bond asset class target. First, the appropriate measure of duration to be used is an "option-adjusted" duration. The conventional or "nominal" duration measure considers only two possible redemption dates for a bond: the maturity date or the first call date. Typically, if the bond is selling at or below its call price, the "nominal" duration measure is calculated considering all of the bond's cashflows up to the maturity date. If the bond is selling above its call price, only the cashflows up to the bond's first call date are considered. Since the bond may be called at some point between these two dates, the nominal duration may under- or overstate the bond's "effective" duration and, consequently, be a poor measure of the bond's true interest rate sensitivity. An "option-adjusted" duration uses option pricing theory to adjust the nominal duration for the probability that the bond will be called sometime between the call and maturity dates.

The use of an "option-adjusted" duration measure is particularly important for a deflation hedge target. As interest rates decline, the nominal duration of a bond will increase. However, the "option-adjusted" duration of a callable bond generally will decrease to reflect the increasing probability that the bond will be called. In this circumstance, the nominal duration of a callable bond will exceed the "option-adjusted"

duration and may seriously overstate the actual deflation hedge potential of the bond.

Second, although duration is the primary measure of an asset class target's interest-rate sensitivity, the full distribution of a target's cashflows must be considered. That is, the coupon and maturity structure of the asset class target must be considered. Bond asset class targets can have identical durations but very different coupon and maturity distributions. In this situation, the asset class targets may respond similarly to a parallel change in the level of interest rates but very differently to changes in the shape of the yield curve.

To minimize exposure to changes in the shape of the yield curve, the distribution of the custom asset class target's expected cashflows should be matched as closely as possible to that of the underlying market index, with minor adjustments being made at the short or long end of the maturity spectrum as necessary to achieve the desired target duration.

Embedded Option Features - Corporates and Mortgages

The call features of many corporate bonds and the prepayment provisions of mortgage securities are called embedded option features. For simplicity, this discussion on embedded options will focus primarily on callable corporate bonds. However, the prepayment provisions of mortgages can be expected to have a similar impact on the behavior of mortgage securities as call provisions have on corporate bonds.

To understand the impact of embedded options on the deflation hedge capacity of callable corporate bonds, it is

helpful to consider a callable bond as two distinct components:

- o the purchase of a non-callable bond with otherwise equivalent characteristics as the callable bond.
- o the sale of a call option to the issuer of the bond.

The call option allows the issuer to redeem or "call away" the bond from the owner at a predetermined price and time. The call feature is called an embedded option because the call cannot be traded separately from the non-callable component.

The market value of a callable bond should equal the value of a non-callable bond with equivalent characteristics less the value of the call option to the issuer:

$$P_c = P_{nc} - P_o$$

where:
P_c = Price of callable bond
P_{nc} = Price of non-callable bond
P_o = Price of call option

