MINNESOTA STATE BOARD OF INVESTMENT MEETING
March 4, 1987

&

INVESTMENT ADVISORY COUNCIL MEETING
March 3, 1987

MINNESOTA STATE BOARD OF INVESTMENT

Governor Rudy Perpich

State Auditor Arne H. Carlson

State Treasurer Michael A. McGrath

Secretary of State Joan Anderson Growe

Attorney General Hubert H. Humphrey III

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

AGENDA

STATE BOARD OF INVESTMENT MEETING

Wednesday, March 4, 1987
8:30 A.M.

Room 118, State Capitol
Saint Paul

		TAB
1.	Approval of Minutes of December 18, 1986	
2.	Executive Director's Report:	
	A. Quarterly Investment Review	A
	1. Basic Retirement Funds	
	2. Post Retirement Fund and Other Investment Funds	
	B. Portfolio Statistics	B
3.	Report from Investment Advisory Council Committees:	
	A. Administrative and Asset Allocation Committees	C
	1. Basic Retirement Fund Paper - Part II	
	B. Equity Manager Committee	D
	1. Manager Performance	
	C. Alternative Investment Committee	E
	1. Report on the Alternative Investment Program	
	D. Legislative Update	F
	1. Status Report	

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

MINUTES
STATE BOARD OF INVESTMENT
DECEMBER 18, 1986

The State Board of Investment met on Thursday, December 18, 1986 at 8:30 A.M. in Room 118 of the State Capitol. Governor Rudy Perpich, Chair; Secretary of State Joan Anderson Growe, State Treasurer Robert W. Mattson, State Auditor Arne H. Carlson, and Attorney General Hubert H. Humphrey III, were present. Treasurer-Elect Michael A. McGrath was also present.

The minutes of the September 3, 1986 Board meeting were unanimously approved.

EXECUTIVE DIRECTOR'S REPORT:

Howard Bicker, Executive Director, first reviewed the asset allocation and investment performance of the Basic Retirement Funds. He stated that the assets for the Basic Retirement Funds decreased by -4.8% during the third quarter due to both the poor performance of the common stock market and withdrawals from the Funds. Withdrawals from the Basic Funds exceeded contributions by $23 million during the third quarter, bringing net withdrawals for calendar 1986 to $74 million. Mr. Bicker stated that the asset mix continued to move toward the long-term policy weights established by the Board. Mr. Bicker stated that the Basic Retirement Funds' total portfolio had a -4.2% total rate of return for the third quarter of 1986, and 23.4% for the year ending September 30, 1986. The Basic Funds' total portfolio excluding alternative equity assets produced a third quarter performance of -4.8% and a yearly return of 25.6%. The negative return was due to the poor performance of the common stock market. Mr. Bicker reported that the Basic Retirement Funds' active equity manager pool produced an aggregate third quarter rate of return of -8.6%. Mr. Bicker stated that the third quarter performance of the Basic Retirement Funds' active bond manager pool was 2.7%, which exceeded the market. The performance of the bond managers for the latest year was 17.9%, somewhat lower than the return available from the bond market as a whole.

Mr. Bicker next summarized the performance of the Post Retirement Fund. The Fund grew in market value by 0.3% during the third quarter. This increase was due to the returns from bonds. He stated that the relatively high cash component on June 30, 1986 was reduced to 6.6% during the third quarter. Mr. Bicker reported that the Post Retirement Fund's equity portfolio produced a -5.2% return during the third quarter, with the market showing a -7.7% return.

In closing, Mr. Bicker stated that as of September 30, 1986 all assets under management at the State Board of Investment were $10.57 billion.

INVESTMENT ADVISORY COUNCIL REPORT

Judy Mares presented the Investment Advisory Council Report.

ADMINISTRATIVE COMMITTEE

Ms. Mares stated that effective at the next Board meeting, there will be a new chair of the Investment Advisory Council. Jan Yeomans of 3M Company will take over the responsibilities of the Chair, and Ms. Mares will remain on the IAC.

Ms. Mares stated that the Administrative Committee discussed six issues. She reported that the Post Retirement benefit increase effective January 1, 1987 will be 9.792%. She stated that the 1986 Annual Report will be available for distribution some time in January, 1987 and also reported that the Board's fifth investment conference is scheduled for Wednesday, February 18, 1987.

Ms. Mares stated that the Committee reviewed the response to the Board's request for Proposal for its computerized accounting and portfolio management system. The Committee recommends that a four year contract be approved with Compensation and Capital at the maximum rate of $162,000. Secretary of State Joan Anderson Growe moved approval. The motion was unanimously approved.

Ms. Mares requested that Mr. Bicker review the proposed legislative package. He stated the first component submitted would change sign-off provisions on forms required for the Board's Certificate of Deposit program. Mr. Bicker stated the second item would remove the three year maturity limit on investments for state cash accounts. This change would assist the Board in maximizing arbitrage earnings for the State Treasury. The third proposal would increase the limit on equity investments from 75% to no more than 85% of the value of a fund, and increase the limit on alternative investments (real estate, resource funds and venture capital) from 20% to no more than 35% of the value of a fund. Mr. Bicker stated the remaining items add new authority in the alternative investment area. One would add authority to purchase high-yield debt securities and non-rated bonds, and the fifth proposal would add authority to purchase foreign securities. Ms. Mares stated the Advisory Council recommended one additional item for the legislative package requiring the Board to adopt a formal investment policy. The policy statement should address the asset allocation of each fund and discuss the need for diversification within each portfolio.

In response to a question from Mr. Humphrey on the fourth recommendation regarding the purchase of unrated bonds, Mr. Bicker stated that many new securities are being issued without ratings. This provision would give the Board the flexibility to buy these securities. In response to a question from Mr. Carlson, Mr. Bicker stated that the recommendation concerning foreign securities was reviewed by the IAC and approved. Ms. Growe moved approval of the legislative package. The motion was unanimously approved. The 1987 meeting schedule was the final item presented under the Administrative Committee report.

ASSET ALLOCATION COMMITTEE

Judy Mares stated that the Committee reviewed the staff position paper on investment policy for the Basic Retirement Funds. This paper discusses investment objectives and risk tolerance. There will be three additional papers covering the subjects of asset allocation, investment management structure, and performance evaluation.

EQUITY MANAGER COMMITTEE

Judy Mares stated that the Committee reviewed a staff proposal to implement a low risk financial futures program. The Committee recommends that the Board approve the use of the proposed financial futures strategies for the Post Retirement Investment Fund and that $100 million be placed with BEA, an investment firm. Mr. Bicker stated that the manager will be compensated by a performance based fee, and that a custodial arrangement will be negotiated. Attorney General Humphrey moved that BEA be retained to manage $100 million in the Post Retirement Fund using the proposed strategy. The motion was unanimously approved.

FIXED INCOME COMMITTEE

Judy Mares reported that the Fixed Income Committee met to review and consider several items. The first matter was to review the performance of the bond managers. She stated that the entire structure of the bond portfolio is undergoing analysis, and the Committee is taking a complete look at the role of bonds in the Basic Retirement Funds. She reported the Committee reviewed the bidding process used to select a manager for the Guaranteed Return Account of the Supplemental Investment Fund. The guaranteed investment contract was awarded to Principal Mutual Life (formerly Bankers Life of Iowa) at a rate of 7.72%. The Committee also recommended that the Board extend its contract with Bankers Trust Company for services used in rebalancing in the dedicated bond portfolio. The Committee recommended that the current contract be extended for one year at a rate of $100,000. Ms. Growe moved approval. The motion was unanimously approved.

ALTERNATIVE INVESTMENT COMMITTEE

Judy Mares stated that the Alternative Investment Committee recommended an additional $30 million oil and gas investment with

Apache Corporation. She stated that this investment would finance the acquisition of certain oil and gas properties from Occidental Petroleum Company. Mr. Bicker stated the Board would commit $30 million to a fund totaling $197 million. Mr. Carlson moved approval of this request. The motion was unanimously approved.

SOUTH AFRICA TASK FORCE

Jay Kiedrowski, Chairman of the South Africa Task Force, stated that the Task Force at its December 8, 1986 meeting, voted to recommend that the State Board of Investment propose legislation requiring the Board to divest holdings in companies doing business in South Africa. The divestment program would take place in stages. New or additional investment would be prohibited effective July 1, 1987. Securities would be liquidated over a three year period, one-third in 1988, one-third in 1989, and the final one-third in 1990. Mr. Kiedrowski pointed out that the divestment program would be abandoned if the Federal government terminates the sanctions embodied in the Anti-Apartheid Act of 1986. He also stated that the legislation would indemnify the Board, its staff and investment managers, and the Advisory Council for any action associated with the divestment program. Mr. Kiedrowski stated that the second part of the Task Force Report relates to implementation of the existing resolution of the Board. Current activities relate mainly to shareholder resolutions. The Board is proceeding to author and support shareholder resolutions to try to influence the behavior of companies doing business in South Africa. Mr. Carlson asked Mr. Kiedrowski a series of questions regarding the divestment proposal recommended by the Task Force. Mr. Carlson asked why the pension funds were not included in the idemnification provision and raised several questions regarding the statement of purpose in the proposed legislation. Mr. Kiedrowski stated that the legislation would make it easier to accomplish the intent of the Board's resolution on companies doing business in South Africa. Ms. Growe stated she did not see the need for legislation and said the Board should proceed with implementation of its resolution. Mr. Carlson moved that the legislation be tabled. The motion failed. Mr. Humphrey moved that the Board adopt the recommendation of the Task Force. There was no second.

The meeting adjourned at 9:25 A.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

AGENDA

INVESTMENT ADVISORY COUNCIL MEETING

Tuesday, March 3, 1987
2:00 P.M.

MEA Building-Conference Room "A"
41 Sherburne Avenue, Saint Paul

	TAB
1. Approval of Minutes of December 17, 1986	
2. Executive Director's Report:	
A. Quarterly Investment Review	A
1. Basic Retirement Funds	
2. Post Retirement Fund and Other Investment Funds	
B. Portfolio Statistics	B
3. Report from Investment Advisory Council Committees:	
A. Administrative and Asset Allocation Committees	C
1. Basic Retirement Fund Paper - Part II	
B. Equity Manager Committee	D
1. Manager Performance	
C. Alternative Investment Committee	E
1. Report on the Alternative Investment Program	
D. Legislative Update	F
1. Status Report	

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

MINUTES
INVESTMENT ADVISORY COUNCIL
December 17, 1986

The Investment Advisory Council met on Wednesday, December 17, 1986, at 2:00 P.M. in the MEA Building, St. Paul.

MEMBERS PRESENT: Verona Burton, James Eckmann, Paul Groschen, Ken Gudorf, James Hacking, Jay Kiedrowski, Elton Erdahl, Judy Mares, Joe Rukavina, Ray Vecellio, Debbie Veverka, Jan Yeomans, Gary Norstrem, Mike Rosen.

MEMBERS ABSENT: Harry Adams, Dick Hume and Malcolm McDonald.

SBI STAFF: Howard Bicker, Jeff Bailey, Beth Lehman, Doug Gorence, John Griebenow and Daralyn Peifer.

OTHERS ATTENDING: Tom Richards, Richards & Tierney; Peter Sausen; Mike Ousdigian; Bob Whitaker; Jay Stoffel; Al Finlayson; Ralph Jewell, Rochester; Allan Burton, Rochester; Greg Pinney, Minneapolis Star & Tribune.

The minutes of the September 2, 1986 meeting were approved.

Judy Mares stated she will be resigning as the Chair of the IAC. Nominations for a new chair were opened. Ken Gudorf nominated Jan Yeomans. There being no other nominations, Jan Yeomans was unanimously elected as the new chair.

EXECUTIVE DIRECTOR'S REPORT:

Howard Bicker, Executive Director, first reviewed the asset allocation and investment performance of the Basic Retirement Funds. He stated that the assets for the Basic Retirement Funds decreased by -4.8% during the third quarter due to both the poor performance of the common stock market and withdrawals from the Funds. Withdrawals from the Basic Funds exceeded contributions by $23 million during the third quarter, bringing net withdrawals for calendar 1986 to $74 million. Mr. Bicker stated that the asset mix continued to move toward the long-term policy weights established by the Board. Mr. Bicker stated that the Basic

Retirement Funds' total portfolio had a -4.2% total rate of return for the third quarter of 1986, and 23.4% for the year ending September 30, 1986. The Basic Funds' total portfolio excluding alternative equity assets produced a third quarter performance of -4.8% and a yearly return of 25.6%. The negative return was due to the poor performance of the common stock market. Mr. Bicker reported that the Basic Retirement Funds' active equity manager pool produced an aggregate third quarter rate of return of -8.6%. Mr. Bicker stated that the third quarter performance of the Basic Retirement Funds' active bond manager pool was 2.7%, which exceeded the market. The performance of the bond managers for the latest year was 17.9%, somewhat lower than the return available from the bond market as a whole.

Mr. Bicker next summarized the performance of the Post Retirement Fund. The Fund grew in market value by 0.3% during the third quarter. This increase was due to the returns from bonds. He stated that the relatively high cash component on June 30, 1986 was reduced to 6.6% during the third quarter. Mr. Bicker reported that the Post Retirement Fund's equity portfolio produced a -5.2% return during the third quarter, with the market showing a -7.7% return. He also stated that the dedicated bond portfolio was rebalanced at the beginning of the third quarter.

In closing, Mr. Bicker stated that as of September 30, 1986 all assets under management at the State Board of Investment were $10.57 billion.

ADMINISTRATIVE COMMITTEE REPORT

Jay Kiedrowski stated that the Administrative Committee reviewed several items. He stated that the Post Retirement benefit increase effective January 1, 1987 will be 9.792%. He also stated that the 1986 Annual Report has been sent to the printer and should be available for distribution by January, 1987. The Board's fifth investment conference is now scheduled for Wednesday, February 18, 1987. Mr. Kiedrowski stated that the Committee reviewed the response to the Board's Request for Proposal for its computerized accounting and portfolio management system. The Committee recommends that a four year contract be approved with Compensation and Capital at the maximum rate of $162,000. The current contract is at $115,000. Jay Kiedrowski moved approval with Ken Gudorf second. The motion was unanimously approved. Mr. Kiedrowski stated that the Committee reviewed several proposals for statutory changes to the Board's investment authority. The Committee recommends that the Board support these proposals and seek legislative approval for all the changes discussed. The first item submitted would change sign-off provisions on forms required for the Board's Certificate of Deposit program. The second item would remove the three year maturity limit on investments for state cash accounts. Mr. Bicker presented the remaining three items in the legislative package. The third proposal would increase the limit on equity investments to no more than 85% of the value of the fund and increase the limit on alternative investments to no more than 35% of the value of the fund. The fourth proposal would add authority to purchase high-yield debt securities as an alternative investment, and the fifth proposal would add authority to purchase foreign securities as an alternative investment. Mr. Kiedrowski moved that the five recommendations be approved. Ms. Mares stated that the new investment authorities would be used to further diversify the Board's portfolios. She recommended that the legislation include a provision that would require the Board to formulate an investment policy statement that addresses the diversification needs of the portfolios. The motion was unanimously approved. Mr. Kiedrdowski reported the last item discussed was the schedule for the 1987 Board and IAC meetings.

ASSET ALLOCATION COMMITTEE REPORT

Judy Mares stated that the Committee reviewed the staff position paper on investment policy for the Basic Retirement Funds. This paper discusses investment objectives and risk tolerance. There will be three additional papers covering the subjects of asset allocation, investment management structure, and performance evaluation. Ms. Mares stated that the next two parts of the statement will be completed by the June Board meeting.

EQUITY MANAGER COMMITTEE

Jan Yeomans reported that the Committee reviewed a staff proposal to implement a low risk financial futures program. The Committee recommends that the Board approve the use of the proposed financial futures strategies for the Post Retirement Investment Fund and that $100 million be placed with BEA, a New York investment firm that has experience in this area. Ms. Yeomans then described the performance-based fee that would be used to compensate the manager. Total fees could range from zero to 0.5% of assets under management, depending on actual performance. Ms. Yeomans stated that the contract would have a 30-day escape clause. Mike Rosen moved that BEA be retained to manage $100 million in the Post Retirement Fund and that the appropriate custodial fees be born by them. The motion was unanimously approved. Ms. Yeomans stated that the Committee reviewed the recent performance of the Board's equity managers and concluded that no action was needed on the current managers.

FIXED INCOME MANAGER COMMITTEE

Gary Norstrem reported that the Fixed Income Committee met to review and consider several items. The first matter was that of manager performance. He stated that the Committee feels the objectives and structure of the bond manager group should be reviewed before the end of the fiscal year. Mr. Norstrem suggested that the Committee would come back to the full IAC in June with a more specific recommendation concerning the bond managers. He stated that, in general, the existing managers outperformed the market.

Mr. Norstrem stated that the Committee reviewed the bidding process used to select a manager for the Guaranteed Return Account of the Supplemental Investment Fund. The guaranteed investment contract was awarded to Principal Mutual Life (formerly Bankers Life of Iowa) at a rate of 7.72% for a three year period beginning November 1986 and ending October 1987.

The final item discussed was the dedicated bond portfolio rebalancing. Mr. Norstrem stated that for the last two years the Board has contracted with Bankers Trust Company to provide the computer support necessary to accomplish the rebalancing. In accordance with the Committee's recommendation, Mr. Norstrem moved that the contract with Bankers Trust be extended for one year at a cost of $100,000. The motion was unanimously approved.

ALTERNATIVE INVESTMENT COMMITTEE REPORT

Mr. Gudorf reported that the Committee had three meetings during the quarter. Mr. Gudorf stated that the Alternative Investment Committee and staff, after lengthy negotiations, recommend that an additional $30 million oil and gas investment be committed to Apache. He stated that this investment would finance the acquisition of certain oil and gas properties from Occidental Petroleum Company. The SBI will receive 85% of the net profits from this investment. Debbie Veverka moved approval of this request. The motion was unanimously approved.

SOUTH AFRICA TASK FORCE REPORT

Jay Kiedrowski, Chairman of the South Africa Task Force, stated that the Task Force met twice during the quarter. He stated that the Task Force voted to recommend that the State Board of Investment propose legislation requiring the Board to divest holdings in companies doing business in South Africa, with actual liquidation to begin in 1988. Mr. Kiedrowski stated that a provision would be added to indemnify the Board, its staff and investment managers for their implementation of the investment program, and also that a statement of legislative intent would be included regarding the purpose of the divestment program. He stated that the Board's fiduciary responsibility would be amended to clearly state that the divestment action is not a violation of the prudent person standard. Mr. Kiedrowski reported that in addition to its recommendations regarding legislation, the Task Force is continuing its implementation of the Board's resolution on companies doing business in South Africa. Currently, most activity focuses on shareholder resolutions calling for companies to sign the Sullivan Principles. Mr. Vecellio asked for clarification that the Investment Advisory Council would be indemnified by the General Fund. Gary Norstrem moved that the

Investment Advisory Council reaffirm its position against any measure that could lower the Board's investment returns. The motion was unanimously approved.

The meeting adjourned at 3:30 P.M.

Respectfully submitted,

Howard Bicker

Howard J. Bicker
Executive Director

Tab A

TABLE OF CONTENTS

TABLE OF CONTENTS

MINNESOTA STATE BOARD OF INVESTMENT

BASIC RETIREMENT FUNDS

QUARTERLY INVESTMENT REVIEW

DECEMBER 31, 1986

MINNESOTA STATE BOARD OF INVESTMENT

BASIC RETIREMENT FUNDS

FOURTH QUARTER 1986

Summary

ASSETS

The assets of the Basic Retirement Funds grew 3.0% in market value during the fourth quarter of the year. This increase brought the Basic Funds' asset growth for calendar year 1986 to 11.0%. The growth in the market value of the assets was due entirely to investment performance as net withdrawals from the Basic Funds totaled $39 million for the fourth quarter and $113 million for the latest year. The asset growth of the Basic Retirement Funds over the last five calendar years is detailed 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	1Q	4,463	+ 10.7
	2Q	4,564	+ 2.3
	3Q	4,345	- 4.8
	4Q	4,474	+ 3.0

ASSET MIX

The asset mix of the Basic Retirement Funds shifted very little during the fourth quarter of the year. The funding of several of the Board's real estate, venture, and resource managers resulted in a minor increase in the alternative equity segment of the Basic Funds' portfolio. The balance of the portfolio was essentially unchanged.

As discussed in recent Quarterly Investment Summaries, investment staff and the Alternative Investment Committee of the Investment Advisory Council continue to evaluate investment opportunities for all three of the alternative equity areas. This segment of the Basic Funds' portfolio is expected to reach its target weighting within the next one to two years.

The Basic Funds' asset mix for the most recent two quarters is displayed below. Asset mix for calendar year 1985 is presented as well. Comparison of the asset mix for calendar years 1985 and 1986 indicates the Board's progress during the year toward meeting the long-term policy weights for each of the asset classes.

ASSET MIX

	12/31/85	9/30/86	12/31/86
Common Stocks	61.6%	59.1%	58.3%
Bonds	23.8	24.3	24.3
Cash Equivalents*	5.1	6.2	6.2
Alternative Equity Assets	9.5	10.4	11.2
	100.0%	100.0%	100.0%

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

INVESTMENT RETURNS

The Basic Retirement Funds' total portfolio generated a 3.8% rate of return for fourth quarter 1986, resulting in a calendar year performance of 13.8%. Excluding alternative equity assets, the total portfolio produced fourth quarter results of 4.2% and a yearly performance of 15.2%.

The fourth quarter investment returns reflect the modest performances of the stock and bond markets. Excluding alternative equity assets, the Basic Funds' total portfolio performance exceeded that of its assigned benchmarks for the quarter, although total portfolio performance roughly matched that of the TUCS Median Balanced Manager and the stock/bond composite for the most recent year.

The Basic Funds' total portfolio and asset segment returns are presented below.

	Total Rate of Return	
	Fourth Quarter 1986	Year Ending 12/31/86
Common Stocks	3.9%	15.2%
Bonds	5.2	15.1
Cash	1.5	7.0
Alternative Equity Assets	0.5	2.3
Total Fund (including alt. assets)	3.8	13.8

EQUITY PERFORMANCE

In aggregate, the Basic Retirement Funds' active equity managers produced a fourth quarter rate of return of 3.9%, essentially equalling the 4.0% return generated by the Wilshire 5000. For calendar year 1986, the active equity managers produced a combined performance of 14.3%, underperforming the Wilshire 5000 with its annual return of 16.1%.

The majority of the active equity managers matched or exceeded the performance of the market. However, a few of the managers experienced difficulties during the quarter as small capitalization stocks substantially underperformed large cap companies. In addition, a small number of the managers were also hindered by their heavy weighting of the Financial sector, the only sector of the market to produce negative returns for the period.

As a group, the active equity managers changed their industry concentrations slightly. In aggregate, the managers pared back their holdings in the Capital Goods, Consumer NonDurables, and Energy sectors and increased their weightings in the Materials and Services and Technology sectors. The active managers are now overweighted in the Financial, Technology, and Transportation sectors and underweighted in the Capital Goods, Energy, and Utilities sectors.

The index fund continued to perform as designed, generating a 3.7% rate of return for fourth quarter 1986 and a 15.4% return for the year.

The Basic Retirement Funds' equity manager returns for the most recent quarter and year are displayed below.

Total Portfolio Returns

	Fourth Quarter 1986	Year Ending 12/31/86
Fred Alger	5.3%	17.6%
Alliance Capital	5.2	17.2
Beutel Goodman	-1.3	7.5
BMI Capital	5.5	20.5
Forstmann Leff	3.4	19.3
Hellman Jordan	4.9	8.7
IDS	4.5	18.4
Investment Advisers	4.1	11.5
Lieber & Company	0.1	14.5
Peregrine Capital	4.4	7.9
Waddell and Reed	5.1	16.9
Internal Manager	4.0	14.3
Total - External Active Managers	3.9	14.3
Wilshire Associates (Index Fund)	3.7	15.4*
Wilshire 5000	4.0	16.1

* Performance negatively impacted due to cash withdrawals under the Rule of 85.

BOND PERFORMANCE

The Basic Retirement Funds' active bond managers in aggregate produced a fourth quarter rate of return of 5.2% and an annual return of 15.3%. As a group, the bond managers outperformed both the Salomon Brothers Broad Bond Index and the TUCS Median Fixed Income portfolio for the fourth quarter. For calendar year 1986, the bond managers' performance exceeded that of the TUCS Median Bond Manager but trailed that of the Salomon Index.

The bond managers' sector concentrations remained essentially the same. The managers as a group are overweighted in the Mortgage and Corporate sectors relative to the bond market and underweighted in the Treasury and Agency sectors.

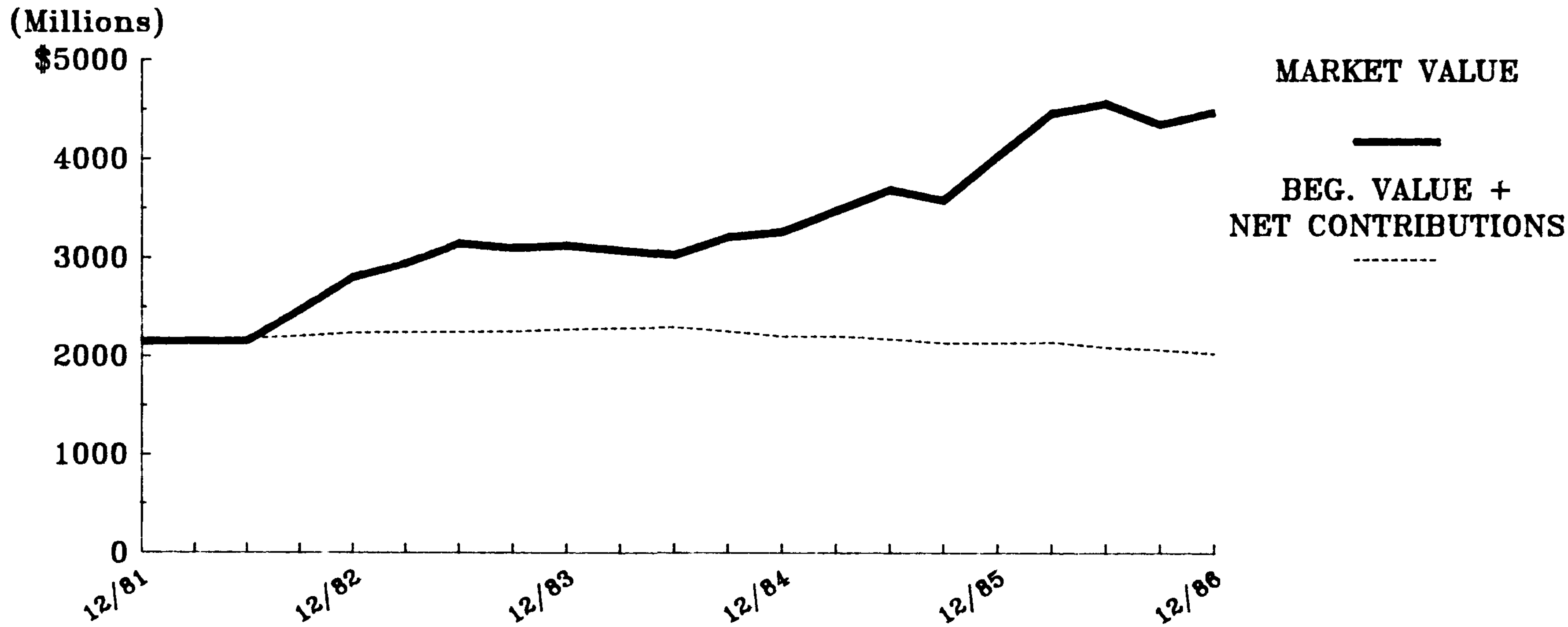
The individual bond manager results varied substantially. Several of the managers performed very well, boosting the performance of the manager pool. The fourth quarter performance of the pool was also positively impacted by a pricing adjustment to the Miller, Anderson and Sherrerd portfolio. This adjustment corrected a previous undervaluation of the Miller portfolio.

Bond manager performance for the Basic Retirement Funds for the fourth quarter and calendar year 1986 are presented below.

	Total Portfolio Returns	
	Fourth Quarter 1986	Year Ending 12/31/86
Investment Advisers	2.7%	12.3%
Lehman Management	2.8	13.9
Miller Anderson	10.3	17.7
Morgan Stanley	4.5	15.1
Peregrine Capital	3.3	11.6
Western Asset	4.9	16.1
Total - External Managers	5.2	15.3
Salomon Brothers Broad Bond Index	3.3	15.5

FIGURE 1

BASIC RETIREMENT FUNDS
ASSET GROWTH



PERIOD ENDING

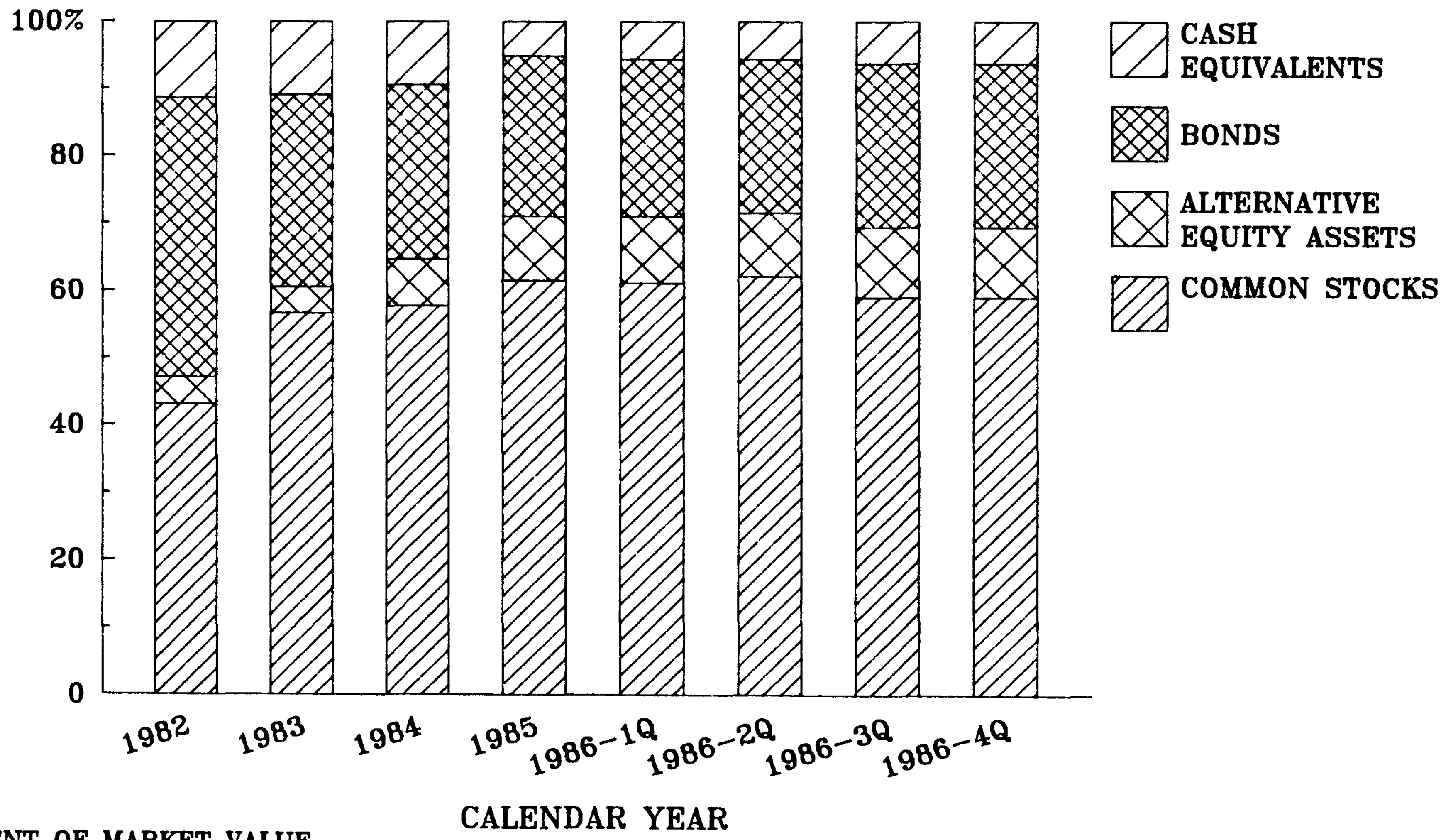
	12/82	12/83	12/84	12/85	12/86
BEGINNING VALUE	2,148.8	2,806.2	3,129.0	3,265.0	4,029.6
NET CONTRIBUTIONS	91.0	40.0	-77.6	-62.7	-112.8
INVESTMENT RETURN	566.4	282.8	213.6	827.3	557.3
ENDING VALUE	2,806.2	3,129.0	3,265.0	4,029.6	4,474.1

(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 1Q	2,730	61.2	1,041	23.3	291	6.5	307	6.9	38	0.9	54	1.2
2Q	2,838	62.2	1,041	22.8	253	5.6	330	7.2	37	0.8	65	1.4
3Q	2,570	59.1	1,055	24.3	270	6.2	337	7.8	33	0.7	80	1.9
4Q	2,608	58.3	1,088	24.3	277	6.2	367	8.2	63	1.4	71	1.6

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

TABLE 2

BASIC RETIREMENT FUNDS

ASSET MIX - ACTUAL vs. POLICY

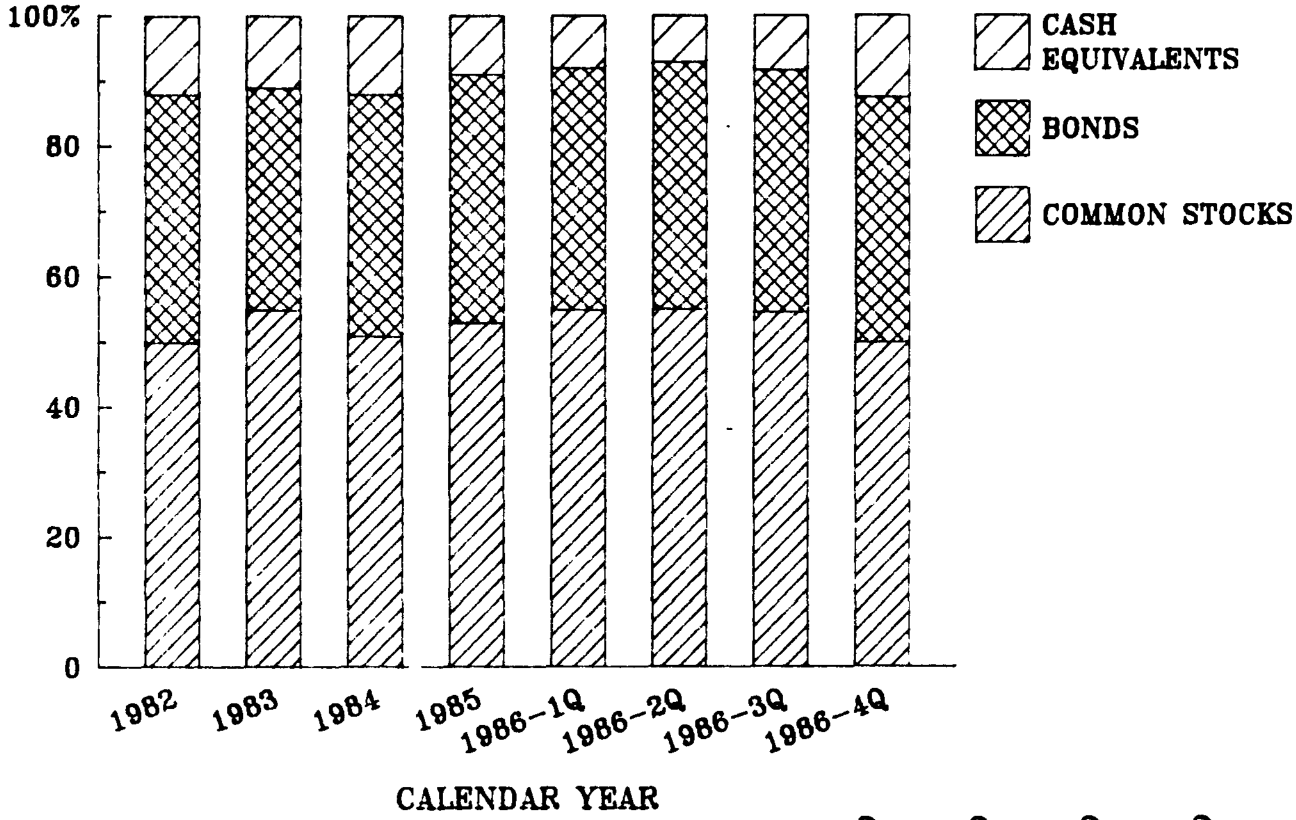
PERCENT OF MARKET VALUE
(End of Period Allocations)

		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

*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



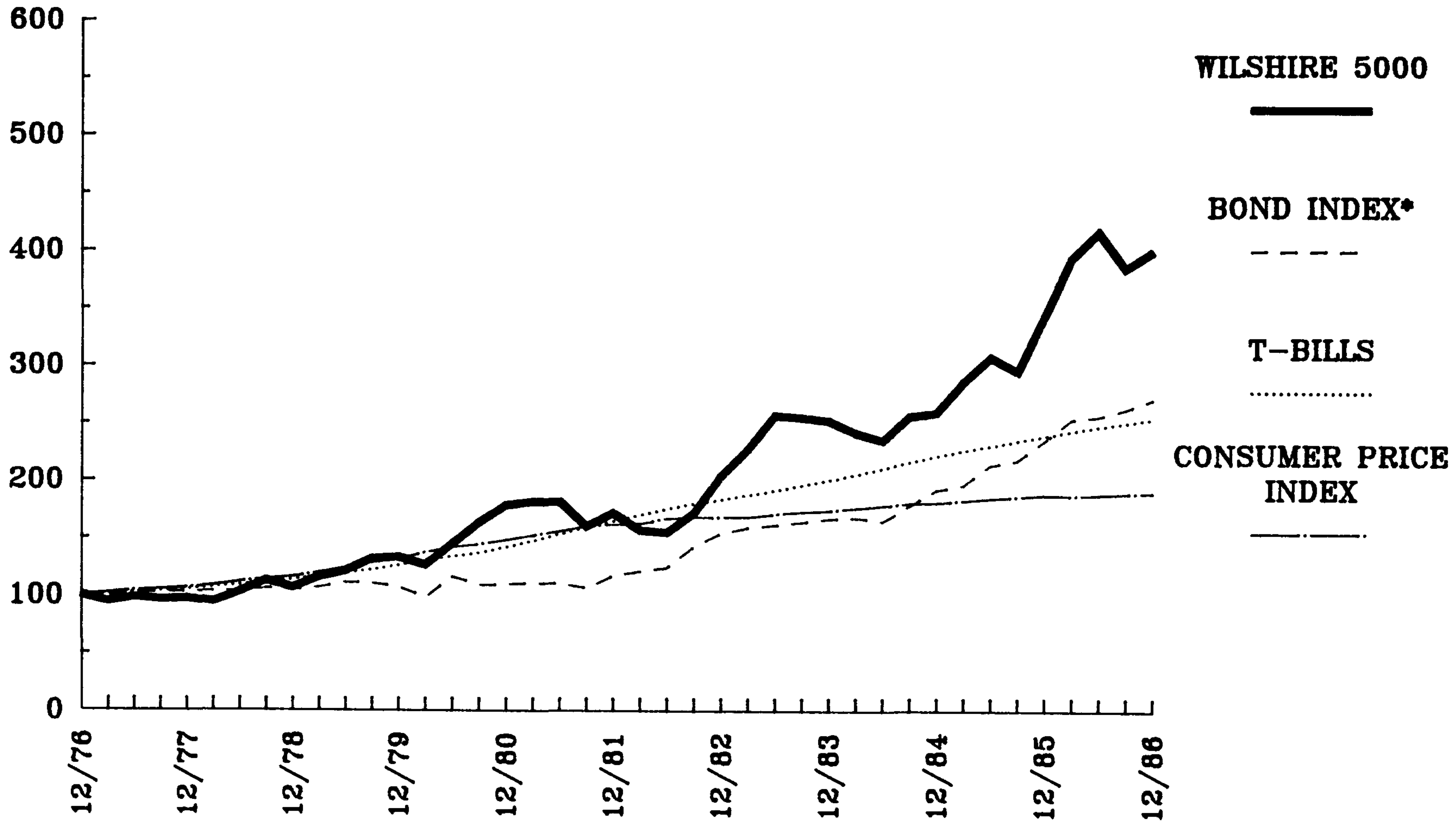
	1982	1983	1984	1985	1986-1Q	1986-2Q	1986-3Q	1986-4Q
COMMON STOCKS	48%	52%	48%	50%	53%	54%	53%	48%
BONDS	36	32	35	36	35	37	36	36
CASH EQUIVALENTS	12	10	11	9	8	7	8	12

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 four quarters and four 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

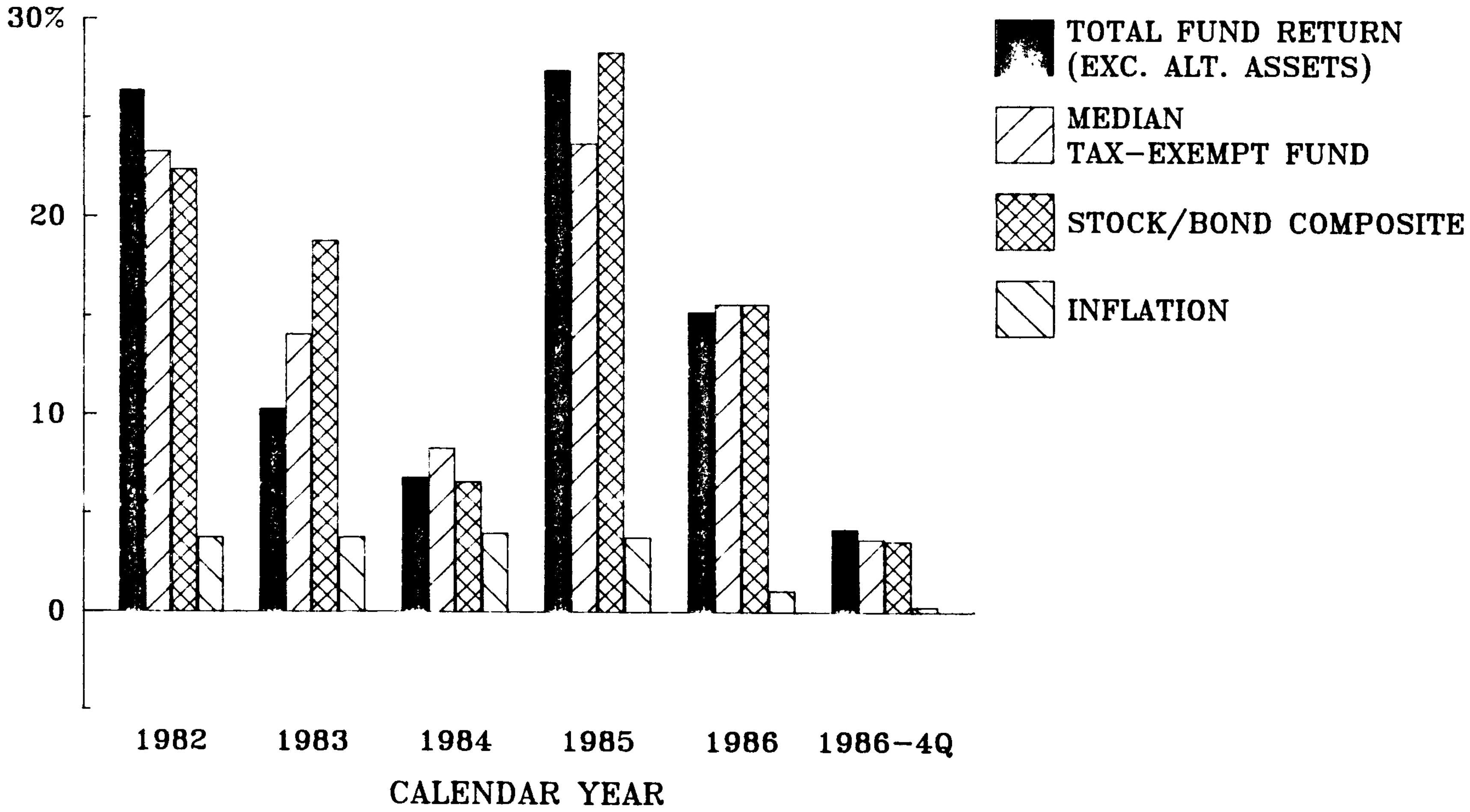


TABLE 3

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	1Q	11.4	10.7	11.8	-0.4	1.8	10.6
	2Q	3.8	3.2	4.2	0.6	1.6	3.5
	3Q	-4.8	-2.3	-4.2	0.7	1.4	-4.2
	4Q	4.2	3.7	3.6	0.3	1.3	3.8
1 Year Through 12/31/86		15.2	15.6	15.6	1.1	6.3	13.8
3 Years Annualized Through 12/31/86		16.1	16.5	16.6	2.9	8.2	15.2
5 Years Annualized Through 12/31/86		16.9	17.7	18.5	3.3	9.1	16.2

*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 Basics	COMMON STOCKS Wilshire 5000	BONDS Basics	BONDS Salomon Bond Index	ALTERNATIVE EQUITY ASSETS 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	1Q	14.4	14.4	6.1	8.6	-1.1
	2Q	5.1	5.8	0.4	1.1	1.9
	3Q	-7.8	-7.7	2.7	2.5	1.1
	4Q	3.9	4.0	5.2	3.3	0.5
1 Year Through 12/31/86		15.2	16.1	15.1	15.5	2.3
3 Years Annualized Through 12/31/86		15.8	16.6	17.0	17.5	7.0
5 Years Annualized Through 12/31/86		16.3	18.4	19.3	18.2	8.0

TABLE 5

BASIC RETIREMENT FUNDS

EQUITY MANAGER PERFORMANCE

TOTAL PORTFOLIO RETURNS

Managers	Fourth Quarter 1986	Year Ending 12/31/86	Two Years Ending 12/31/86 (Annualized)	Since Inception 3/1/83 (Annualized)
Fred Alger	5.3%	17.6%	24.8%	14.5%
Alliance Capital	5.2	17.2	28.8	15.4
Beutel Goodman	-1.3	7.5	14.4	14.1
BMI Capital	5.5	20.5	19.0	6.5
Forstmann Leff	3.4	19.3	26.3	16.0
Hellman Jordan	4.9	8.7	19.3	12.3
IDS	4.5	18.4	26.2	16.9
Investment Advisers	4.1	11.5	17.8	13.7
Lieber & Company	0.1	14.5	23.4	15.1
Peregrine Capital	4.4	7.9	N.A.	N.A.
Waddell & Reed	5.1	16.9	19.3	13.2
Internal Manager	4.0	14.1	N.A.	N.A.
Total - External Active Managers	3.9	14.3	21.3	12.5
Wilshire Associates (Index Fund)	3.7	15.4*	23.7	N.A.
Performance Benchmarks				
Wilshire 5000	4.0	16.1	24.1	16.9
90-Day Treasury Bills	1.3	6.3	7.1	8.8
Inflation	0.3	1.1	2.4	3.2

* Performance negatively impacted due to cash withdrawals under the Rule of 85.