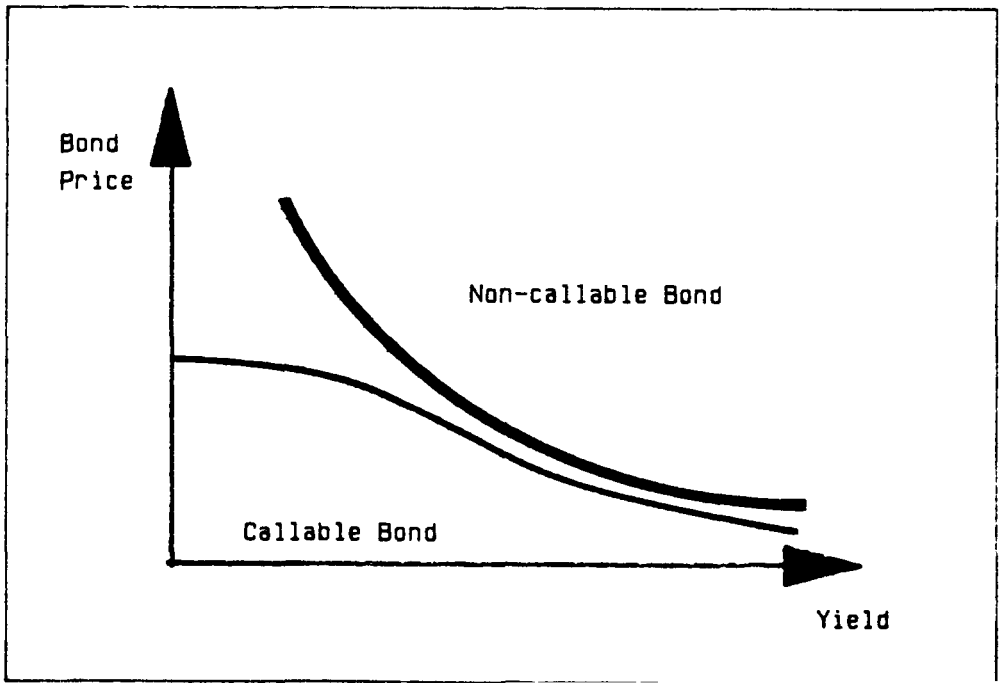
The value of the call option to the issuer depends upon a number of factors, including the level of interest rates relative to the callable bond's coupon rate. If the level of interest rates drops below the bond's coupon, the value of the call option to the issuer increases. The increase in value reflects the issuer's potential savings if the higher coupon bond is redeemed

and new bonds are issued at a lower rate. In this situation, the call option is said to be "in-the-money".

When interest rates decline, callable bonds with "in-the-money" call options experience less market value appreciation than would be expected from the characteristics of their non-callable component. The market value gain that would be experienced on the straight noncallable bond component for a given rate decrease is "absorbed" by the increase in the value of the option to the issuer. In fact, the price appreciation of a callable bond for a given rate change can be zero if the increase in the value of the call option to the issuer exactly offsets the price appreciation on the noncallable bond component. It is this response of callable bonds to interest rate declines that limit their effectiveness as deflation hedge vehicles. The figure below illustrates this price response.

FIGURE 2

EMBEDDED OPTIONS
Impact on Interest Rate Sensitivity



Tab F

EXECUTIVE DIRECTOR
HOWARD J. BICKER

STATE OF MINNESOTA
STATE BOARD OF INVESTMENT
Room 105, MEA Building
55 Sherburne Avenue
Saint Paul 55155
(612) 296-3328

November 12, 1987

TO: Members, State Board of Investment
Members, Investment Advisory Council

FROM: Alternative Investment Committee

SUBJECT: Alternative Investment Strategy

ALTERNATIVE INVESTMENT STRATEGY

To increase overall portfolio diversification and provide a hedge against inflation, the Investment Advisory Council's Asset Allocation Committee has recommended that 15%, or $750 million, of the $5 billion Basic Retirement Funds be allocated to alternative investments. Alternative investments include real estate, venture capital and resource investments where Minnesota State Board of Investment (SBI) participation is limited to commingled funds or other pooled vehicles.

The venture capital investment strategy is to establish and maintain a broadly diversified venture capital portfolio comprised of investments that provide diversification by industry type, stage of corporate development and location. To date, the SBI has committed to twelve commingled venture capital funds for a total commitment of $271.1 million.

The real estate investment strategy involves three steps. The first step calls for investment of 30-40% of the real estate portfolio in diversified open-end commingled funds. The second step calls for investment of 30-40% of the real estate portfolio in diversified closed-end commingled funds. The third step calls for investment of 20-30% of the real estate portfolio in less diversified, more focused (specialty) commingled funds. Currently, the SBI has committed $370 million to eleven commingled real estate funds.

The strategy for resource investment requires that investments be made in resource investment vehicles that are specifically designed for institutional investors to provide an inflation hedge and additional diversification. Individual resource investments will include proved producing oil and gas properties, royalties and other investments that are diversified geographically and by type. Currently, the SBI has committed $97.5 million to five commingled oil and gas funds.