TABLE 6

BASIC RETIREMENT FUNDS

BOND MANAGER PERFORMANCE

TOTAL PORTFOLIO RETURNS

Managers	Fourth Quarter 1986	Year Ending 12/31/86	Since Inception 6/30/84 (Annualized)
Investment Advisers	2.7%	12.3%	22.2%
Lehman Management	2.8	13.9	20.0
Miller Anderson	10.3	17.7	21.9
Morgan Stanley	4.5	15.1	20.7
Peregrine Capital	3.3	11.6	17.4
Western Asset	4.9	16.1	26.8
Total - External Bond Managers	5.2	15.3	21.3
Performance Benchmarks			
Salomon Brothers Broad Bond Index	3.3	15.5	22.1
90-Day Treasury Bills	1.3	6.3	7.7
Inflation	0.3	1.1	2.6

MINNESOTA STATE BOARD OF INVESTMENT

POST RETIREMENT INVESTMENT FUND

QUARTERLY INVESTMENT REVIEW

DECEMBER 31, 1986

MINNESOTA STATE BOARD OF INVESTMENT

POST RETIREMENT INVESTMENT FUND

FOURTH QUARTER 1986

Summary

ASSETS

The market value of the Post Retirement Investment Fund's assets increased 3.8% during the fourth quarter of the year. The fourth quarter asset growth was attributable to modest stock and bond market performances and continued net contributions to the Post Fund. Investment returns and net contributions of approximately $200 million combined to produce a 22.6% growth in the Post Fund's assets for calendar year 1986. Asset growth for the Post Retirement Investment Fund for the last five calendar years 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	1Q	3,476	+11.9
	2Q	3,658	+ 5.2
	3Q	3,670	+ 0.3
	4Q	3,808	+ 3.8

ASSET MIX

The cash equivalents segment increased as a percentage of the Post Retirement Investment Fund during fourth quarter 1986, as net contributions continued to flow into the Fund. The excess cash reserves will be invested in bonds during the normal rebalancing of the dedicated bond portfolio in first quarter 1987.

As discussed in previous Quarterly Investment Summaries, the common stock component of the portfolio continues to decrease in relative weighting. The prevailing low level of interest rates has necessitated the placing of new contributions into the Post Retirement Fund's dedicated bond portfolio to finance promised benefits and maintain the floor benefit increase. As a result, common stocks as a portion of the Fund's total market value have declined.

The asset mix of the Post Retirement Investment Fund for the most recent two quarters and the previous calendar year are detailed below.

ASSET MIX

	12/31/85	9/30/86	12/31/86
Common Stocks	20.5%	16.1%	15.1%
Bonds	70.2	77.3	74.2
Cash Equivalents	9.3	6.6	10.7
	100.0%	100.0%	100.0%

EQUITY PERFORMANCE

The Post Retirement Investment Fund's equity portfolio produced a 0.0% rate of return for the fourth quarter. In contrast to the third quarter, in which the Post Fund's equity portfolio outperformed the Wilshire 5000 by a significant margin, the equity portfolio failed to match the performance of the market during the last quarter of the calendar year. The equity portfolio trailed the performance of the Wilshire 5000 for the latest year as well. The Post Fund's equity portfolio was hindered by its value/contrarian style which performed poorly relative to growth and rotational styles throughout much of the calendar year.

The sector weightings of the Post Retirement Investment Fund's equity portfolio were altered significantly. Positions in the Capital Goods, Technology, and Energy sectors were reduced, while holdings in the Consumer NonDurables, Financial, Transportation and Utilities sectors were increased. The equity portfolio is now overweighted relative to the market in the Finance and Technology sectors and underweighted in the Consumer NonDurables, Materials and Services, and Utilities sectors.

The equity performance of the Post Fund for the fourth quarter and calendar year 1986 are presented below.

	Fourth Quarter 1986	Year Ending 12/31/86
Equity Portfolio	0.0%	3.5%
Wilshire 5000	4.0	16.1

DEDICATED BOND PORTFOLIO

The composition of the Post Retirement Investment Fund's dedicated bond portfolio was essentially unchanged during the fourth quarter. The greatest percentage of the portfolio remains concentrated in Treasury and Agency issues, with the balance of the portfolio split among the Industrial, Utilities, Finance, and Transportation sectors. The portfolio continues to be invested in high quality issues, with an average quality rating of AA.

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

DECEMBER 31, 1986

Value at Market	$2,250,388,122
Value at Par	$2,238,245,995
Average Coupon	8.70%
Current Yield	8.66%
Yield to Maturity	8.21%
Time to Maturity	12.99 Years
Average Duration	6.88 Years
Average Quality Rating	AA
Number of Issues	280

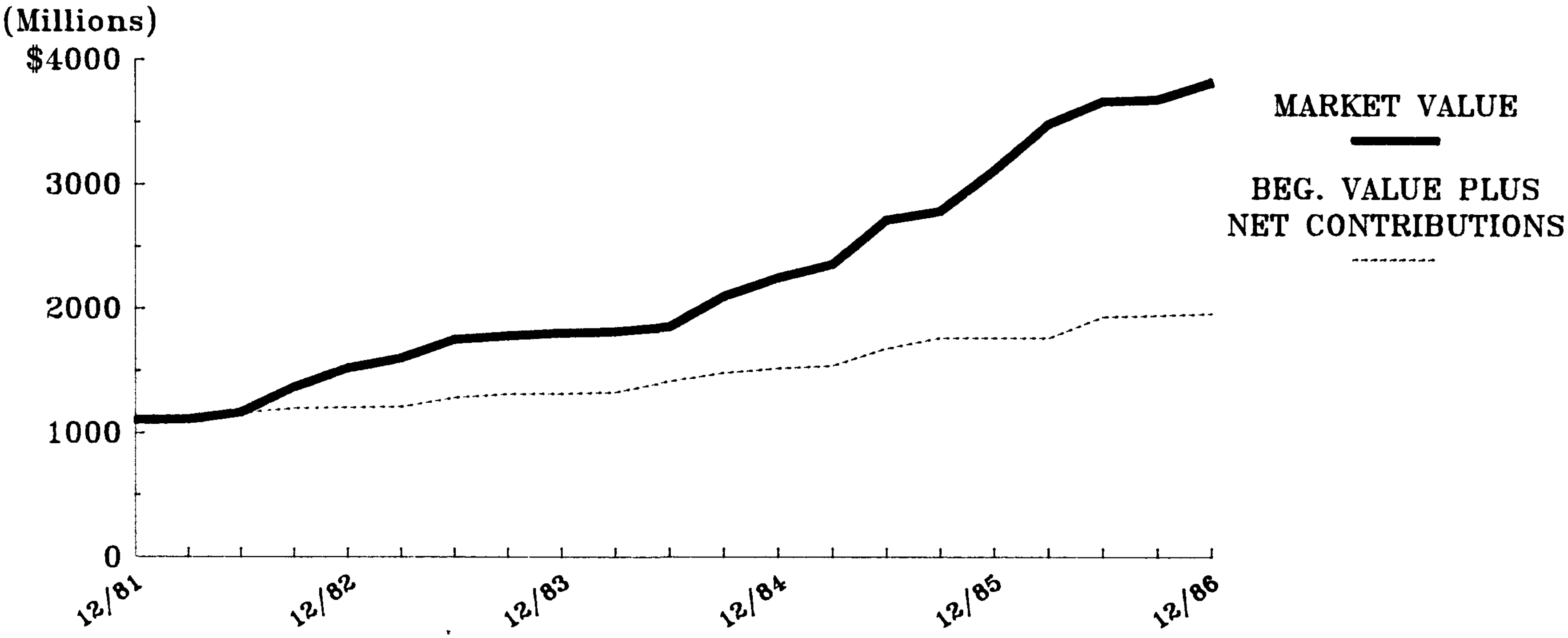
SECTOR WEIGHTINGS

Treasury	56.9%
Federal Agency	8.5
Industrial	10.1
Utilities	8.7
Finance	7.4
Transportation	1.0
Mortgages	0.0
Miscellaneous	7.4
	100.0%

FIGURE 6

POST RETIREMENT INVESTMENT FUND

ASSET GROWTH



PERIOD ENDING

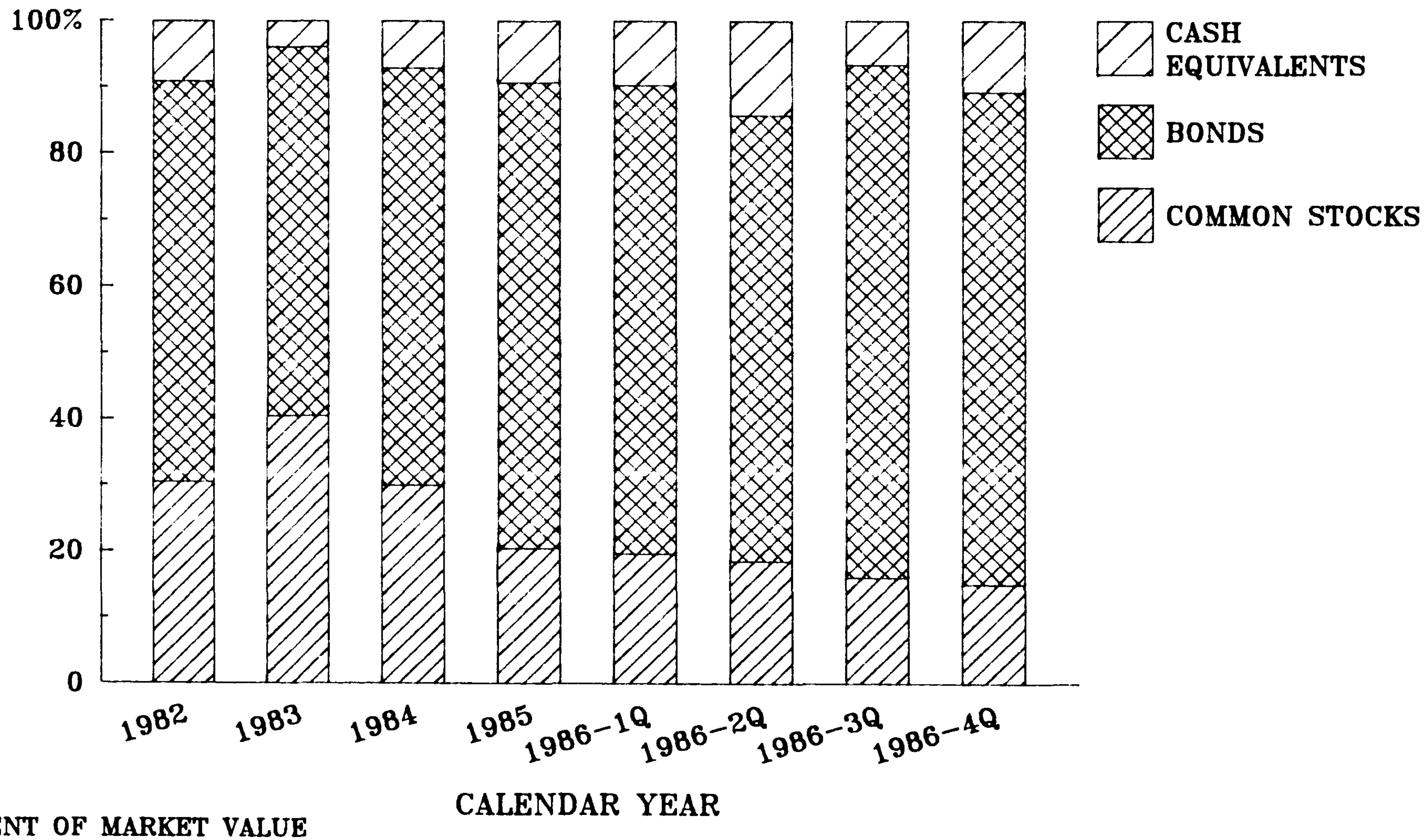
	12/82	12/83	12/84	12/85	12/86
BEGINNING VALUE	1,100.9	1,522.9	1,802.9	2,245.7	3,107.3
NET CONTRIBUTIONS	102.6	109.1	201.0	238.9	198.6
INVESTMENT RETURN	319.4	170.8	241.8	622.7	501.6
ENDING VALUE	1,552.9	1,802.9	2,245.7	3,107.3	3,807.5

(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

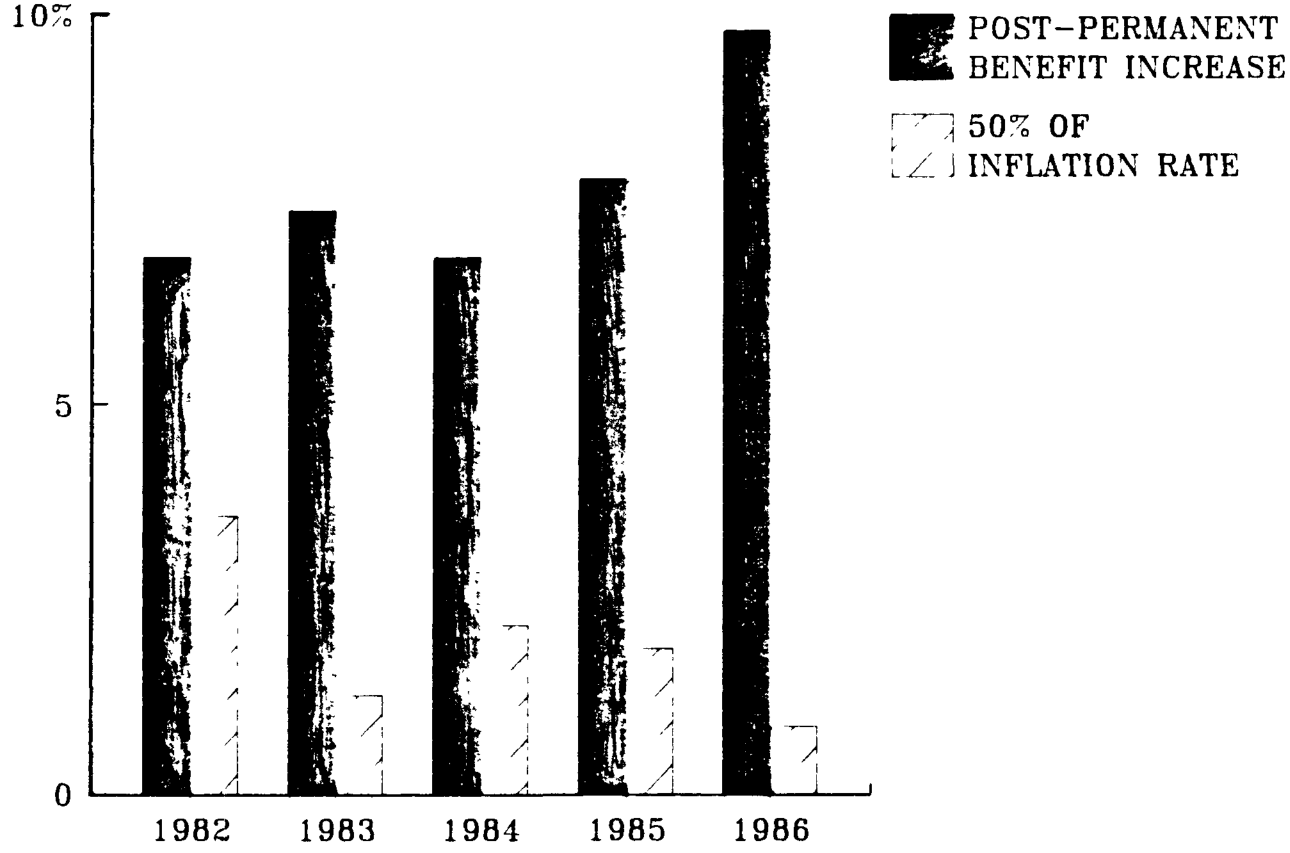
PERCENT OF MARKET VALUE

(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	1Q	686.3	19.7	2,454.3	70.6	335.6	9.7
	2Q	681.0	18.6	2,457.1	67.2	519.6	14.2
	3Q	591.3	16.1	2,838.9	77.3	240.1	6.6
	4Q	574.6	15.1	2,827.2	74.2	405.7	10.7

FIGURE 8

POST RETIREMENT INVESTMENT FUND
BENEFIT INCREASES VERSUS INFLATION



FISCAL YEAR

	1982	1983	1984	1985	1986	(Annualized) 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

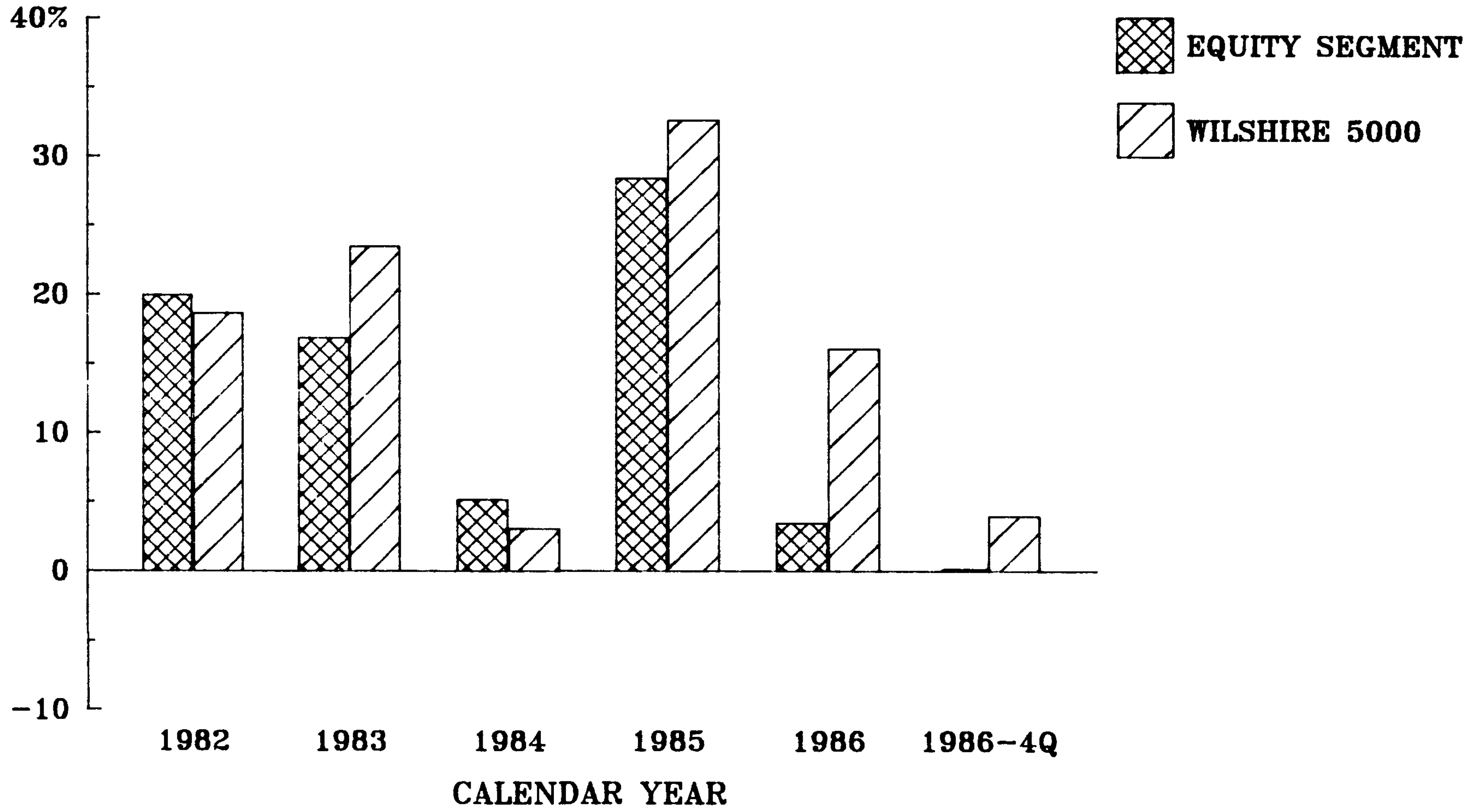


TABLE 9

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	1Q	10.5	14.4
	2Q	-1.2	5.8
	3Q	-5.2	-7.7
	4Q	0.0	4.0
1 Year Through 12/31/86		3.5	16.1
3 Years Annualized Through 12/31/86		11.8	16.6
5 Years Annualized Through 12/31/86		14.4	18.4

TABLE 10

POST RETIREMENT INVESTMENT FUND

EQUITY MANAGER DATA

DECEMBER 31, 1986

SECTOR WEIGHTINGS

SECTORS	WEIGHTING INTERNAL MANAGER	WEIGHTING WILSHIRE 5000
Capital Goods	2.2%	4.6%
Consumer Durables	5.6	3.8
Consumer Nondurables	17.3	27.2
Energy	9.1	9.0
Financial	24.4	13.5
Materials & Services	6.5	12.6
Technology	20.3	12.2
Transportation	5.0	3.0
Utilities	9.6	14.1
	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.	143	100%	1.16	0.93	0.12	0.19	-0.57	-0.23	0.11	0.32	0.08	0.20	0.27	0.09

* See Equity Manager Portfolio Statistics Glossary for definitions.