ALTERNATIVE INVESTMENT COMMITTEE
CURRENT ACTIVITIES AND RECOMMENDATIONS

During the latest quarter, the Alternative Investment Committee conducted annual review sessions with five of the SBI's venture capital managers (Matrix, Allied, DSV, Inman/Bowman and Superior). The focus of the review session was on investment strategy, fund performance and organization/staff changes. No significant problems were identified.

In general, it is too early in the investment cycles of the partnerships to meaningfully evaluate investment performance. Most portfolio company investments are still being valued near cost. However, all of the venture managers are investing at a disciplined pace and are following the investment strategies they outlined for us at their initial interviews.

FUTURE CONSIDERATIONS

Going forward, the Alternative Investment Committee agenda will include:

- Conducting annual review sessions with existing alternative investment managers
- Ongoing reviews of investment objectives, strategy, asset allocation and performance measurement
- Considering additional investments with new and existing managers
- Considering potential alternative investment consultants

ALTERNATIVE EQUITY INVESTMENTS
OCTOBER 30, 1987

REAL ESTATE:	INCEPTION DATE	FUND SIZE (MILLIONS)	SBI COMMITMENT	SBI-FUNDED	SBI- TO BE FUNDED	FUND DESCRIPTION
EQUITABLE	10/81	$2,849.7	$40,000,000.00	$40,000,000.00	$0.00	OPEN END - DIVERSIFIED
AETNA	4/82	$1,592.0	$40,000,000.00	$40,000,000.00	$0.00	OPEN END - DIVERSIFIED
PRUDENTIAL	9/81	$4,584.0	$40,000,000.00	$40,000,000.00	$0.00	OPEN END - DIVERSIFIED
RREEF- USA III	4/84	$773.0	$75,000,000.00	$67,000,000.00	$8,000,000.00	CLOSED END - DIVERSIFIED
HEITMAN I	6/84	$113.0	$20,000,000.00	$20,000,000.00	$0.00	CLOSED END - DIVERSIFIED
HEITMAN II	10/85	$238.0	$30,000,000.00	$30,000,000.00	$0.00	CLOSED END - DIVERSIFIED
HEITMAN III	11/86	$200.0	$20,000,000.00	$10,000,000.00	$10,000,000.00	CLOSED END - DIVERSIFIED
TCW I	7/85	$216.0	$40,000,000.00	$40,000,000.00	$0.00	CLOSED END - SPECIALIZED
TCW II	9/86	$250.0	$30,000,000.00	$15,000,000.00	$15,000,000.00	CLOSED END - SPECIALIZED
STATE STREET I	7/85	$103.0	$20,000,000.00	$20,000,000.00	$0.00	CLOSED END - SPECIALIZED
STATE STREET II	7/86	$86.0	$15,000,000.00	$15,000,000.00	$0.00	CLOSED END - SPECIALIZED
TOTAL R.E. PORTFOLIO			$370,000,000.00	$337,000,000.00	$33,000,000.00	
VENTURE CAPITAL:						
NORWEST	1/84	$60.0	$10,000,000.00	$10,000,000.00	$0.00	EARLY STAGE
KKR I	3/84	$1,000.0	$25,000,000.00	$25,000,000.00	$0.00	LBO
KKR II	12/85	$2,000.0	$50,000,000.00	$25,895,340.00	$24,104,660.00	LBO
KKR III	10/87	$4,300.0	$115,000,000.00	$0.00	$115,000,000.00	LBO
SUMMIT	12/84	$93.0	$10,000,000.00	$7,500,000.00	$2,500,000.00	LATER STAGE
FIRST CENTURY	12/84	$100.0	$10,000,000.00	$2,500,000.00	$7,500,000.00	EARLY STAGE
DSV	4/85	$60.0	$10,000,000.00	$10,000,000.00	$0.00	EARLY STAGE
MATRIX	7/85	$70.0	$10,000,000.00	$7,500,000.00	$2,500,000.00	EARLY STAGE
INMAN/BOWMAN	6/85	$44.0	$7,500,000.00	$3,750,000.00	$3,750,000.00	EARLY STAGE
ALLIED	7/85	$40.0	$5,000,000.00	$3,333,334.00	$1,666,666.00	LATER STAGE
SUPERIOR VENTURE	6/86	$35.0	$6,600,000.00	$1,661,250.00	$4,938,750.00	EARLY STAGE - MAL
GOLDER THOMA	10/87	$225.0	$12,000,000.00	$600,000.00	$11,400,000.00	LATER STAGE
TOTAL V.C. PORTFOLIO			$271,100,000.00	$97,739,924.00	$173,360,076.00	
RESOURCES:						
AMBO I	7/81	$144.0	$15,000,000.00	$15,000,000.00	$0.00	DEBT WITH EQUITY
AMBO II	2/83	$36.0	$7,000,000.00	$7,000,000.00	$0.00	DEBT WITH EQUITY
APACHE I	5/84	$150.0	$22,500,000.00	$842,291.15	$21,657,708.85	DEBT WITH EQUITY
APACHE II	10/85	$100.0	$23,000,000.00	$22,400,000.00	$600,000.00	DEBT WITH EQUITY
APACHE III	12/86	$190.0	$30,000,000.00	$30,000,000.00	$0.00	NET PROFITS INTEREST
TOTAL RES. PORTFOLIO:			$97,500,000.00	$75,242,291.15	$22,257,708.85	
TOTAL ALT. INV. PORT.			$738,600,000.00	$509,982,215.15	$228,617,784.85	