MINNESOTA STATE BOARD OF INVESTMENT

SUPPLEMENTAL INVESTMENT FUND

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

QUARTERLY INVESTMENT REVIEW

DECEMBER 31, 1986

MINNESOTA STATE BOARD OF INVESTMENT

SUPPLEMENTAL INVESTMENT FUND

FOURTH QUARTER 1986

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 December 31, 1986 the market value of the entire fund was $350 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

- o Growth Share Account - an actively managed, all common stock portfolio
- o Common Stock Index Account - a passively managed, all common stock portfolio designed to track the performance of the entire stock market
- o Bond Market Account - an actively managed, all bond portfolio that reflects changes in the market value of bonds
- o Money Money Account - a portfolio utilizing short term, liquid debt securities
- o Guaranteed Return Account - an option utilizing guaranteed investment contracts (GIC's), which offer a fixed rate of return for a specified period of time.
- o 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 both the passive and active components of the common stock segment of the Combined Investment Funds. Through its participation in the Funds, the Account utilizes the same external common stock managers as the Basic Retirement Funds.

The December 31, 1986 market value of the Income Share Account was $185 million.

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

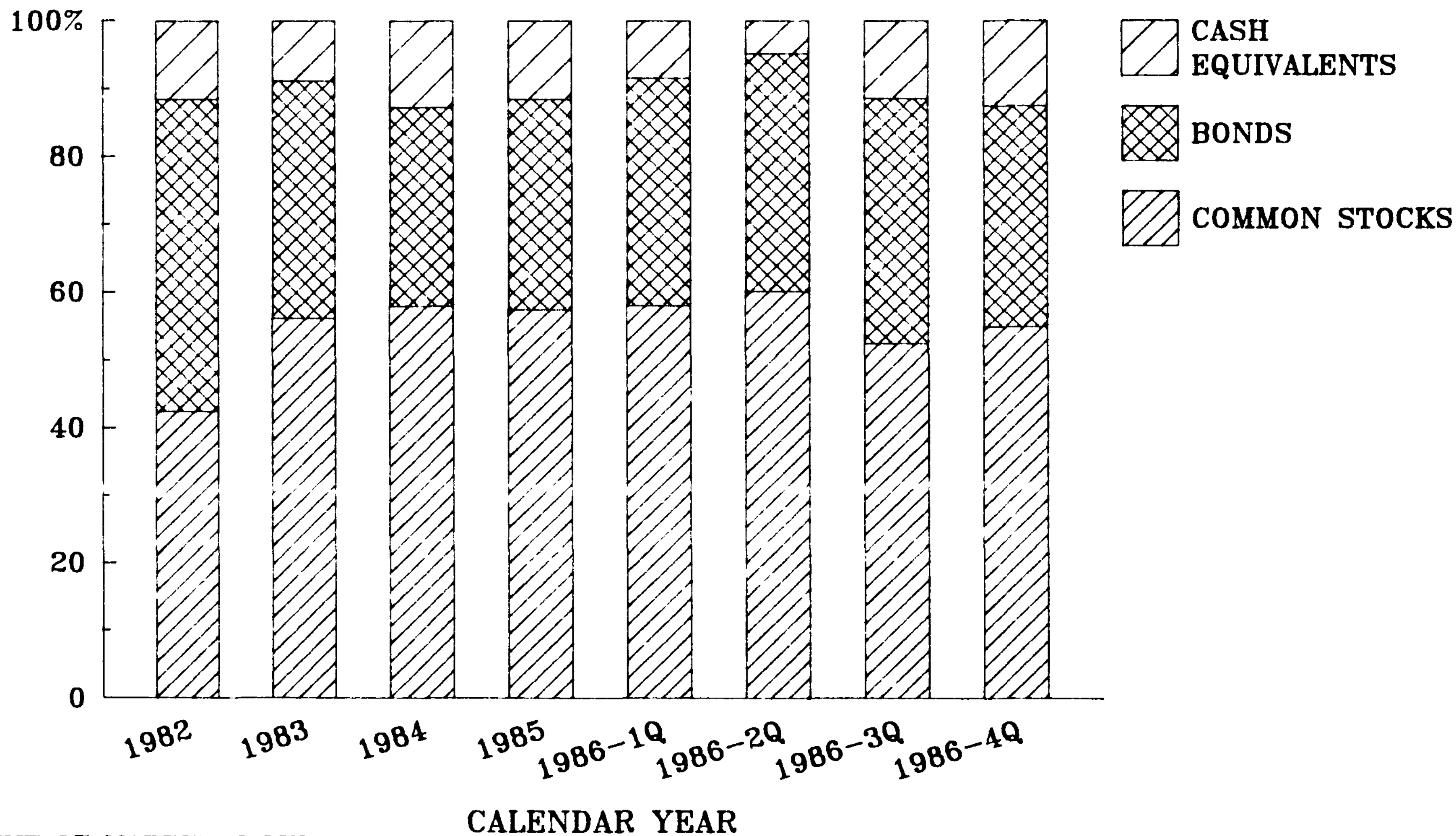
Total account and asset segment performance is displayed on page 39. Individual external manager performance is presented on page 16.

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	1Q	103.5	58.1	59.8	33.5	15.0	8.4
	2Q	108.0	60.2	62.7	35.0	8.6	4.8
	3Q	92.9	52.5	63.9	36.1	20.1	11.4
	4Q	101.9	55.0	60.2	32.5	23.1	12.5

*Includes cash held by the external managers

TABLE 12

SUPPLEMENTAL INVESTMENT FUND

INCOME SHARE ACCOUNT

INVESTMENT PERFORMANCE

	Total Returns	
	FOURTH QUARTER 1986	YEAR ENDING 12/31/86
Total Account	2.1%	8.2%
Median Fund*	3.7	15.6
Composite**	3.6	15.6
Equity Segment	1.7	5.4
Wilshire 5000	4.0	16.1
Bond Segment	2.7	13.0
Salomon Broad Bond Index	3.3	15.5

* 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 fourth 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 December 31, 1986 market value of the Growth Share Account was $75 million.

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

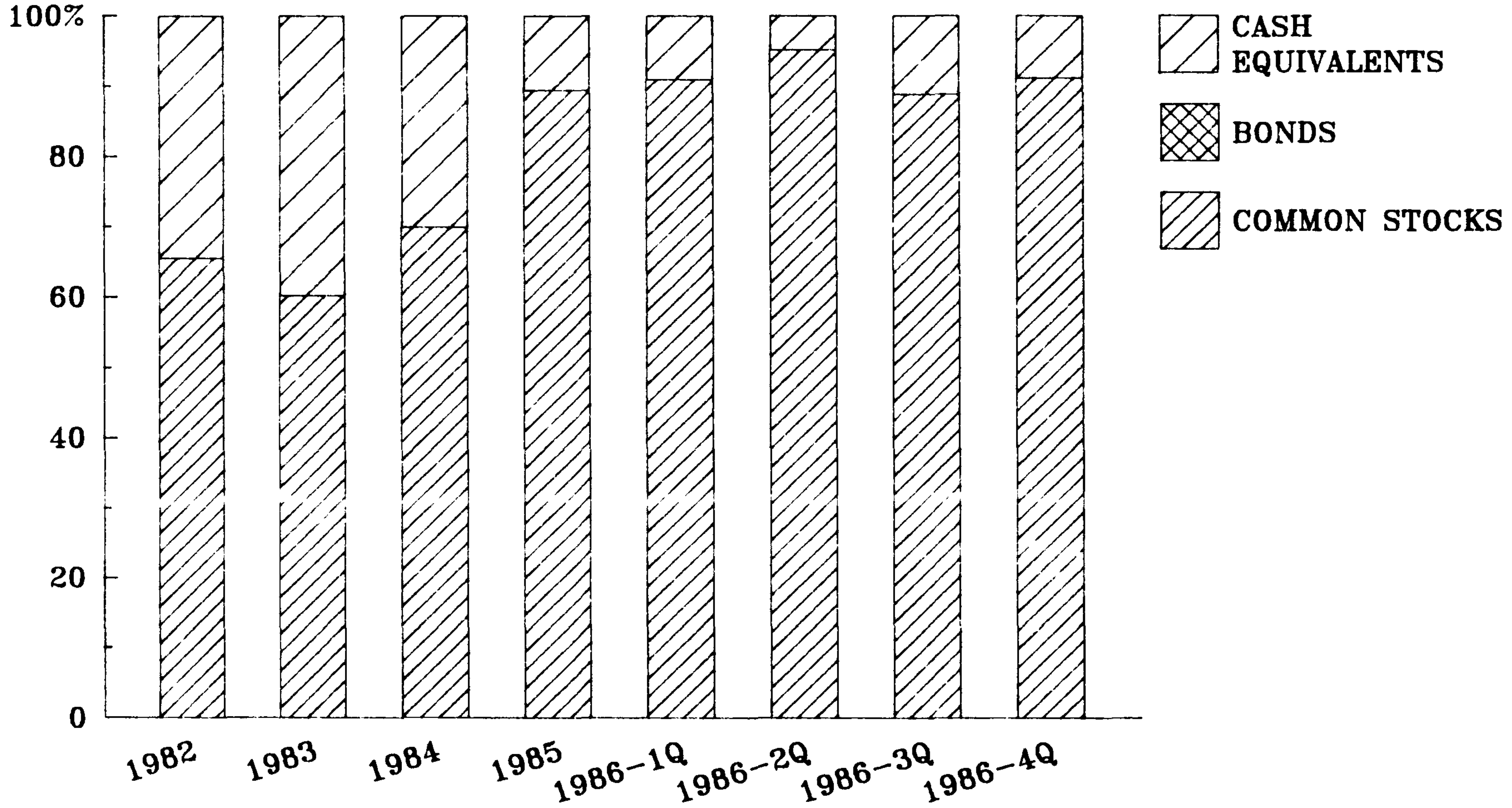
Total account and asset segment performance is presented on page 43. Individual common stock manager performance is listed on page 16.

FIGURE 11

SUPPLEMENTAL INVESTMENT FUND

(GROWTH SHARE ACCOUNT)

HISTORICAL ASSET MIX



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	1Q	74.9	91.0	----	----	7.4	9.0
	2Q	75.0	95.2	----	----	3.8	4.8
	3Q	65.0	88.9	----	----	8.1	11.1
	4Q	68.5	91.2	----	----	6.6	8.8

*Includes cash held by the external managers

TABLE 14

SUPPLEMENTAL INVESTMENT FUND

GROWTH SHARE ACCOUNT

INVESTMENT PERFORMANCE

Total Returns

	FOURTH QUARTER 1986	YEAR ENDING 12/31/86
Total Account	2.6%	8.5%
Median Fund*	4.0	16.7
Composite**	3.8	15.7
Equity Segment	2.6	8.8
Wilshire 5000	4.0	16.1

* 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 December 31, 1986 market value of the Account was $918,610.

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. Only the third and fourth quarter 1986 performance data reflects the returns earned by the newly created Common Stock 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
1986 1Q	14.0	14.4
2Q	5.4	5.8
3Q	-7.5	-7.7
4Q	4.0	4.0
1 Year Ending 12/31/86	15.6	16.1
2 Years Annualized Ending 12/31/86	23.7	24.1

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 December 31, 1986 market value of the Account was $799,279.

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, only the third and fourth quarter 1986 performance 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
1986 1Q	6.3%	7.9%
2Q	0.4	1.1
3Q	2.7	2.5
4Q	5.2	3.3
1 Year Ending 12/31/86	15.1	15.5
2 Years Annualized Ending 12/31/86	18.1	18.8

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 December 31, 1986 market value of the Account was $73 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
1986 1Q	7.9%	7.4%
2Q	7.0	6.5
3Q	6.6	5.8
4Q	6.1	5.4
1 Year Ending 12/31/86	6.9	6.3
2 Years Annualized Ending 12/31/86	7.6	7.1

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 1986 GIC contract occurred during October, 1986. Principal Mutual Life Insurance Company (formerly The Bankers Life of Iowa) submitted the winning bid of 7.72%.

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

MINNESOTA STATE BOARD OF INVESTMENT

MINNESOTA VARIABLE ANNUITY FUND

QUARTERLY INVESTMENT REVIEW

DECEMBER 31, 1986

MINNESOTA STATE BOARD OF INVESTMENT

MINNESOTA VARIABLE ANNUITY FUND

FOURTH QUARTER 1986

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 December 31, 1986 market value of the Fund was $140 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.

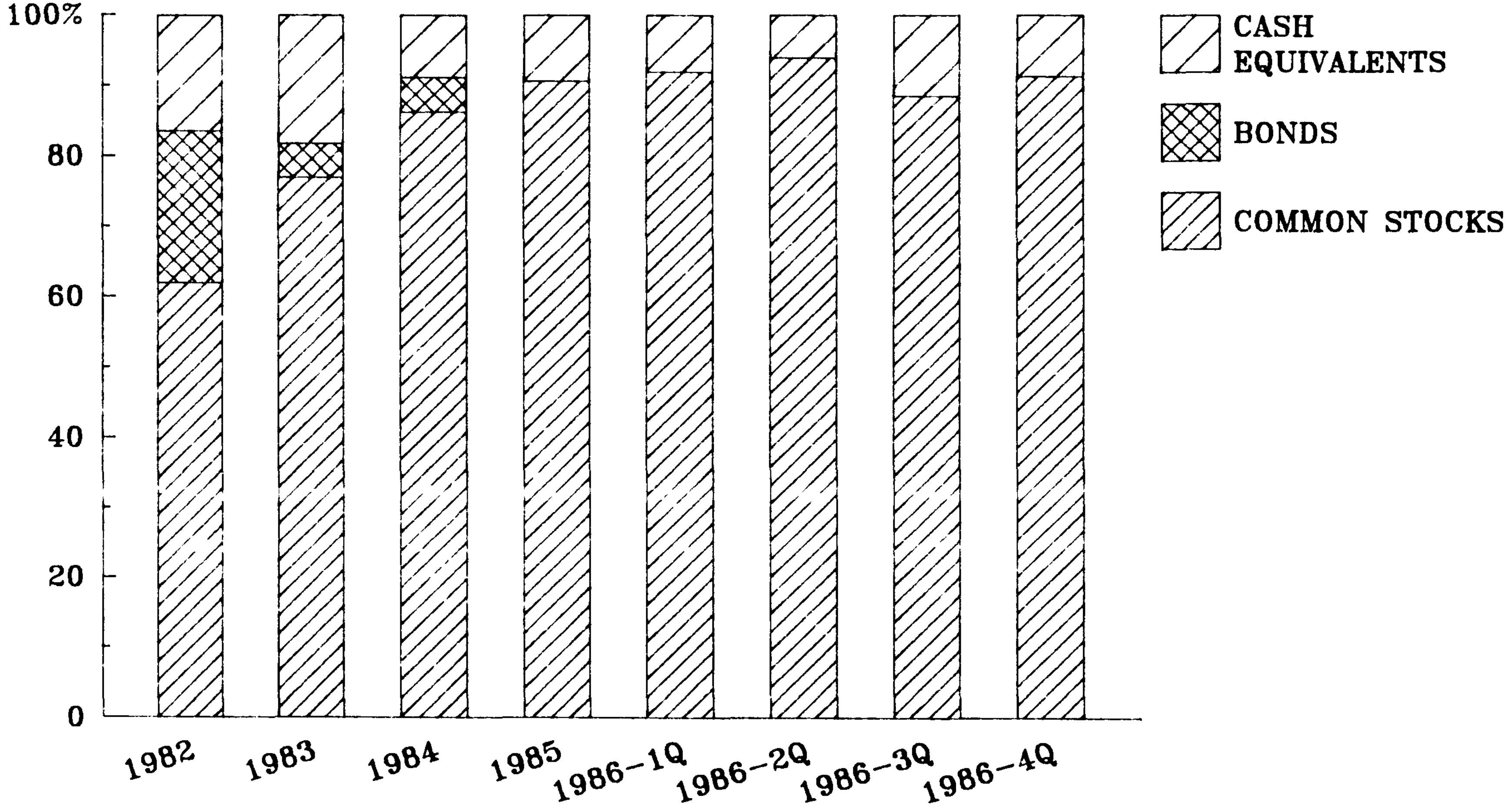
Historical asset allocation for the Minnesota Variable Annuity Fund is presented in the graph on page 51 and the accompanying table on page 52.

Total account and asset segment performance is presented in the table on page 53. 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	1Q	133.5	92.0	---	---	11.6	8.0
	2Q	138.9	94.0	---	---	8.8	6.0
	3Q	120.8	88.6	---	---	15.5	11.4
	4Q	127.6	91.4	---	---	12.0	8.6

*Includes cash held by external managers

TABLE 16

MINNESOTA VARIABLE ANNUITY FUND

INVESTMENT PERFORMANCE

	Total Returns	
	FOURTH QUARTER 1986	YEAR ENDING 12/31/86
Total Account	2.7%	9.4%
Median Fund*	4.0	16.7
Composite**	3.8	15.7
Equity Segment	2.7	9.5
Wilshire 5000	4.0	16.1

* TUCS Median Managed Equity Portfolio

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

MINNESOTA STATE BOARD OF INVESTMENT

PERMANENT SCHOOL FUND

QUARTERLY INVESTMENT REVIEW

DECEMBER 31, 1986

MINNESOTA STATE BOARD OF INVESTMENT

PERMANENT SCHOOL FUND

FOURTH QUARTER 1986

Summary

ASSETS

The market value of the Permanent School Fund's assets decreased 2.4% during the fourth quarter of the year. The decrease was due to net withdrawals, which totalled $20 million for the quarter.

The market values of the Permanent School fund over the last five calendar years 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	1Q	359	+ 2.6
	2Q	365	+ 1.7
	3Q	373	+ 2.2
	4Q	364	- 2.4

ASSET MIX

The assets of the Permanent School Fund are invested entirely in fixed income securities. As discussed in previous Quarterly Investment Reviews, the accounting restrictions under which the Fund must operate dictate that current income maximization be its primary investment goal. Common stocks are not a viable component of the Fund's long-run asset mix.

Cash equivalents increased as a percentage of the Fund's total value during the fourth quarter. Excess cash reserves will be invested in bonds during first quarter 1987.

The percentage of the Fund (at market value) invested in common stocks, bonds, and cash equivalents over the last three quarters and previous year is presented below.

ASSET MIX

	12/31/85	9/30/86	12/31/86
Common Stocks	0.0%	0.0%	0.0%
Bonds	68.2	75.8%	72.0
Cash Equivalents	31.8	24.2	28.0
	100.0%	100.0%	100.0%

BOND PORTFOLIO

The composition of the Permanent School Fund's bond portfolio changed very little during fourth quarter 1986. The Permanent School Fund's bond portfolio continued to be concentrated in the Treasury, Agency, and Mortgage sectors of the bond market. The average quality rating of the portfolio remained at AAA. Portfolio statistics as of December 31, 1986 are presented on the following page.