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY

FUND NAME:	Allied Capital
FUND NAME:	Allied Venture Partnership
CONTACT:	David Gladstone
ACCOUNT INCEPTION:	September, 1985
SBI CURRENT INVESTMENT (COST):	$3,333,334
SBI CURRENT INVESTMENT (MARKET VALUE):	$3,331,570
SBI TOTAL COMMITMENT:	$5,000,000

INVESTMENT DESCRIPTION: Allied Venture Partnership was formed in September, 1985 and has a ten year term. Based in Washington D.C., the fund will focus on later stage, low technology companies located in the Southeastern and Eastern U.S. Most investments will be made in syndication with Allied Capital, a large publicly-owned venture capital corporation formed in 1958.

ALLIED VENTURE PARTNERSHIP
PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
23	$10,953,995

LOCATION		STAGE OF DEVELOPMENT	
East:	74%	Early Stage	0%
Midwest:	10	Expansion Stage	35
South:	5	Mezzanine Stage	0
West	11	Leveraged Buyouts	65

INDUSTRY:

Computer-related	2%
Medical/Healthcare	2
Consumer-related	30
Communications	17
Industrial/Machinery	49
Other	0

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY

FUND NAME:	Data Science Ventures
FUND NAME:	DSV Partners IV
CONTACT:	Rob Hillas
ACCOUNT INCEPTION:	April, 1985
SBI CURRENT INVESTMENT (COST):	$10,000,000
SBI CURRENT INVESTMENT (MARKET VALUE):	$10,534,436
SBI TOTAL COMMITMENT:	$10,000,000

INVESTMENT DESCRIPTION: DSV Partners IV was formed in April, 1985. It has a twelve year term. DSV Partners IV is the fourth venture fund to be managed by DSV Management Ltd. since the firm's inception in 1968. The firm's primary office is located in Princeton, New Jersey. However, the firm opened a new California office in 1986. DSV Partners' investment emphasis is on portfolio companies in the start up and early stages of corporate development. The geographic focus of the partnership is on East and West Coast firms. Investments are diversified by industry type.