TABLE 17

PERMANENT SCHOOL FUND

BOND PORTFOLIO STATISTICS

DECEMBER 31, 1986

Value at Market	$257,401,781
Value at Par	$246,274,628
Average Coupon	9.42%
Current Yield	9.01%
Yield to Maturity	7.53%
Time to Maturity	18.72 Years
Average Duration	6.68 Years
Average Quality Rating	AAA
Number of Issues	117

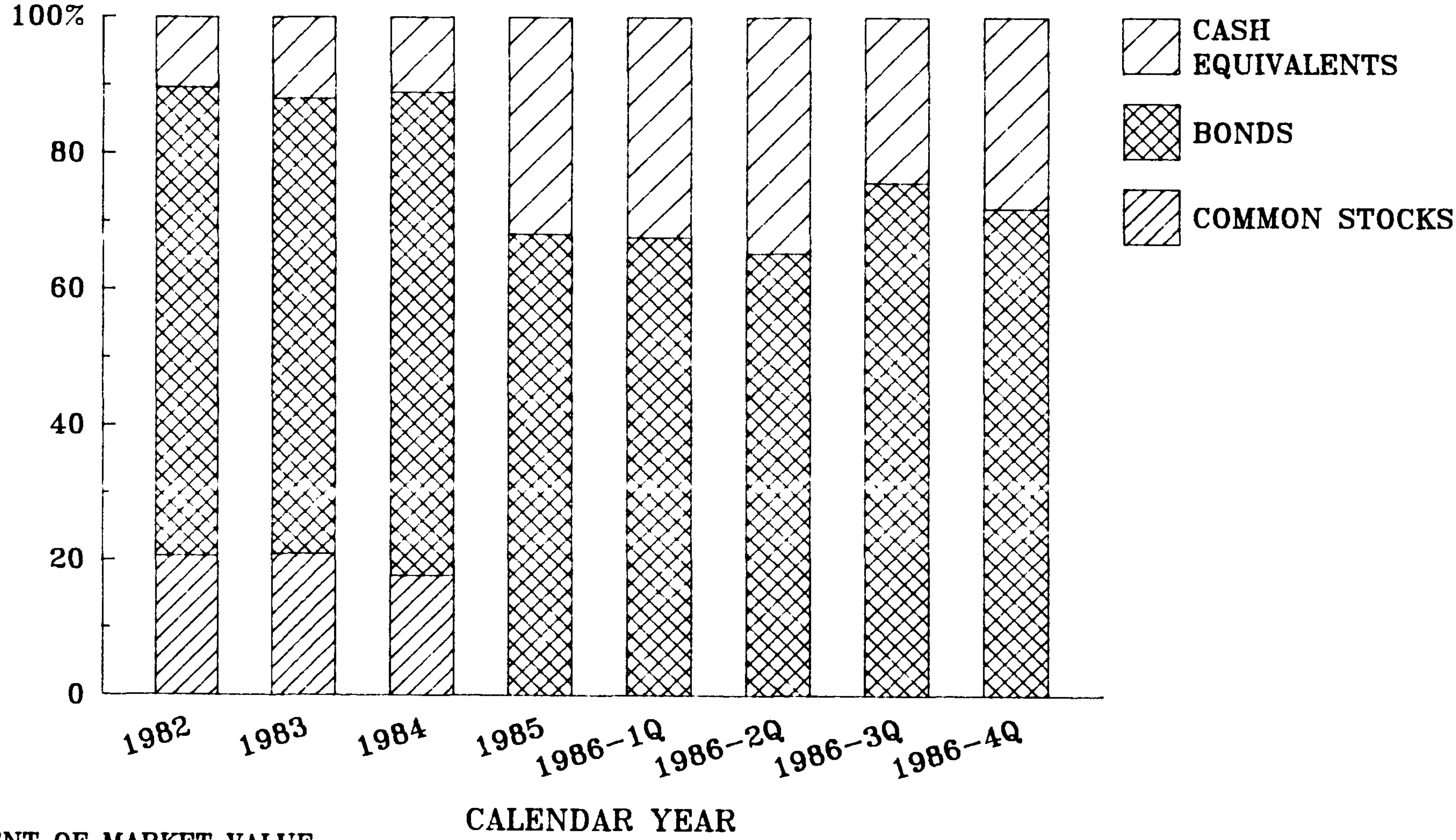
SECTOR WEIGHTINGS

Treasury	17.1%
Federal Agency	25.6
Industrial	12.6
Utilities	8.5
Finance	1.8
Transportation	6.2
Mortgages	27.0
Miscellaneous	1.2
	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	1Q	0.0	0.0	243.5	67.7	116.0	32.3
	2Q	0.0	0.0	238.4	65.4	126.3	34.6
	3Q	0.0	0.0	282.8	75.8	90.1	24.2
	4Q	0.0	0.0	262.3	72.0	102.1	28.0

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)	41	93	1.17	0.95	-0.34	-0.02	0.26	0.73	0.01	0.45	0.13	0.19	0.39	-0.04
	(B)	643	95	1.15	N.A.	-0.36	-0.06	-0.11	0.51	0.37	0.37	0.01	0.32	0.41	-0.04
Alliance	(A)	38	96	1.23	0.92	-0.58	-0.06	0.28	0.66	0.34	0.43	-0.04	-0.15	0.82	-0.08
	(B)	344	95	1.22	N.A.	-0.46	0.04	-0.19	0.30	0.48	0.53	0.06	0.60	0.58	-0.09
SMALL GROWTH MANAGERS															
BMI Capital	(A)	30	96	1.21	0.91	-0.74	-0.09	0.13	-0.01	-0.43	0.67	0.47	1.15	0.76	-0.04
	(B)	750	95	1.31	N.A.	-0.60	-0.07	-0.21	0.53	0.34	0.72	0.18	1.33	0.83	-0.03
Lieber & Co.	(A)	117	96	1.28	0.88	-0.32	0.19	0.01	-0.08	0.13	0.35	0.11	1.47	0.49	-0.17
	(B)	1,226	95	1.29	N.A.	-0.45	0.03	-0.41	0.15	0.20	0.49	0.12	1.80	0.77	-0.18
Waddell & Reed	(A)	61	98	1.13	0.95	0.09	-0.11	0.06	-0.14	-0.47	0.38	0.16	0.23	-0.02	-0.01
	(B)	N.A.	80	1.14	N.A.	0.03	0.12	-0.38	-0.13	0.13	0.17	-0.06	0.85	0.21	0.08
ROTATIONAL MANAGERS															
Forstmann Leff	(A)	31	71	1.29	0.88	-0.58	-0.09	0.90	1.01	0.24	0.64	0.29	0.19	0.44	-0.16
	(B)	1,373	70	1.18	N.A.	-0.16	-0.02	-0.24	0.17	0.15	0.37	0.05	0.64	0.41	0.03
Hellman Jordan	(A)	37	96	1.29	0.91	-0.64	0.02	0.05	0.36	-0.22	0.72	0.11	-0.24	0.65	-0.05
	(B)	N.A.	100	1.06	N.A.	0.15	0.06	N.A.	0.01	-0.01	0.08	-0.04	0.01	0.03	0.00
IDS	(A)	49	99	1.16	0.94	-0.21	0.09	0.48	0.51	0.25	0.35	0.08	0.01	0.27	-0.07
	(B)	N.A.	100	1.06	N.A.	0.15	0.06	N.A.	0.01	-0.01	0.08	-0.04	0.01	0.03	0.00
IAI	(A)	36	77	1.07	0.93	-0.23	0.00	0.29	0.45	0.02	0.24	0.12	-0.12	0.18	-0.02
	(B)	N.A.	100	1.06	N.A.	0.15	0.06	N.A.	0.01	-0.01	0.08	-0.04	0.01	0.03	0.00
VALUE MANAGERS															
Beutel Goodman	(A)	30	96	1.21	0.86	-0.04	-0.35	-0.79	-0.69	-0.24	0.41	0.22	0.22	0.40	0.39
	(B)	402	95	1.16	N.A.	-0.04	-0.03	-0.50	-0.31	-0.11	0.16	0.11	1.02	0.06	0.14
Peregrine Cap.	(A)	182	81	1.18	0.86	0.42	-0.15	-1.05	-0.57	-0.20	0.12	0.04	0.51	0.16	0.12
	(B)	1,259	90	1.16	N.A.	0.11	0.02	-0.65	-0.40	-0.12	0.09	0.07	0.75	0.22	0.07
Composite Active Ext. Managers		526	89	1.18	0.97	-0.20	-0.04	-0.07	0.11	-0.02	0.39	0.12	0.15	0.37	0.04
Index Fund Manager		1,421	100	1.06	0.98	0.15	0.06	-0.24	0.01	-0.01	0.08	-0.04	0.01	0.03	0.00
Composite All Basic Eq. Managers		1,553	96	1.10	0.97	0.04	0.04	-0.10	0.04	-0.02	0.17	0.01	0.05	0.13	0.01

(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)	2.0%	3.0%	44.1%	6.5%	10.8%	12.2%	20.4%	0.9%	---%
	(B)	3.3	1.6	37.0	2.1	9.1	20.3	21.6	3.1	1.9
Alliance	(A)	3.3	4.6	32.5	---	23.2	10.4	15.0	11.0	---
	(B)	2.8	1.2	30.1	1.4	21.0	17.5	20.9	5.1	---
SMALL GROWTH MANAGERS										
BMI Capital	(A)	8.7	10.5	35.9	---	20.1	8.9	15.9	---	---
	(B)	5.2	4.6	35.8	1.8	7.5	20.2	20.6	3.5	0.9
Lieber & Company	(A)	3.0	8.0	26.5	2.4	41.1	8.6	7.7	1.7	0.7
	(B)	6.6	6.0	26.8	1.8	18.6	16.0	18.6	2.7	2.8
Waddell & Reed	(A)	1.6	11.2	21.7	12.3	12.3	16.1	19.2	5.6	---
	(B)	5.8	4.7	28.0	6.0	13.2	12.7	10.7	2.6	16.3
ROTATIONAL MANAGERS										
Forstmann Leff	(A)	---	1.4	44.6	---	16.7	20.5	9.6	5.9	1.3
	(B)	3.5	3.4	28.5	4.6	16.8	15.3	14.1	4.2	9.6
Hellman Jordan	(A)	---	3.8	29.8	---	31.7	7.3	23.2	4.1	---
	(B)	4.6	3.8	27.2	9.0	13.2	12.8	12.3	3.1	14.0
IDS	(A)	2.7	1.1	25.2	7.4	10.9	24.6	7.8	7.3	13.0
	(B)	4.6	3.8	27.2	9.0	13.2	12.8	12.3	3.1	14.0
Investment Advisers	(A)	4.5	2.2	31.0	2.9	6.9	25.8	10.1	9.7	6.7
	(B)	4.6	3.8	27.2	9.0	13.2	12.8	12.3	3.1	14.0
VALUE MANAGERS										
Beutel Goodman	(A)	2.1	3.4	9.7	4.8	23.0	20.6	29.3	4.3	2.7
	(B)	9.8	4.5	28.7	7.5	14.6	19.9	10.6	4.4	---
Peregrine Capital	(A)	6.7	8.1	22.0	4.5	11.8	11.1	17.3	4.7	13.8
	(B)	7.7	2.8	19.5	9.9	16.9	13.9	13.3	3.9	12.1
Composite External Managers		2.9	4.9	27.4	5.4	17.4	14.2	17.1	5.6	5.2
Index Fund Manager		4.6	3.8	27.2	9.0	13.2	12.8	12.3	3.1	14.0
Composite All Basic Managers		4.1	4.2	27.2	7.9	14.4	13.2	13.8	3.9	11.3
Wilshire 5000		4.6	3.8	27.2	9.0	13.5	12.6	12.2	3.0	14.1

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

TABLE A-3

EXTERNAL EQUITY MANAGERS

PERFORMANCE RELATIVE TO BENCHMARK PORTFOLIOS

Managers	Fourth Quarter 1986		Year Ending 12/31/86		Two Years Ending 12/31/86 (Annualized)	
	Actual Portfolio	Benchmark Portfolio	Actual Portfolio	Benchmark Portfolio	Actual Portfolio	Benchmark Portfolio
Fred Alger	5.3%	5.2%	17.6%	15.7%	24.8%	23.6%
Alliance Capital	5.2	2.6	17.2	11.7	28.8	20.2
Beutel Goodman	-1.3	3.4	7.5	16.6	14.4	24.1
BMI Capital	5.5	4.8	20.5	13.5	19.0	21.9
Forstmann Leff	3.4	2.9	19.3	12.1	26.3	18.1
Hellman Jordan	4.9	4.0	8.7	16.1	19.3	24.1
IDS	4.5	4.0	18.4	16.1	26.2	24.1
Investment Advisers	4.1	4.0	11.5	16.1	17.8	24.1
Lieber & Company	0.1	2.2	14.5	12.1	23.4	21.8
Peregrine Capital	4.4	2.8	7.9	14.0	N.A.	N.A.
Waddell & Reed	5.1	3.5	16.9	8.7	19.3	13.4
Internal Manager	4.0	4.9	14.1	17.3	N.A.	N.A.
Total - External Active Managers	3.9	N.A.	14.3	N.A.	21.3	N.A.
Wilshire Associates (Index Fund)	3.7	N.A.	15.4*	N.A.	23.7	N.A.
Performance Standards						
Wilshire 5000	4.0		16.1		24.1	
90-Day Treasury Bills	1.3		6.3		7.1	
Inflation	0.3		1.1		2.4	

* Performance negatively impacted due to cash withdrawals under the Rule of 85.

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	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	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
ALLIANCE CAPITAL	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

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
BEUTEL GOODMAN	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	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
FORSTMANN-LEFF	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

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
HELLMAN JORDAN	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	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
INVESTMENT ADVISERS	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

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
LIEBER & COMPANY	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	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
WADDELL & REED	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	0.37	-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	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
			EQUITY SECTOR WEIGHTS								
AVG. EXT. MANAGERS	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	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	---	---
ALLIANCE CAPITAL	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	---

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
BEUTEL GOODMAN	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	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	---	---
FORSTMANN-LEFF	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

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
HELLMAN JORDAN	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 ADIVSERS	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
IDS ADVISORY	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

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
LIEBER & COMPANY	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	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
WADDELL & REED	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	---	---

EQUITY SECTOR WEIGHTS

MANAGER NAME	DATE	TOTAL PORTFOLIO MARKET VALUE	CAP GDS	CONS DUR	CONS NDUR	ENER	FINL	MAT & SERV	TECH	TRAN	UTIL
WILSHIRE 5000	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

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

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	12/31/86	30	40	94	9.2	8.6	N/A	AAA	N/A	N/A
	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.	12/31/86	11	25	93	8.9	8.4	N/A	AAA	N/A	N/A
	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.	12/31/86	40	45	94	9.6	8.9	N/A	AAA	N/A	N/A
	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	12/31/86	30	57	96	9.5	8.8	N/A	AA	N/A	N/A
	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	12/31/86	42	19	100	7.7	8.5	N/A	AAA	N/A	N/A
	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	12/31/86	24	52	84	10.5	8.1	N/A	AA	N/A	N/A
	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
WESTERN ASSET	12/31/86	33	40	95	8.8	8.7	N/A	AA	N/A	N/A
	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.	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.	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.	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 AAA	AA	A	BAA	OTHER	SECTOR WEIGHTINGS GOVT	AGCY	ZERO	IND	UTIL	FIN	TRAN	MTGS	MISC	CASH
MILLER ANDERSON	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	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	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
WESTERN ASSET	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

	4Q 1986	3Q 1986	2Q 1986	1Q 1986	4Q 1985	3Q 1985	2Q 1985	1Q 1985	4Q 1984	3Q 1984
INVESTMENT ADVISERS										
Fixed Income	2.8%	2.5%	0.9%	6.2%	6.5%	2.5%	9.4%	1.9%	8.8%	11.8%
Total Fund	2.7	2.4	0.9	5.9	6.3	2.3	9.2	1.8	8.8	11.8
LEHMAN MANAGEMENT										
Fixed Income	2.8	3.0	1.2	6.7	6.9	2.1	8.7	2.0	7.7	9.6
Total Fund	2.8	2.9	1.1	6.5	6.5	2.1	7.6	2.1	6.8	8.7
MILLER ANDERSON										
Fixed Income	10.6	2.2	0.2	4.4	8.8	4.4	6.0	2.5	7.5	7.7
Total Fund	10.3	2.2	0.2	4.2	8.7	4.4	5.7	2.5	6.3	6.7
MORGAN STANLEY										
Fixed Income	4.3	3.1	-2.1	8.2	7.7	2.5	9.3	1.5	7.3	6.1
Total Fund	4.5	3.1	-1.3	8.3	7.7	2.4	9.1	1.5	7.2	6.3
PEREGRINE CAPITAL										
Fixed Income	3.4	3.6	0.2	4.3	5.4	3.1	7.3	2.3	6.0	7.7
Total Fund	3.3	3.5	0.2	4.2	5.2	3.0	7.1	2.2	5.6	6.9
WESTERN ASSET										
Fixed Income	5.0	2.3	0.9	7.4	10.7	1.9	10.7	2.4	8.0	11.8
Total Fund	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	5.3	2.8	1.7	6.4	8.1	2.8	8.5	2.1	7.5	8.8
Total Fund	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	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 PORTFOLIO'S BY TYPE OF INVESTMENT
MARKET VALUE DECEMBER 31, 1986

	CASH AND SHORT TERM SECURITIES	BONDS INTERNAL	BONDS EXTERNAL	STOCKS INTERNAL	STOCKS EXTERNAL	ALTERNATIVE ASSETS	TOTAL
BASIC RETIREMENT FUNDS:							
TEACHERS RETIREMENT FUND	$ 47,466 2.60%	$ -0- 0.00%	$ 461,654 25.27%	$ -0- 0.00%	$1,106,778 60.59%	$210,860 11.54%	$ 1,826,758 100%
PUBLIC EMPLOYEES RETIRE. FUND	32,181 2.60%	-0- 0.00%	312,894 25.27%	-0- 0.00%	750,130 60.59%	142,914 11.54%	1,238,119 100%
STATE EMPLOYEES RETIRE. FUND	24,962 2.60%	-0- 0.00%	242,778 25.27%	-0- 0.00%	582,041 60.59%	110,888 11.54%	960,669 100%
PUBLIC EMP. POLICE & FIRE FUND	11,644 3.12%	-0- 0.00%	93,809 25.14%	-0- 0.00%	224,902 60.26%	42,847 11.48%	373,202 100%
HIGHWAY PATROL RETIRE. FUND	545 .77%	-0- 0.00%	18,096 25.54%	-0- 0.00%	43,946 62.02%	8,265 11.67%	70,852 100%
JUDGES RETIREMENT FUND	8 .18%	-0- 0.00%	1,299 29.17%	-0- 0.00%	2,552 57.31%	594 13.34%	4,453 100%
POST RETIREMENT FUND	405,723 10.66%	2,827,158 74.25%	-0- 0.00%	574,632 15.09%	-0- 0.00%	-0- 0.00%	3,807,513 100%
MINNESOTA SUPPLEMENTAL FUNDS:							
INCOME SHARE ACCOUNT	21,026 11.35%	60,205 32.50%	-0- 0.00%	25,481 13.76%	78,531 42.39%	-0- 0.00%	185,243 100%
GROWTH SHARE ACCOUNT	821 1.09%	-0- 0.00%	-0- 0.00%	18,661 24.84%	55,650 74.07%	-0- 0.00%	75,132 100%
MONEY MARKET ACCOUNT	72,651 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	72,651 100%
BOND ACCOUNT	481 4.04%	11,426 95.96%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	11,907 100%
COMMON STOCK INDEX ACCOUNT	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	919 100%	-0- 0.00%	919 100%
BOND MARKET ACCOUNT	-0- 0.00%	-0- 0.00%	799 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	799 100%
GUARANTEED RETURN ACCOUNT	-0- 0.00%	-0- 0.00%	4,057 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	4,057 0.00%
MINNESOTA VARIABLE ANNUITY	1,166 .84%	-0- 0.00%	-0- 0.00%	34,356 24.61%	104,078 74.55%	-0- 0.00%	139,600 100%
TOTAL RETIREMENT FUNDS	$ 618,674 7.05%	$2,898,789 33.05%	$1,135,386 12.94%	$653,130 7.45%	$2,949,527 33.62%	$516,368 5.89%	$ 8,771,874 100%

PERMANENT SCHOOL FUND	102,093 28.02%	262,307 71.98%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	364,400 100%
TREASURERS CASH	526,666 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	526,666 100%
TRANSPORTATION FUNDS	436,055 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	436,055 100%
STATE BUILDING FUNDS	18,749 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	18,749 100%
HOUSING FINANCE AGENCY	167,477 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	167,477 100%
MINNESOTA DEBT SERVICE FUND	236,696 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	236,696 100%
MISCELLANEOUS ACCOUNTS	264,478 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	264,478 100%
TACONITE AREA ENVIR. PROTECTION	6,921 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	6,921 100%
N.E. MINNESOTA PROTECTION	42,005 100%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	-0- 0.00%	42,005 100%
GRAND TOTAL	$2,419,814 22.33%	$3,161,096 29.17%	$1,135,386 10.48%	$653,130 6.03%	$2,949,527 27.22%	$516,368 4.77%	$10,835,321 100%

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

For period of
October 1, 1986 - December 31, 1986

Teachers Retirement Fund	$ -0-
Public Employees Retirement Fund	(39,000,000.00)
State Employees Retirement Fund	-0-
Public Employees Police & Fire	1,500,000.00
Highway Patrol Retirement Fund	(781,000.00)
Judges Retirement Fund	(710,099.25)
Post Retirement Fund	16,261,060.18
Supplemental Retirement Fund - Income	4,685,462.35
Supplemental Retirement Fund - Growth	137,711.84
Supplemental Retirement Fund - Money Market	(5,047,805.62)
Supplemental Retirement Fund - Bond Fund	(49,615.75)
Supplemental Retirement Fund - Index	697,019.60
Supplemental Retirement Fund - Bond Mkt.	127,447.55
Supplemental Retirement Fund - Guaranteed	4,007,027.08
Minnesota Variable Annuity Fund	$ (380,417.55)
Total Retirement Funds Net Cash Flow	$ (18,553,209.57)
Permanent School Fund	(19,716,216.62)
Total Net Cash Flow	$ (38,269,426.19)

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)
December 1984	91	(71)	20	12	6.3	41.2	52.5	5864
January 1985	(5)	131	126	20	4.3	42.0	53.7	6188
February	30	(5)	25	27	4.3	41.2	54.5	6177
March	(1)	5	4	26	4.6	41.7	53.7	6213
April	(79)	17	(62)	23	5.9	40.7	53.4	6260
May	(13)	(41)	(54)	32	6.9	40.4	52.7	6602
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

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

February 23, 1987

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

FROM: Administrative and Asset Allocation Committees

SUBJECT: Committee Reports

The Committees reviewed Part II of the staff's position paper on investment policy for the Basic Retirement Funds. Part II of the paper recommends a policy asset mix and various asset class targets for the Basic Funds. It also discusses the subject of market timing.

The Committees recommend adoption of the staff position paper. However, the Committees also believe that the market timing issue should be given further consideration by the IAC and staff. The Asset Allocation Committee plans to hold additional discussions in the near future.

A copy of Part II of the investment policy paper follows this report.

BASIC RETIREMENT FUNDS
INVESTMENT POLICY

PART II
POLICY ASSET MIX, ASSET CLASS TARGETS, AND MARKET TIMING

Staff Position Paper
February 1987

EXECUTIVE SUMMARY

Part I of Basic Retirement Funds' investment policy paper addressed the issues of investment objectives and risk tolerance. The securitization of promised benefits is the primary investment goal of the Basic Funds. However, high returns, that will permit pension cost reductions and/or benefit increases, are also desired. The Board is willing to accept considerable short-run volatility in portfolio returns in exchange for the opportunity to earn high long-run returns.

Building upon the conclusions of Part I, Part II of the investment policy paper considers three specific subject:

- o Policy asset mix
- o Asset class targets
- o Market timing

A pension plan's policy asset mix is the desired long-run allocation of plan assets among various broad asset classes. It represents that combination of asset classes believed to be most consistent with the plan's investment objectives and risk tolerance.

The approach used to determine an appropriate policy asset mix for the Basic Funds is the "strategic planning" method. This method builds a logically consistent case for a particular policy asset mix based upon a pension plan's investment objectives, investment theory, and historical and expected capital markets returns and risks. Applied to the Basic Funds, the strategic planning method translates the Basic Funds' investment objectives into three asset mix requirements:

- To secure promised benefits, the policy asset mix must avoid financial catastrophes which might result from a severe economic depression or inflation.
- To reduce pension costs and/or increase benefits, the policy asset mix must seek maximum returns, within the constraints of the first and third objectives.
- To avoid excessive short-run volatility, the policy asset mix must achieve adequate diversification.

Based upon the strategic planning analysis, staff recommends that the Board's current policy asset mix for the Basic Funds be maintained. That policy asset mix is:

Equity Assets		75.0%
Common Stocks	60.0%	
Venture Capital	2.5	
Real Estate	10.0	
Resource Funds	2.5	
Fixed Income Assets		25.0
Bonds	22.0	
Cash Equivalents	3.0	
		100.0%

The Basic Funds' policy asset mix is aggressively positioned in common stocks and venture capital, which serve as total return maximizing vehicles. Real estate and resource funds act as inflation hedges, while bonds are a deflation hedge. In addition, the non-common stock asset classes also produce meaningful diversification benefits in the total portfolio which is dominated by common stocks.