DSV PARTNERSHIP IV
PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
12	$7,719,257

LOCATION		STAGE OF DEVELOPMENT	
East:	83%	Early Stage	100%
Midwest:	0	Expansion Stage	0
South:	0	Mezzanine Stage	0
West	17	Leveraged Buyouts	0

INDUSTRY:

Computer-related	52%
Medical/Healthcare	17
Consumer-related	0
Communications	10
Industrial/Machinery	0
Other	21

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY

FUND NAME:	Inman & Bowman Management
FUND NAME:	Inman & Bowman
CONTACT:	Kirk Bowman
ACCOUNT INCEPTION:	June, 1985
SBI CURRENT INVESTMENT (COST):	$3,750,000
SBI CURRENT INVESTMENT (MARKET VALUE):	$3,489,695
SBI TOTAL COMMITMENT:	$7,500,000

INVESTMENT DESCRIPTION: Inman & Bowman was formed in June, 1985. Its investment focus is early-stage, high-technology firms. The fund will emphasize investments in California, where the general partner, Inman & Bowman Management, is based. However, Inman and Bowman work closely with Rainier Venture Partners, a small Washington venture firm. They expect to make several co-investments with Rainier in the Pacific Northwest. The partnership has a ten year term.

INMAN & BOWMAN
PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
8	$6,773,737

LOCATION		STAGE OF DEVELOPMENT	
East:	0%	Early Stage	69%
Midwest:	0	Expansion Stage	31
South:	0	Mezzanine Stage	0
West	100	Leveraged Buyouts	0

INDUSTRY:

Computer-related	63%
Medical/Healthcare	37
Consumer-related	0
Communications	0
Industrial/Machinery	0
Other	0

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY

FUND NAME:	Investment Advisers, Inc. IAI Venture Capital Group
FUND NAME:	Superior Ventures
CONTACT:	Mitch Dann
ACCOUNT INCEPTION:	June, 1986
SBI CURRENT INVESTMENT (COST):	$1,661,250
SBI CURRENT INVESTMENT (MARKET VALUE):	$1,766,594
SBI TOTAL COMMITMENT:	$6,600,000

INVESTMENT DESCRIPTION: Superior Ventures is a Minnesota-based venture capital limited partnership. It was formed in June, 1986 and has an eleven year term. Superior Ventures is managed by IAI Venture Capital Group, a subsidiary of Investment Advisers, Inc. Up to 15% of the fund will be invested in other Minnesota-based venture capital limited partnerships. The remainder of the fund will be invested in operating companies located within the state.

SUPERIOR VENTURES
PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
5 portfolio companies 1 venture capital partnership	$3,438,315

LOCATION		STAGE OF DEVELOPMENT	
East:	0%	Early Stage	62%
Midwest:	100	Expansion Stage	38
South:	0	Mezzanine Stage	0
West	0	Leveraged Buyouts	0

INDUSTRY:

Computer-related	57%
Medical/Healthcare	5
Consumer-related	0
Communications	0
Industrial/Machinery	38
Other	0

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY

FUND NAME:	Matrix II Management Company
FUND NAME:	Matrix Partners II
CONTACT:	Mike Humphreys
ACCOUNT INCEPTION:	August, 1985
SBI CURRENT INVESTMENT (COST):	$ 7,500,000
SBI CURRENT INVESTMENT (MARKET VALUE):	$ 7,548,705
SBI TOTAL COMMITMENT:	$10,000,000

INVESTMENT DESCRIPTION: Matrix Partners II was formed in August, 1985 and has a term of ten years. The fund's investment emphasis is on high-technology firms in the early and expansion stages of corporate development. However, for diversification the Fund's portfolio will include a sizable component of non-technology firms. The portfolio may include several small leveraged buyout investments as well. The partners have offices in Boston, San Jose, and San Francisco.

MATRIX PARTNERS II
PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
23	$29,115,959

LOCATION		STAGE OF DEVELOPMENT	
East:	32%	Early Stage	68%
Midwest:	0	Expansion Stage	26
South:	3	Mezzanine Stage	0
West	65	Leveraged Buyouts	3
		Other	3

INDUSTRY:

Computer-related	65%
Medical/Healthcare	15
Consumer-related	9
Communications	11
Industrial/Machinery	0
Other	0