An asset class target is a diversified collection of securities within a particular asset class. It represents the set of feasible investment opportunities that best achieves the purposes for which the asset class is included in the policy asset mix. The selection of an appropriate asset class target completes the connection between the pension plan's investment objectives and policy asset mix.

In many cases, the full range of investment opportunities available in the market place to institutional investors should represent the asset class target. However, there may be specific circumstances under which the target should be restricted to a certain subset of securities within an asset class.

The following market indices are recommended as targets for the asset classes within the Basic Funds' policy asset mix:

Asset Class	Asset Class Target
o Common Stocks	o Wilshire 5000
o Bonds	o Salomon Brothers Large Pension Fund Baseline Bond Index
o Cash Equivalents	o 90-day Treasury Bills
o Real Estate	o Equitable Account #8
o Venture Capital	o First Chicago Venture Capital Index
o Resource Funds	o Portfolio of publicly held energy companies

Market timing is the short-run deviation from a policy asset mix in order to take advantage of perceived temporary over or undervaluations of particular asset classes. The potential gains from successful market timing are strikingly large. However, the potential losses from unsuccessful market timing are even greater.

Particularly for a large pension plan, such as the Basic Funds, the transactions expenses of implementing a market timing strategy could be significant. This cost consideration, when viewed in light of the highly uncertain outcome of market timing, makes such a strategy unattractive for the Basic Funds.

RECOMMENDED INVESTMENT POLICY STATEMENT: PART II

The Board desires to select a policy asset mix that is consistent with the investment objectives and risk tolerance established for the Basic Retirement Funds. Those investment objectives emphasize the securitization of the Basic Funds' pension obligations, while at the same time recognizing the cost reduction and/or benefit enhancement advantages of a high return policy. The Board views its tolerance for short-run return volatility in the Basic Funds' investment portfolio as being relatively high.

The Board has reviewed the available capital markets' risk-return historical data. The Board believes that a large common stock exposure in the policy asset mix is appropriate for the Basic Funds. However, the Board seeks to protect the Basic Funds from debilitating economic environments by holding deflation and inflation hedge assets. Additionally, the Board seeks to avoid excessive short-run return volatility by diversifying among equity and fixed income assets.

The policy asset mix established by the Board for the Basic Funds is:

Equity Assets		75.0%
Common Stocks	60.0	
Venture Capital	2.5	
Real Estate	10.0	
Resource Funds	2.5	
Fixed Income Assets		25.0
Bonds	22.0	
Cash Equivalents	3.0	
TOTAL		100.0%

The Board also desires to select asset class targets that best achieve the purposes for which each of the various asset classes are included in the policy asset mix. The asset class targets chosen by the Board for the Basic Funds are:

Asset Class	Asset Class Target
o Common Stocks	o Wilshire 5000
o Bonds	o Salomon Brothers Large Pension Fund Baseline Bond Index
o Cash Equivalents	o 90-day Treasury Bills
o Real Estate	o Equitable Account #8
o Venture Capital	o First Chicago Venture Capital Index
o Resource Funds	o Portfolio of publicly held energy companies

The Board does not view market timing as a viable option for the Basic Funds. The Board intends to alter the Basic Funds' asset mix only in the event of fundamental changes in: the Board's investment authority; the Basic Funds' investment objectives; or, the risk-return opportunities available in the capital markets.

SECTION 1: REVIEW OF PART I CONCLUSIONS

Part I of the Basic Retirement Funds' investment policy paper dealt with fund objectives and risk tolerance. Specifically, Part I identified three primary investment objectives for the Basic Funds. In order of importance, those investment objectives are:

1) Secure promised benefits.

2) Reduce employer/employee contributions and/or increase promised benefits.

3) Avoid excessive short-run volatility in portfolio returns.

Part I explained that the first and third objectives are best achieved through a "minimum risk" investment policy. But this policy also produces the lowest expected long-run returns. Conversely, the second objective is best achieved through a "maximum return" investment policy. However, this policy also results in the highest level of volatility in investment returns. Part I discussed these trade-offs between "minimum risk" and "maximum return" investment policies. The appropriate investment policy for the Basic Funds depends on the relative emphasis that the Board chooses to place on the three investment objectives.

The willingness of the Board to tolerate risk in the short-run figures prominently in its choice of an investment policy. Part I presented historical capital markets return data which demonstrated that asset class long-run returns are highly correlated with short-run risk. The implication is that the more volatility in short-run returns that the Board will accept, the higher will be the expected long-run pay-offs for the Basic Funds' investment portfolio.

The Board is unlikely to be satisfied with the significant short-run volatility inherent in an all-common stock portfolio, even though that portfolio probably would produce the greatest long-run returns. However, staff recommended in Part I that the Board continue to pursue an aggressive investment policy that incorporates a sizable equity exposure. Excessive short-run volatility can be avoided by maintaining a modest fixed income component and by diversifying among classes of equity assets (e.g., domestic and foreign common stocks, real estate, venture capital, etc.). This investment policy may result in quarters or even years of disappointing returns. Nevertheless, the financial characteristics of an active lives pension fund, such as the Basic Funds, are well-suited for an aggressive, long time horizon investment policy. If the Board is willing to view its tolerance for short-run risks as being relatively high, the long-run benefits are expected to be significant.

The goal of Part I was to formally present and prioritize the Board's investment objectives for the Basic Funds, as well as to establish the Board's attitude toward investment risk and reward. Part II's purpose is to follow-up on the concepts developed in Part I by presenting a specific set of asset mix recommendations. Part II will accomplish three tasks:

- o Recommend a policy (long-run) asset mix for the Basic Retirement Funds.
- o Specify a target for each asset class within the policy asset mix.
- o Consider the issue of market timing.

SECTION 2: POLICY ASSET MIX RECOMMENDATION

DEFINITION OF POLICY ASSET MIX

A pension plan's policy asset mix is the desired long-run allocation of plan assets among various broad asset classes. It represents that combination of asset classes that the plan sponsor believes is most consistent with the plan's investment objectives and risk tolerance.

By definition, a plan's policy asset mix is not adjusted in response to transitory market movements. It is changed only when the plan's investment objectives or risk tolerance are altered, or in the rare event that significant changes in the capital markets occur which affect the risk-return relationships between the different asset classes.

The choice of a policy asset mix is one of the most important investment decisions that a plan sponsor can make. The Board, like most plan sponsors, has focused considerable energy selecting and monitoring investment managers. But the impact of managers on the performance of the Basic Funds is dwarfed by the effects of the asset mix decision.

BRIEF HISTORICAL CAPITAL MARKETS REVIEW

The starting point for any asset allocation study is a review of historical capital markets risks and returns. The future is unlikely to mirror the past exactly. Nevertheless, there are established long-run relationships between asset classes that can be expected to hold in the future. Table 1 presents the well-known Ibbotson-Sinquefield data summarizing historical returns and risks for common stocks, bonds, cash equivalents, and inflation over the period 1926-85. [1] Figure 1 reinforces the information in Table 1 by showing the cumulative value of $1 invested in these three asset classes over the same period.

TABLE 1
Capital Markets Historical Performance
1926-1985

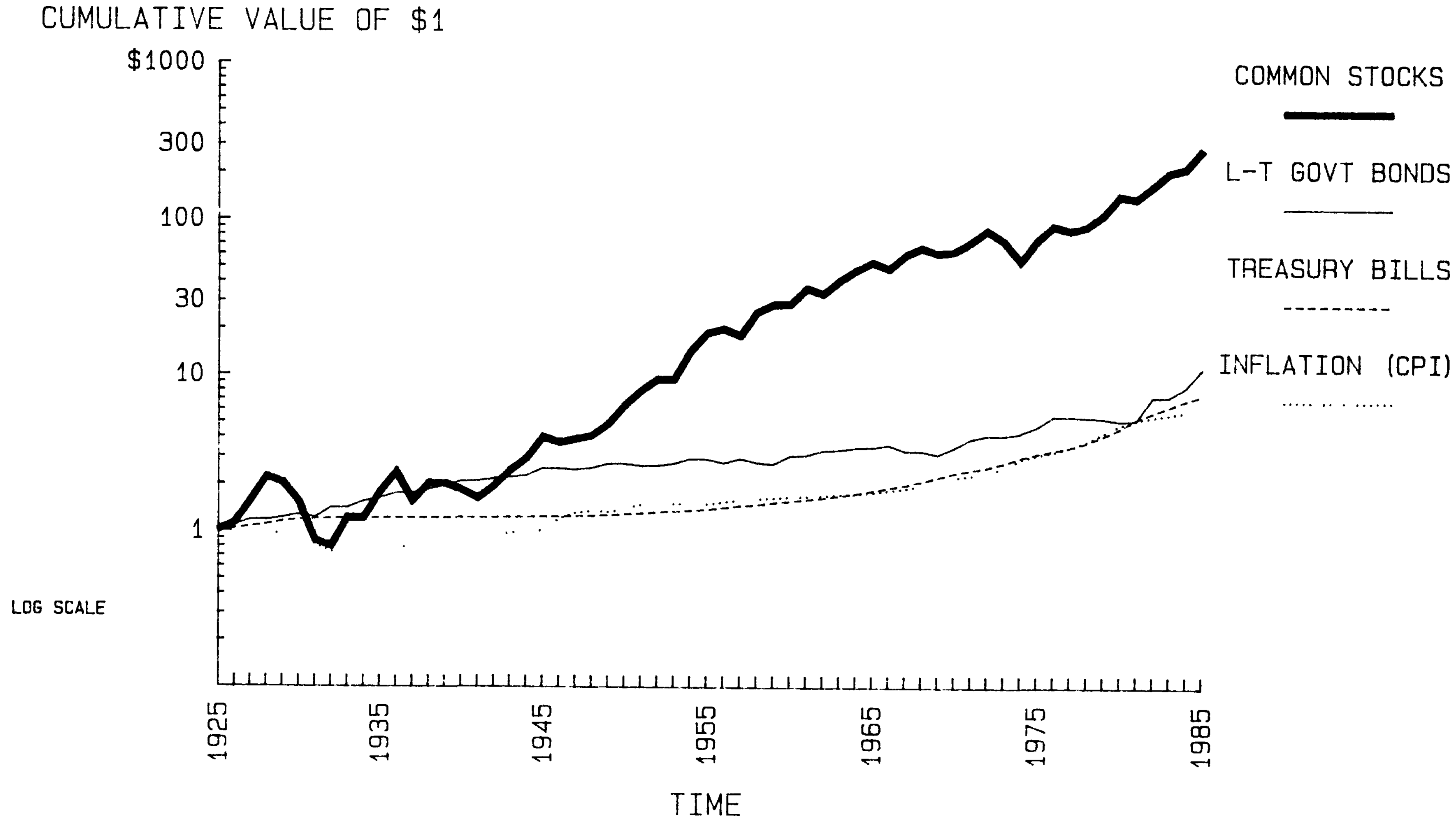
	Annual Compound Return	Annual Standard Deviation	Cumulative Value of $1 Investment
Common Stocks	9.8%	21.2%	$279.12
Long-term Govt. Bonds	4.1	8.2	11.03
U.S. Treasury Bills	3.4	3.4	7.47
Inflation	3.1	4.9	6.10

Source: Ibbotson Associates

Table 1 and Figure 1 stress concepts developed in Part I of this investment policy paper. Quite simply, common stocks have been by far the best performing asset class over the last 60 years. In fact, common stocks are the only asset class of the three analyzed that has provided a significant real (i.e., inflation-adjusted) return during the 1926-85 period. At the same time, common stocks have been the most volatile asset class, with a standard deviation of returns considerably above that of bonds or cash equivalents. [2] The implication of these historical risk-return data is that the patient investor is well-rewarded over the long-run for accepting short-run risk.

FIGURE 1

HISTORICAL CAPITAL MARKETS RETURNS
CUMULATIVE INVESTMENT VALUES
1926-1985



SOURCE: IBBOTSON ASSOCIATES

An analysis of the historical risk-return data also provides information regarding the correlation of returns among the three asset classes. Assets whose returns do not move in the same direction at the same time (i.e., exhibit low correlations) are useful in constructing portfolios that dampen return volatility. The process of combining assets whose returns are not highly correlated is referred to as diversification. Table 2 presents correlation coefficients among stocks, bonds, and cash equivalents over the 1926-85 period.

TABLE 2
Capital Markets Historical Return Correlations
Inflation-Adjusted
1926-1985

	Common Stocks	L-T Govt Bonds	U.S. T-Bills
Common Stocks	1.00	0.20	0.09
L-T Govt Bonds	0.20	1.00	0.62
T-Bills	0.09	0.62	1.00

Source: Ibbotson Associates

Table 2 shows that the returns on bonds and cash equivalents exhibit historical correlations with common stock returns considerably less than the maximum possible value of 1.0. These relationships, along with the lower volatility of bond and cash equivalent returns, imply that combined in a portfolio with common stocks, bonds and cash equivalents can reduce the volatility of the total portfolio's returns.

Unfortunately, comprehensive historical risk-return information is available only for domestic common stocks, bonds, and cash equivalents. Risk-return information on other investable asset classes is of short history and generally unreliable quality. Data on foreign securities and real estate is gradually improving in quantity and quality. To date, that data indicates that foreign securities and real estate are at least as profitable and probably as volatile as domestic common stocks. Just as importantly, returns on these asset classes appear to have fairly low correlations with domestic common stocks.

STRATEGIC PLANNING APPROACH TO POLICY ASSET MIX SELECTION

A number of approaches are commonly used by pension plans to arrive at a policy asset mix. Appendix A discusses a representative group of these methods. Of the alternative asset allocation techniques, staff believes that the most effective approach is the "strategic planning" method. [3]

The strategic planning method, in essence, is an eclectic combination of both the qualitative and quantitative asset allocation techniques discussed in Appendix A. The strategic planning method uses the intuitive concepts derived from the qualitative techniques while avoiding much of these methods' arbitrariness. Further, it employs many of the valid conclusions of the quantitative techniques, while extending the analysis past the limits of the available risk-return data.

The strategic planning approach builds a logically consistent argument for a particular policy asset mix based upon a pension plan's investment objectives, conventional investment theory, and objective observations concerning historical and expected capital markets returns and risks.

Applying the strategic planning approach to the Basic Funds, the starting point is the Basic Funds' investment objectives. Translated into asset mix requirements, those objectives are interpreted as follows:

- To secure promised benefits, the policy asset mix must avoid financial catastrophes which might result from a severe economic depression or inflation.
- To reduce pension costs and/or increase benefits, the policy asset mix must seek maximum returns, within the constraints of the first and third objectives.
- To avoid excessive short-run return volatility, the policy asset mix must achieve adequate diversification.

Consider the first asset mix requirement: Avoid financial catastrophes. A significant extended decline in the value of the Basic Funds' assets would seriously impair their ability to pay promised benefits. There are two potential causes of such a decline. The first is a severe economic depression of the magnitude of the Great Depression. The second is a hyperinflation, with consumer prices rising at double or triple digit annual rates.

In the case of an economic depression, the prospects for corporate profits would deteriorate. Common stock prices, both domestic and foreign, would plummet. The market values of real estate and resource assets would likewise decline drastically as deflation undercut the basis for their valuations.

In the case of a hyperinflation, the probable impacts on financial asset values are more complex. Bond prices would surely decline as interest rates rose. Common stock prices might increase in nominal terms, but on average would probably be unable to keep pace with inflation.

In order to meet the first asset mix requirement, the Basic Funds should hold certain assets that act as a hedge against extreme debilitating economic environments. In the case of an economic depression, high quality, long-term bonds not only will maintain their values but will appreciate in price as interest rates fall. In the case of a hyperinflation, hard assets such as real estate and resource investments can be expected to appreciate in value at a rate at least equal to the inflation rate.

Skipping ahead, consider the third asset mix requirement: Achieve adequate diversification. Excessive volatility in portfolio returns over the short-run can be discomforting, even if long-run results are successful. Volatility can be reduced by establishing a policy asset mix that is diversified. As discussed above, diversification entails holding assets whose returns are not highly correlated. Bonds and inflation-hedge assets can serve the role of diversifiers to common stocks, in addition to acting as economic hedges. Cash equivalents are also effective diversifiers (and provide the Basic Funds with necessary liquidity), although they provide a lower expected return than bonds or inflation-hedge assets.

Finally, consider the second asset mix requirement: Seek maximum returns. With bonds, inflation-hedge assets, and cash equivalents satisfying the first and third requirements, the remainder of the policy asset mix can be devoted to earning the maximum available returns. Common stocks are the most effective total return vehicles available to a large pension plan seeking maximum returns. They have historically provided superior returns. In addition, their risk characteristics are well-quantified. And finally, they offer a high degree of investment management flexibility. [4]

POLICY ASSET MIX RECOMMENDATION AND RATIONALE

How should the policy asset mix be allocated among common stocks, bonds, inflation-hedge assets, and cash equivalents? The 1983 staff report on the Basic Retirement Funds recommended, and the Board subsequently adopted, the policy asset mix shown in Table 3 and Figure 2.

TABLE 3
Basic Retirement Funds
Current Policy Asset Mix

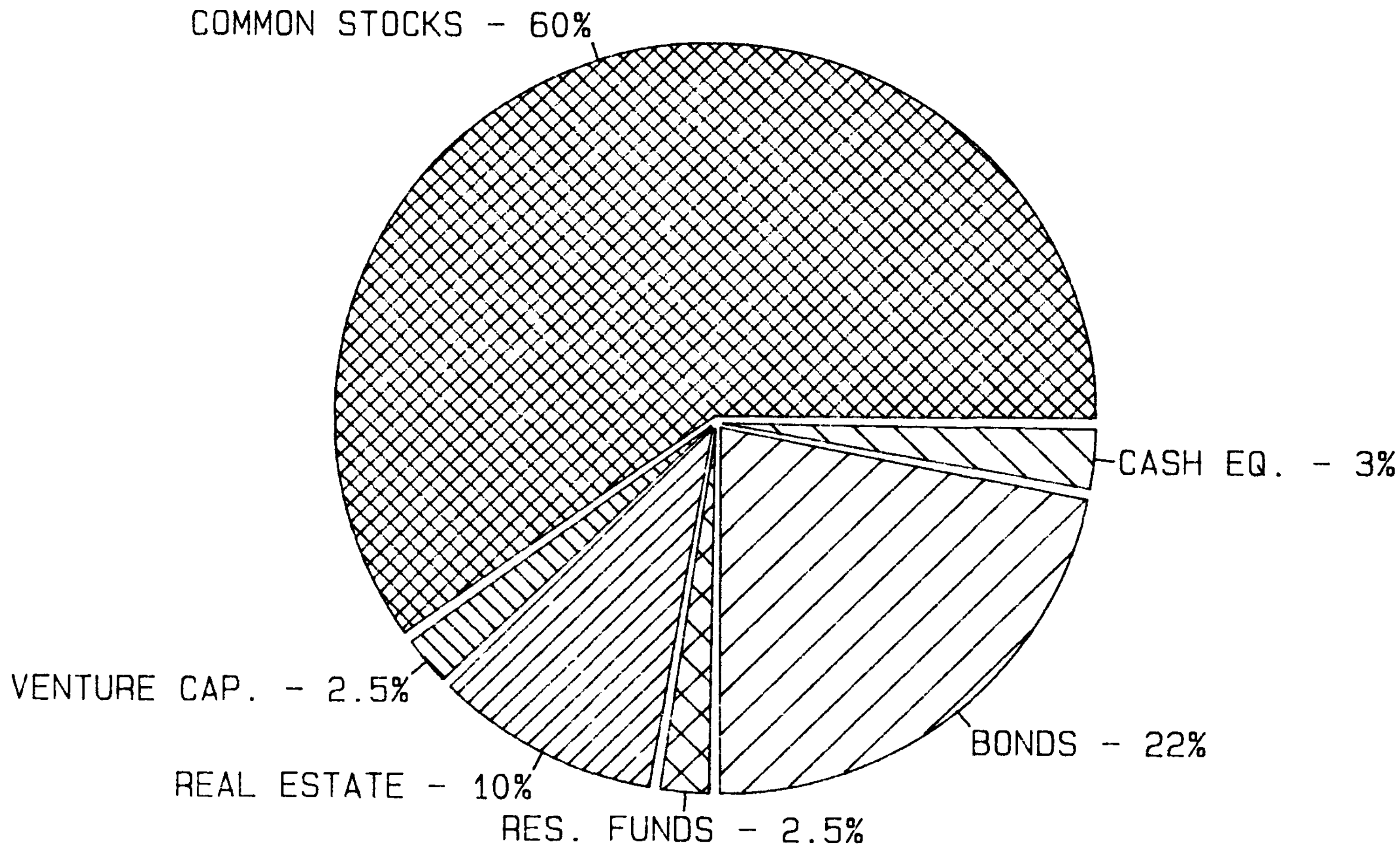
Equity Assets		75.0%
Common Stocks	60.0	
Venture Capital	2.5	
Real Estate	10.0	
Resource Funds	2.5	
Fixed Income Assets		25.0
Bonds	22.0	
Cash Equivalents	3.0	
TOTAL		100.0%

The strategic planning method supplies the rationale for these policy allocations. With respect to bonds, several considerations underlie the assigned 22% policy weight. First, in a severe deflation the bond component is expected to appreciate significantly in value. With a 22% weight in the total portfolio, such an increase would offset a sizable portion of the potentially large declines in equity asset values. Second, the bond allocation is expected to add meaningfully to

FIGURE 2

CURRENT POLICY ASSET MIX

BASIC RETIREMENT FUNDS



POLICY ASSET MIX

the diversification of the total portfolio, helping to counter the short-run volatility of the large equity component. (Assuming normal asset class risk-return relationships and a 5-10 year time horizon, most quantitative asset allocation models generate approximately a 20-30% recommended weighting in fixed income assets.) Finally, state law permits no more that 75% of the total portfolio to be invested in equity assets. The combined 25% bond and cash equivalents allocation satisfies that restriction.

Because cash equivalents are the lowest expected return asset class, their allocation in the policy asset mix is held to a minimal 3%. This allocation is the smallest that can be maintained and still provide the Basic Funds with adequate liquidity.

Real estate and resource funds are assigned a combined 12.5% policy allocation. Given the uncertain response of equity financial asset values to an environment of high inflation, the inflation-hedge allocation in the policy asset mix is somewhat arbitrary. However, presuming that real estate and resource funds do appreciate in value along with inflation, their allocations are large enough to significantly offset losses on the other components of the total portfolio. Further, the inflation-hedge allocation is also sufficiently large to meaningfully contribute to total portfolio diversification.

With the economic hedge and diversification allocations established, the remainder of the portfolio is allocated to total return assets, specifically common stocks and venture capital. [5] The recommended policy asset mix is aggressive in the sense that it has a sizable common stock component. This large allocation is consistent with the Board's relatively high risk tolerance and desire to pursue a high return investment policy for the Basic Funds.

Given existing legislative investment authority, staff recommends that the Basic Funds' current policy asset mix, described above, not be altered. Staff believes that this policy asset mix has effectively satisfied, and will continue to satisfy, the Basic Funds' investment objectives. In the absence of important modifications of those objectives or fundamental changes in the capital markets, staff expects that this asset mix will prove viable for the foreseeable future. [6]

EFFECT OF POTENTIAL NEW LEGISLATIVE AUTHORITY

The Board has recently proposed legislation that would expand its investment authority. Most importantly, the proposed new authority would permit investments in foreign securities. It would also raise the limit on investments in alternative equity assets (defined in statute as real estate, venture capital, resource funds, and, prospectively, foreign securities) to 35% of the total portfolio from the current 20%. Further, it would increase the upper limit on equity investments to 85% of the total portfolio. As of the date of this report, the status of the Board's legislation was undecided.

If the expanded investment authority should be approved by the Legislature, staff would modify its policy asset mix recommendations slightly. Specifically, staff would propose the policy asset mix shown in Table 4 and Figure 3.

TABLE 4
Basic Retirement Funds
Proposed Policy Asset Mix
Contingent Upon Legislative Approval

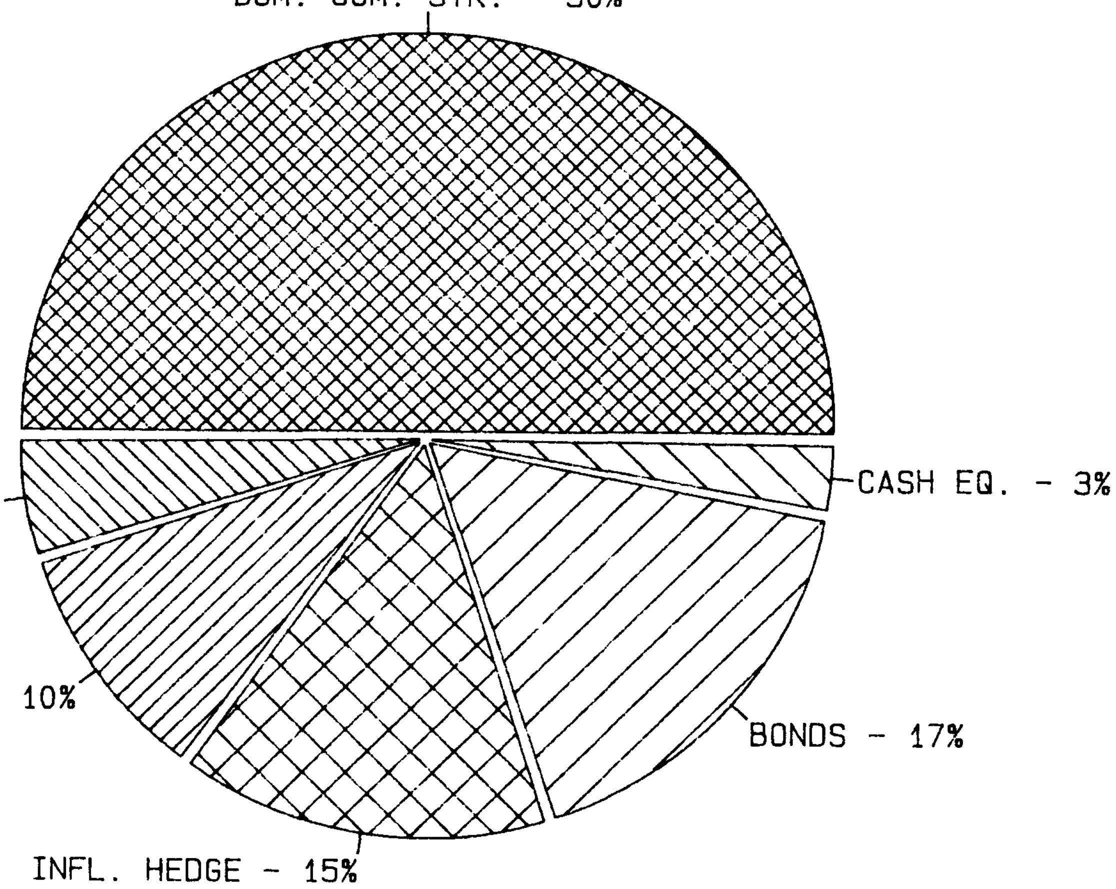
Equity Assets		80.0%
Domestic Common Stocks	50.0	
Foreign Common Stocks	10.0	
Venture Capital	5.0	
Real Estate, Resource Funds	15.0	
Fixed Income Assets		20.0%
Domestic Bonds	17.0	
Cash Equivalents	3.0	
TOTAL		100.0%

The opportunity to invest in foreign securities offers additional diversification opportunities to the Board. Staff recommends reducing the policy allocation to domestic common stocks to accommodate the foreign common stock component. Staff also recommends expanding the inflation-hedge and venture capital allocations modestly. As a net result, staff recommends a total equity asset policy weight five percentage points higher than currently targeted. This larger equity allocation will offer higher expected long-run returns. But because of the added diversification characteristics of foreign common stocks, the short-run volatility of the total portfolio is not expected to be adversely affected.

FIGURE 3

PROPOSED POLICY ASSET MIX

CONTINGENT ON NEW INVESTMENT AUTHORITY
BASIC RETIREMENT FUNDS



POLICY ASSET MIX

INFLATION HEDGE COMPOSED OF
REAL ESTATE AND RESOURCE FUNDS

SECTION 3: ASSET CLASS TARGETS

DEFINITION OF AN ASSET CLASS TARGET

A plan sponsor should do more than simply specify a policy asset mix. If a selected policy asset mix is to be fully consistent with the pension plan's investment objectives and risk tolerance, appropriate asset class targets also must be established.

An asset class target is a diversified collection of securities within a particular asset class. It represents the set of feasible investment opportunities that the plan sponsor believes best achieve the purposes for which the asset class is included in the policy asset mix. The plan's investments in the asset class, in aggregate, should reflect the risk-return characteristics of the selected asset class target.

Ignoring the specific circumstances of a particular pension plan, the most appropriate asset class targets are broad market indices for those asset classes comprising the plan's policy asset mix (e.g., the Wilshire 5000 for domestic common stocks, the Salomon Broad Investment-Grade Bond Index for domestic bonds). These market indices represent the full range of investment opportunities within the asset classes available to institutional investors. However, there may be situations in which the plan sponsor should restrict the composition of an asset class target. There are four primary target-restricting cases:

- An asset class is included in the policy asset mix for purposes other than total return maximization.

- The financial nature of the plan sponsor's business makes it desirable to exclude certain types of securities within an asset class.
- Statutory or regulatory requirements prohibit ownership of certain securities within an asset class.
- The plan sponsor perceives certain permanent investment opportunities within an asset class.

In the first case, the plan sponsor includes certain asset classes in the policy asset mix for reasons other than producing the maximum expected return on total plan investments. The plan sponsor should limit the securities held in such a special purpose asset class to those consistent with the desired purpose. For example, if bonds are included in the policy asset mix as a deflation hedge, it makes no sense to own low-rated bonds that have a high probability of default in the event of an economic depression, even if the low-rated bonds earn higher returns under normal economic conditions. [7]

In the second case, the plan sponsor wishes to avoid certain securities whose returns are highly correlated with the plan sponsor's economic prospects. For example, corporations should not own large positions of their own stock in their employees' pension plans. In periods when the corporation's profit outlook is poor, its stock will also perform poorly, detracting from pension plan performance at a financially inappropriate time.

In the third case, a pension plan is prohibited outright from owning particular types of securities. For example, many public pension plans operate under legal lists which permit ownership of only certain specified securities. Securities not on these legal lists are ineligible for inclusion in the plans' investment portfolios.

In the fourth case, the plan sponsor believes that certain persistent investment opportunities exist within an asset class. In that case, the plan sponsor may wish to concentrate investments within the asset class in those opportunities. For example, it is well-documented that over the last 60 years small capitalization stocks have outperformed large capitalization stocks. A plan sponsor might wish to permanently emphasize small capitalization stocks in the plan's common stock component.

In each of these four situations, the decision to limit the types of securities held in a particular asset class should be reflected in the target for that asset class. By doing so, the plan's investment opportunities are reconciled with its policy asset mix.

BASIC FUNDS ASSET CLASS TARGET RECOMMENDATIONS

Staff recommends the the market indices listed in Table 5 be designated as asset class targets for the Basic Funds' policy asset mix. A description of the rationale behind each of these asset class target recommendations is provided in Appendix C.

TABLE 5
Basic Retirement Funds
Policy Asset Mix
Recommended Asset Class Targets

Asset Class	Asset Class Target
o Domestic Common Stocks	o Wilshire 5000
o Bonds	o Salomon Brothers Large Pension Fund Baseline Bond Index
o Cash Equivalents	o 90-day Treasury Bills
o Real Estate	o Equitable Account #8
o Venture Capital	o First Chicago Venture Capital Index
o Resource Funds	o Portfolio of publicly traded energy companies

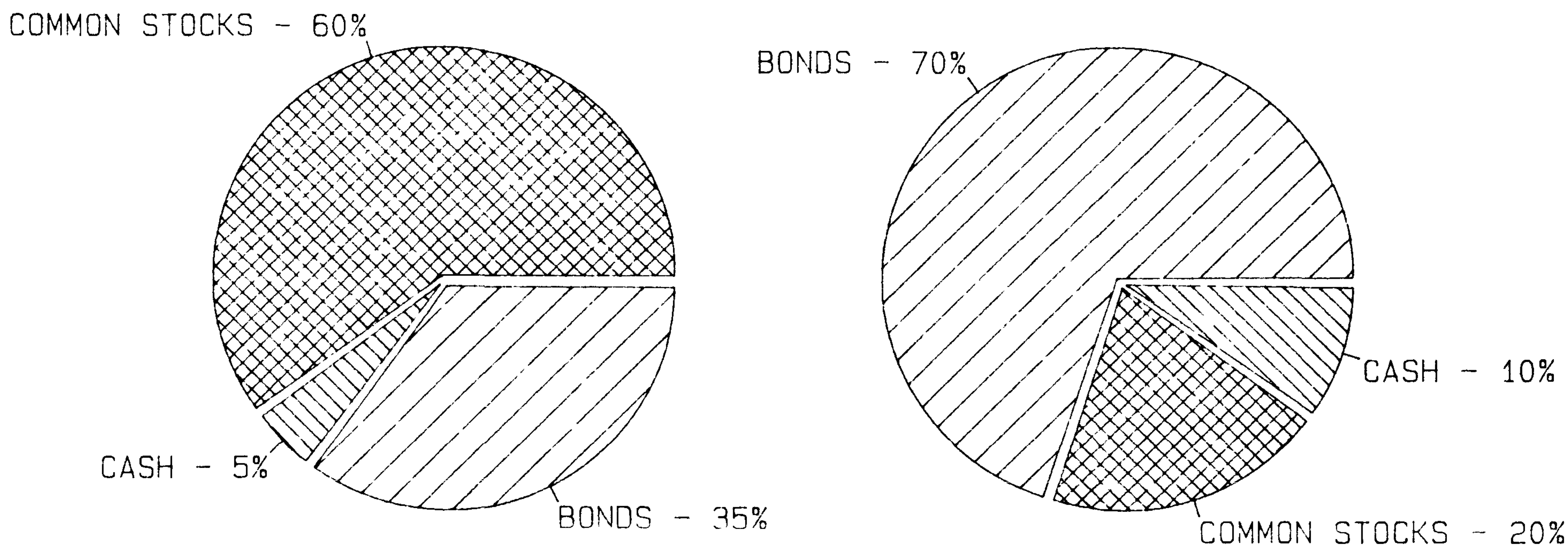
SECTION 4: MARKET TIMING

POLICY ASSET MIX VERSUS TACTICAL ASSET MIX

It is important to distinguish between a pension plan's <u>policy (long-run) asset mix</u> and its potentially different <u>tactical (short-run) asset mix</u>. As defined in Section 2, a pension plan's policy asset mix represents that combination of asset classes best-suited to satisfy the plan's investment objectives and risk tolerance. The policy asset mix is a long-run equilibrium concept. It assumes that "normal" risk-return relationships between asset classes exist. The policy asset mix expresses no opinion as to whether current market prices are out-of-line relative to "fair" values.

Conversely, a pension plan's tactical asset mix reflects the plan sponsor's (or investment managers') perceptions as to the current attractiveness of available asset classes. For example, consider a hypothetical pension plan's policy asset mix and its current tactical asset mix, as illustrated in Figure 4. The plan's policy is to invest 60% of its assets in stocks, 35% in bonds, and 5% in cash equivalents. This is the asset mix that the plan would hold if the plan sponsor believed that stocks, bonds, and cash equivalents were in-line with their normal relative values. However, the hypothetical plan sponsor currently believes stocks to be significantly overvalued relative to the other two asset classes. As a result, the plan's tactical asset mix is 20% stocks, 70% bonds, and 10% cash equivalents. If stock prices decline in the short-run as the plan sponsor expects, thereby removing the perceived overvaluation, the tactical asset mix will be adjusted back toward the policy asset mix.

FIGURE 4
HYPOTHETICAL PENSION PLAN
POLICY VS. TACTICAL ASSET MIX



POLICY ASSET MIX

TACTICAL ASSET MIX

Changes in tactical asset mix caused by perceived shifts in asset class relative values are referred to as market timing. Market timing decisions do not affect the pension plan's policy asset mix. Market timing is a short-run strategy that attempts to add value to the returns produced by the long-run strategy incorporated in the policy asset mix.

Most pension plans do not pursue market timing. There are a number of reasons for this stance and they are discussed at length below. If a pension plan does not utilize market timing, then by definition there is no difference between its policy and tactical asset mixes. In the past, the Board has not attempted market timing for the Basic Funds. Over the last five years, the Board has maintained a essentially constant allocation to stocks, bonds, cash equivalents, and alternative equity assets.

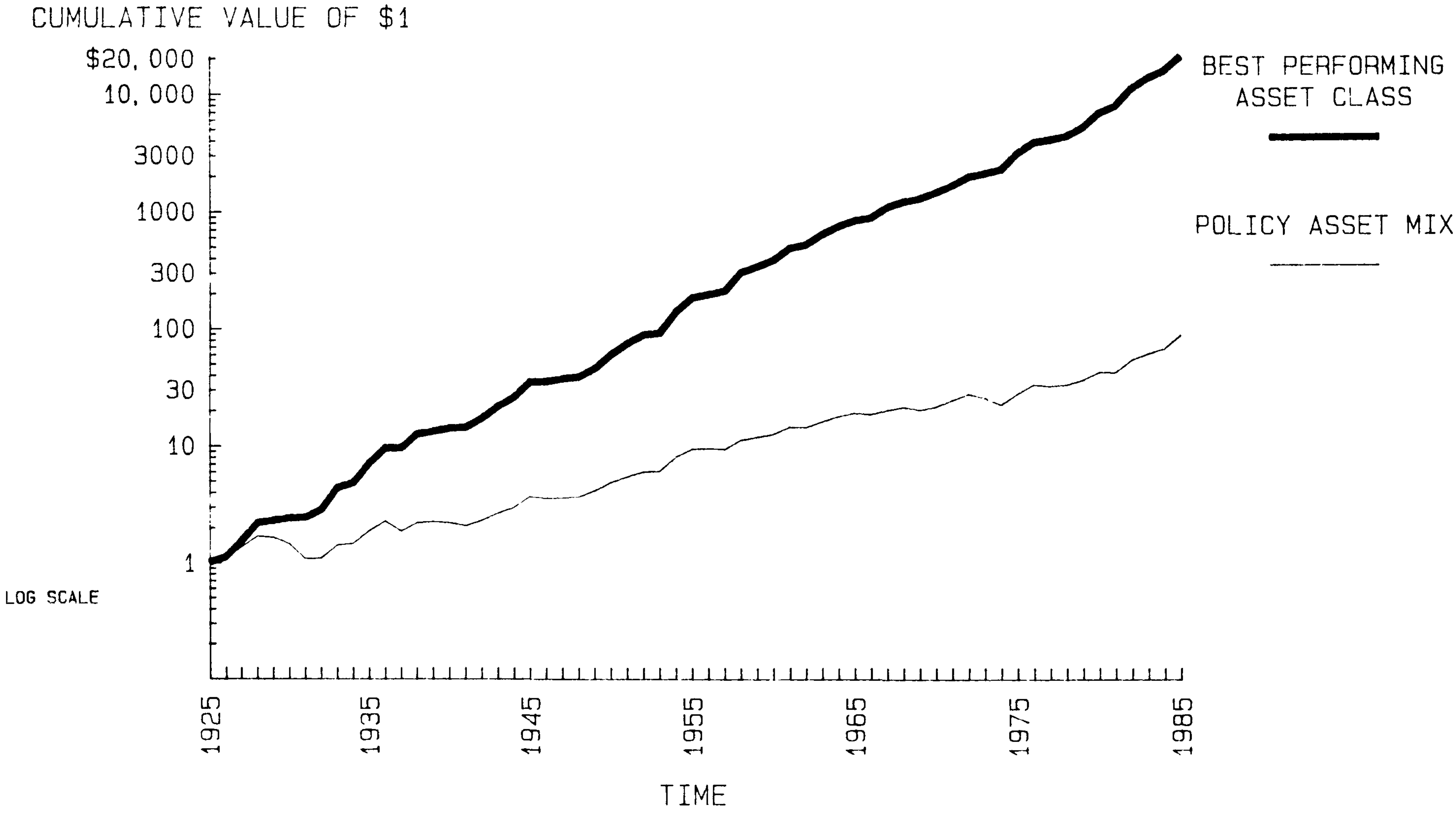
ATTRACTIONS OF MARKET TIMING

In hindsight, market timing is always a seductively attractive option. As discussed, the asset mix decision has an overwhelming impact on the performance of a pension plan. Therefore, successfully anticipating relative movements in the market values of the various asset classes could greatly enhance the returns that a pension plan could earn compared to merely following its constant policy asset mix. [8] Figure 5 illustrates the potential value-added from successful market timing. Figure 5 plots the cumulative value of an investment in the best performing asset class each year since 1926. It is assumed that annually the plan sponsor successfully anticipates which asset class will perform best that year and shifts all of the plan's investments into that asset class. Also shown is the cumulative value

FIGURE 5

POTENTIAL BENEFITS OF SUCCESSFUL MARKET TIMING

BEST PERFORMING ASSET CLASS VS. POLICY ASSET MIX



SOURCE: IBBOTSON ASSOCIATES

of an investment in a policy asset mix composed of 60% stocks, 35% bonds, and 5% cash equivalents. One dollar initially invested in the best performing asset class grows to over $20,600 from 1926-85, or a 17.7% average annual compounded return. One dollar initially invested in the 60/35/5 policy asset mix grows over 60 years to $101.98, or a 7.9% average annual compounded return. The superior performance of successful market timing is striking, outperforming the policy asset mix by almost 10 percentage points per year on average.

The example in Figure 5 is unrealistic in that omniscience is not an attribute possessed by any plan sponsor or investment manager. Further, no pension plan would ever shift all of its investments back and forth among asset classes. In addition, transactions costs are not included in the analysis. Nevertheless, if a plan sponsor could forecast the best performing asset class with some level of skill, the potential for added returns is significant. This thought is especially appealing in today's investment environment when stock prices have reached record highs and the most logical path for stock prices would seem to be down.

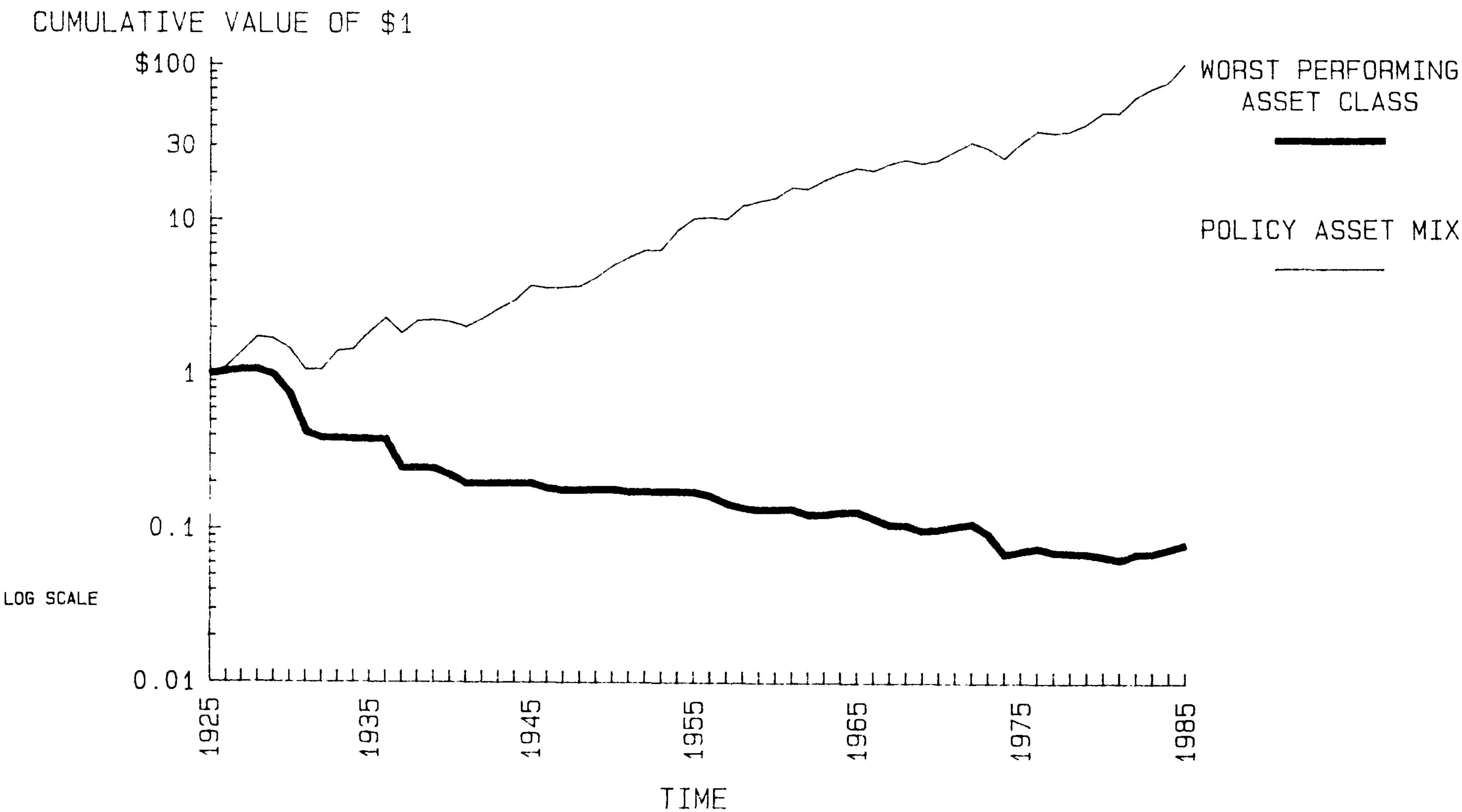
THE CASE AGAINST MARKET TIMING

Despite the apparent attractiveness of market timing, the case against short-run shifts in asset mix is compelling. Figure 6 provides insights into the pitfalls of market timing. As opposed to Figure 5, Figure 6 graphs the cumulative performance of an investment in the worst (instead of the best) performing asset class over the 1926-85 period. Again, the assumption is made that the plan sponsor has perfect foresight, but now each year perversely shifts all of the plan's assets into the upcoming year's worst performing asset class.

FIGURE 6

POTENTIAL COSTS OF UNSUCCESSFUL MARKET TIMING

WORST PERFORMING ASSET CLASS VS POLICY ASSET MIX



SOURCE: IBBOTSON ASSOCIATES

One dollar initially invested in the worst performing asset class shrinks to $.08 during the 1926-85 period, or a -4.1% average annual compounded return. Thus, the worst performing asset class strategy underperformed the 60/35/5 policy asset mix by 12 percentage points per year.

Using the policy asset mix strategy as a base for comparison, the ratio of inferior returns under the worst-case strategy to superior returns under the best case strategy is 1.2 times. The implication of this simple analysis is that the maximum downside risk of market timing is greater than the maximum upside rewards. The risks to poor market timing are greater than the rewards because the policy asset mix used as a benchmark already emphasizes the highest return asset, common stocks. Not being invested at all in common stocks when they perform relatively well is expensive compared to merely increasing the exposure to common stocks in those same periods.

A second important argument against market timing is the observed tendency of the stock market to make abrupt and short-lived moves at important turning points. While common stocks have significantly outperformed bonds and cash equivalents over the last 60 years, the bulk of those superior returns can be found in a small number of fairly short time periods.

As a result, the odds are heavily stacked against the market timer. A plan sponsor missing just a few key quarters of strong market performance would have found the pension plan's performance quite disappointing over the last twenty years. In fact, a market timing plan sponsor who is right 50% of the time, over a long interval, will almost certainly produce returns inferior to those of a constant asset mix tilted toward common stocks. It has been estimated that a market timing strategy must be correct over 75% of the time in order to justify the cost of missed opportunities. [9] This is a record that few, if any, plan sponsors or investment managers can claim.

The last major argument against market timing is that short-run shifts in asset mix can be very expensive for a large pension plan, such as the Basic Funds. The logistics of the process are awesome. For a market timing strategy to have any significant impact on a pension plan's performance, it should effect at a minimum roughly 20% of the plan's assets. For large pension plans, this 20% figure translates into a very sizable amount of dollars being moved back and forth between asset classes.

The Basic Funds assets total almost $5 billion in market value. Therefore, a market timing segment of the Basic Funds would have to be at least $1 billion in order to be a relevant influence on portfolio returns. Presumably, the market timing role would be assigned to a single external investment manager. (Selecting more than one market timing manager would defeat the purpose of the strategy if the managers were to pursue divergent tactical asset mixes.) Therefore, the Board would be entrusting considerably more assets to a single active manager than it has chosen to do so up until now.

Further, the transactions costs of implementing a $1 billion market timing strategy undoubtably would be large. Turnover in market timing strategies usually exceeds 100% per year. If the market timing manager shifted between stocks, bonds, and cash equivalents directly, the ensuing trading costs might be prohibitive. The use of financial futures could significantly reduce transactions costs. Even then, however, the market impact of $1 billion trades in financial futures would be material.

STAFF MARKET TIMING RECOMMENDATIONS

Staff recommends that the Board not implement a market timing strategy for the Basic Funds. Most importantly, staff believes that the sheer size of the Basic Funds makes market timing an expensive and impractical strategy. Further, staff believes that the odds of successful market timing are too small to justify such a strategy, given that the cost of ineffective market timing is significant.

FOOTNOTES

1. See Reference [1] for more information.

2. These historical results clearly are not coincidental. Common stocks represent corporate ownership and, therefore, are much more sensitive to economic events than are bonds and cash equivalentrs which are high quality debt investments. Unless the United States' free market economy is severely disrupted, these historical risk-return relationships can be expected to hold into the future as well.

3. The term "strategic planning" was coined by Lewis Bailey Associates. See Reference [2] for further discussion.

4. See Appendix B for an analysis of the expected distribution of returns under various asset mixes.

5. Common stocks receive considerably more weight than venture capital due to the relative illiquidity and immaturity of the venture capital market.

6. This paper does not address the issue of rebalancing the portfolio's actual asset mix periodically back to the policy asset mix. Part III of the investment policy paper will deal with this issue.

7. Low-rated, or junk bonds, may be very desirable investments. But their financial characteristics are much more closely aligned to common stocks than investment grade bonds. Thus low-rated bonds should serve as equity substitutes rather than deflation-hedge instruments.

8. However, it must be noted that an investor with perfect foresight would earn considerably higher returns through stock selection

than asset mix selection. The best performing stock each year by far exceeds the returns on the best performing asset class.

9. See Reference [3] for more information.

REFERENCES

1. Ibbotson Associates, Stocks, Bonds, Bills, and Inflation: 1986 Yearbook, 1986.

2. Lewis, Bailey Associates, Investment Planning Papers, 1983.

3. Jeffery, Robert H., "The Folly of Stock Market Timing," Harvard Business Review, July - August, 1984.

APPENDIX A

ALTERNATIVE APPROCHES TO POLICY ASSET MIX SELECTION

How might the Board go about determining an appropriate policy asset mix for the Basic Retirement Funds? There are a number of approaches commonly used by pension plans. They can be classified into three broad categories: Qualitative, quantitative, and eclectic. A representative list of methods within these three main categories is shown in Table A1.

TABLE A1
ALTERNATIVE ASSET MIX SELECTION METHODS

A. Qualitative Techniques
   1. Investor consensus
   2. Experiential
   3. Market capitalization

B. Quantitative Techniques
   1. Minimum return target
   2. Liability simulation
   3. Efficient frontier
   4. Utility maximization

C. Eclectic Techniques
   1. Strategic planning

Qualitative techniques require only a minimal knowledge of both the capital markets and the particular pension plan under consideration. These techniques basically operate on a rule-of-thumb basis. Their simplicity and ease of application are their chief positive attributes. Quantitative techniques are more complex. They require a formal specification of the risk-return relationships between various asset classes. This information is processed mathematically to arrive at the appropriate policy asset mix. Finally, eclectic techniques combine elements of both the qualitative and quantitative techniques, benefitting from the insights produced by both approaches. A brief description of each technique listed in Table A1 follows.

INVESTOR CONSENSUS

This approach is the rather unsophisticated process of merely "following the herd." It assumes that the asset allocation strategy of the average investor is an appropriate and reasonable one for the pension plan under consideration. The advantage of this approach lies in its simplicity as well as the comfort level that it provides. No analysis of plan investment objectives, forecasts of asset class risks and returns, or complicated quantitative methods are required. Further, plan sponsors often attain a certain sense of confidence by taking positions similar to those of other pension plans. Its drawbacks similarly are related to its simplicity. No consideration is given to the particular needs of the plan. Nor is any attempt made to improve decisionmaking by applying quantitative techniques. Further, valuable information relating to capital markets opportunities and risks facing the plan are likely to be ignored.

EXPERIENTIAL

Utilizing the wisdom and intuitive insights of seasoned investors within or outside the pension plan is referred to as the experiential method. These individuals possess the accumulated investment experience of years of professional practice. Thus, they are assumed to be able to identify the proper asset mix based upon their knowledge of the capital markets and their understanding of the investment objectives of the fund. Ideally, the experienced investor should be able to qualitatively incorporate much of the quantitative techniques described below into his/her decisionmaking. By adding his/her own intuitive "feel" for the markets the appropriate policy asset mix can be determined. Unfortunately, individuals possessing such vast knowledge are rare and their wisdom is unlikely to be made available directly to a pension fund. Paid consultants may provide some of this experienced advice, but that advice is often very conventional and not particularly valuable.

MARKET CAPITALIZATION

Another approach to policy asset mix selection is simply to hold the desired asset classes in the same proportion those asset classes represent of the capital markets' total value. For example, if common stocks make up 50% of the United States' institutionally-investable wealth, the plan sponsor would assign common stocks a 50% weighting in the policy asset mix. This method has some grounding in investment theory, which argues that investors should hold a portfolio composed of assets weighted in proportion to their market values. However, like the investor consensus method, the market capitalization method ignores both the investment objectives of the pension plan and opportunities and risks existing in the capital markets.

MINIMUM RETURN TARGET

This method sets a desired rate of return objective. The mix of assets which minimizes the probability of failing to achieve this target return is calculated. This approach particularly is useful in situations where minimum real rate of return targets represent an integral part of the pension plan's objectives. The major difficulty associated with this approach is that often a wide range of asset mixes will minimize the probability of attaining a certain target return. The range may be so large as to be of little value in determining an appropriate policy asset mix.

LIABILITY SIMULATION

It is possible to consider the interaction of alternative asset mixes and projected liabilities of the pension plan. In this way the liability simulation method integrates the investment process with the plan's responsibility to provide an adequate level of funding at the lowest possible cost. The liability simulation method usually is presented in terms of the probability of achieving a certain contribution-to-payroll or funded liability ratio. The advantage of this approach is that it deals not only with the asset side of pension policy equation, but the liability side as well. It considers the complete financial well-being of the plan. A drawback to this method is that it adds an additional layer of estimated inputs in the form of actuarial data, thus further complicating the analysis.

UTILITY MAXIMIZATION

This approach attempts to quantitatively define the plan sponsor's risk-return preferences. Combined with a specification of the plan sponsor's rate of return objectives, it is possible to determine the policy asset mix which produces the greatest level of expected satisfaction or utility for the plan sponsor. The primary attribute of this approach is that it necessitates a formal analysis of the plan sponsor's willingness to bear risk. The major disadvantage is that it may be difficult to specify the risk-return preferences of a pension plan with a diverse group of trustees and constituencies.

STRATEGIC PLANNING

Described in Section 2.

APPENDIX B

SIMULATED RESULTS OF VARIOUS POLICY ASSET MIXES

The strategic planning method was utilized in Section 2 to develop a policy asset mix for the Basic Funds. The recommended policy asset mix is designed to produce maximum returns for the Basic Funds, given the constraints of protecting against debilitating economic environments and avoiding excessive short-run return volatility. Left unanswered has been the question: What range of portfolio returns can be expected from the recommended policy asset mix and alternative asset mixes? That question is best answered by a computer model that simulates portfolio returns given assumptions concerning asset classes' expected risks and returns. In its analysis, staff used an asset mix simulator supplied by Richards & Tierney (R&T), the Board's consultant. The R&T model requires the user to provide expectational values for a number of financial and economic variables. The assumptions used by staff are shown in Tables B1-B3.

TABLE B1
Expected Asset Class Returns and Standard Deviations

Asset Class	Expected Real Return	Expected Standard Deviation
Common Stocks	6.0%	20.0%
Bonds	2.0	10.0
Real Estate	3.0	4.0

TABLE B2
Expected Asset Class Correlations

	Common Stocks	Bonds	Real Estate	Suprise Inflation
Common Stocks	1.00	0.65	0.00	-0.20
Bonds	0.65	1.00	0.00	-0.40
Real Estate	0.00	0.00	1.00	0.20
Surprise Inflation	-0.20	-0.40	0.20	1.00

TABLE 3
Expected Values for Other Variables

Current short term interest rate	= 6.0%
Cash or surprise inflation standard deviation	= 2.0%
Current inflation rate	= 5.0%
Long-term imbedded inflation rate	= 5.0%

The expectational values provided by staff are relatively conventional. The only serious questions arise regarding real estate expected returns and standard deviations. There are two possible approaches. In the first case, data from commingled real estate funds can be used. Due to the smoothing effect of real estate appraisals, this approach produces surprisingly low standard deviations of returns. The alternative is to use data from the few limited studies of actual real estate transactions that have been conducted. These studies indicate considerably higher standard deviations of returns. Staff chose the former approach largely due to the fact that all of the Board's real estate investments are in commingled funds.

Using the expectational values shown in Tables B1-B3, staff applied the R&T asset simulator to three different policy asset mixes:

1) 100% common stocks
2) 60% stocks, 35% bonds, 5% cash equivalents

3) 63% stocks, 22% bonds, 3% cash equivalents
12% real estate

The three asset mixes were simulated over a ten year period. For each year 200 simulated outcomes were produced. The distribution of outcomes for each of the asset mixes for one year and ten years are shown in Table B4 and Figures B1 and B2.

TABLE B4
Alternative Asset Mixes
Simulated Portfolio Returns: One and Ten Years

ONE YEAR

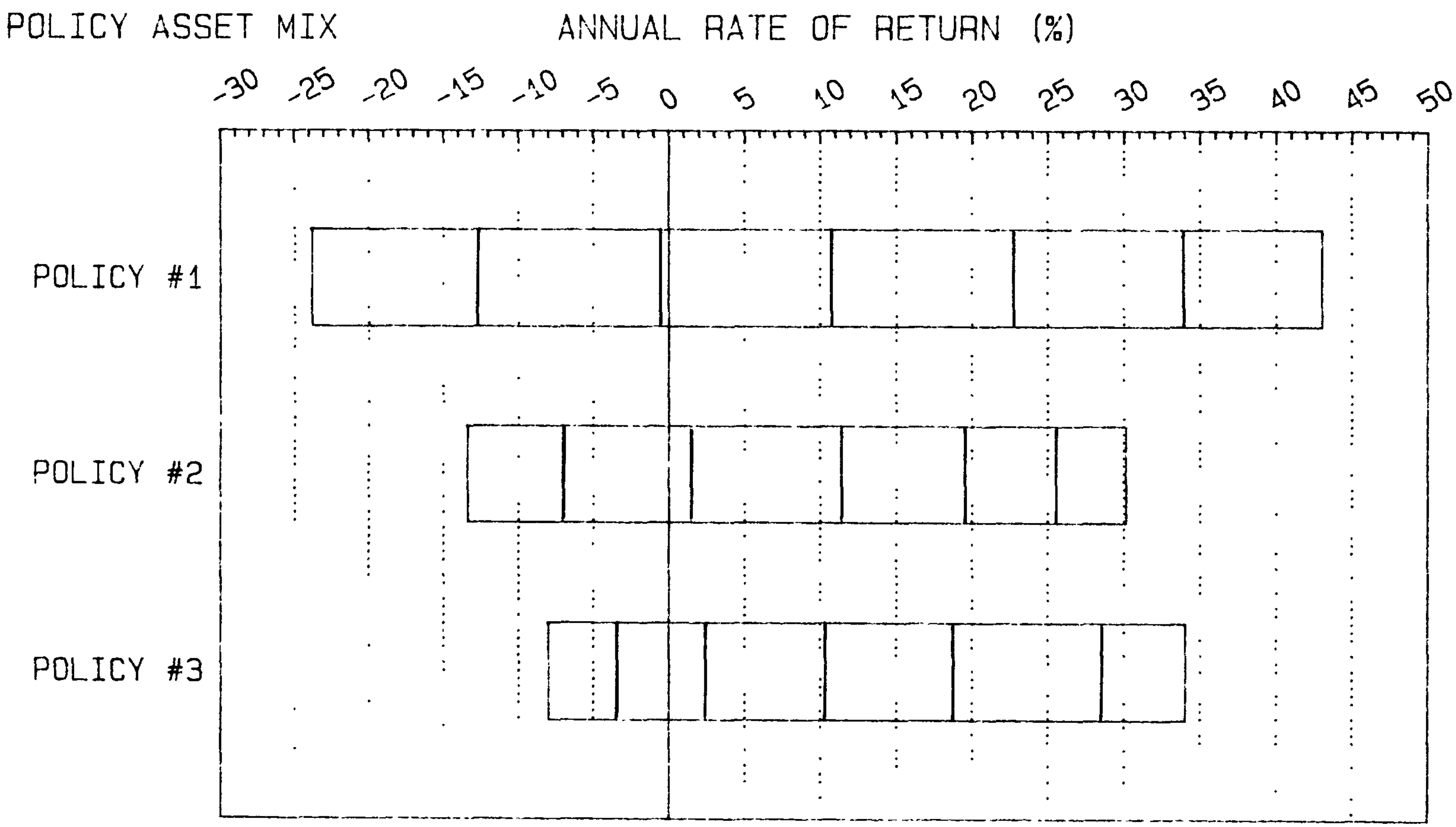
Percentile	100% Common Stocks	60% CS 35% BD 5% CE	63% CS 22% BD 3% CE 12% RE
Minimum	-39.3%	-35.5%	-28.8%
5	-23.9	-13.5	- 8.1
10	-12.6	-7.2	- 3.6
25	-0.7	1.2	2.2
50	10.6	11.1	10.1
75	22.7	19.3	18.5
90	33.9	26.3	28.5
95	43.1	30.2	32.1
Maximum	55.2	37.1	48.0

TEN YEARS
(Annualized)

Percentile	100% Common Stocks	60% CS 35% BD 5% CE	63% CS 22% BD 3% CE 12% RE
Minimum	-4.9%	-3.5%	-4.4%
5	-1.2	-0.1	1.2
10	1.8	2.8	3.0
25	4.9	5.6	5.8
50	8.5	8.4	8.7
75	13.4	11.5	11.6
90	16.8	15.1	14.9
95	18.3	17.6	16.5
Maximum	23.4	20.3	20.4

This analysis produces a number of interesting observations. Beginning with the one year results, first, as expected the 100%

FIGURE B1
ALTERNATIVE ASSET MIXES: SIMULATED RETURNS
ONE YEAR HOLDING PERIOD



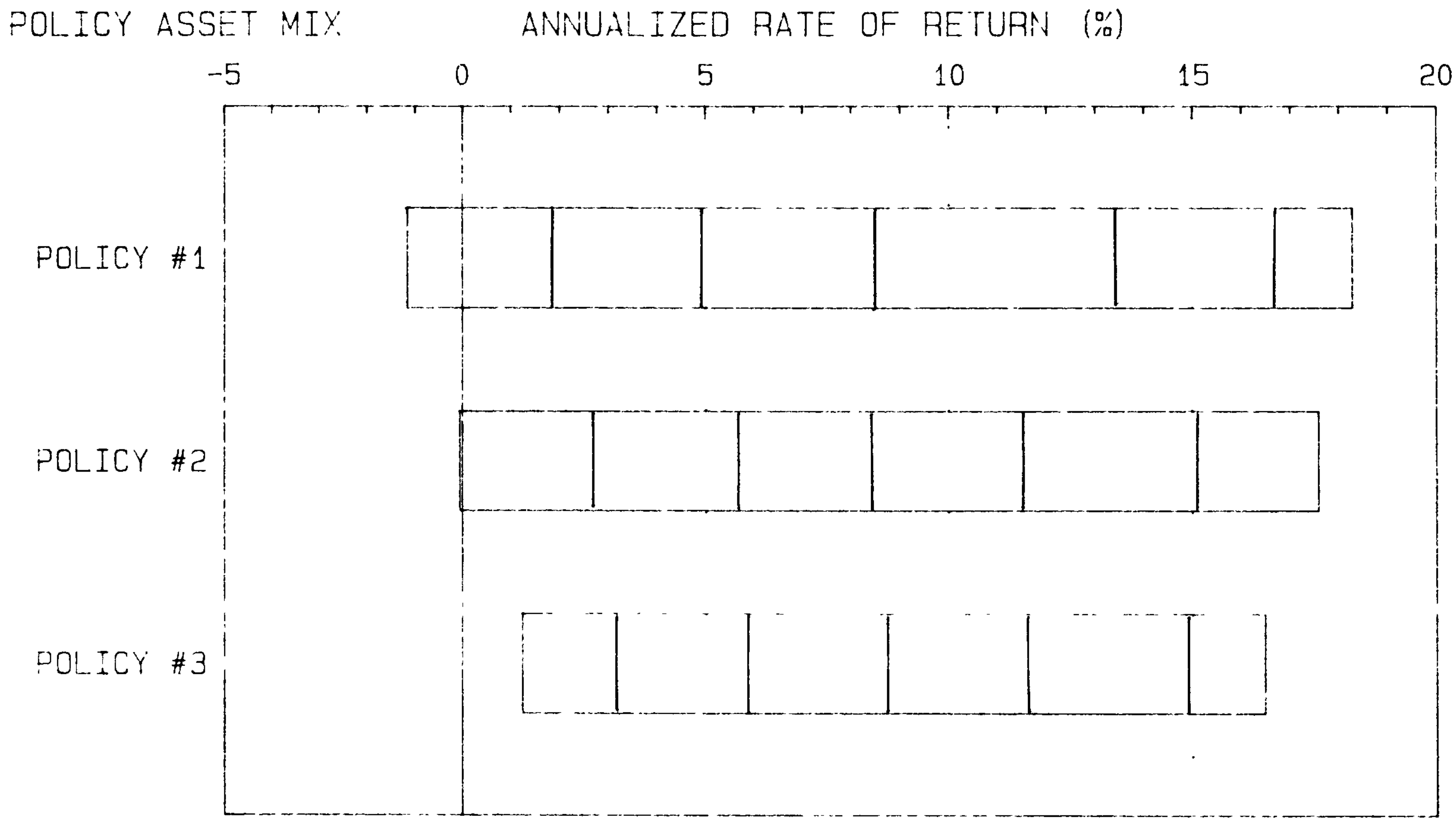
SOURCE: RICHARDS & TIERNEY

RANGE ENDPOINTS REPRESENT
5TH AND 95TH PERCENTILES

FIGURE B2

ALTERNATIVE ASSET MIXES: SIMULATED RETURNS

TEN YEAR HOLDING PERIOD



REBALANCED ANNUALLY

SOURCE: RICHARDS & TIERNEY

RANGE ENDPOINTS REPRESENT
5TH AND 95TH PERCENTILES

common stock asset mix is quite volatile in the short-run relative to the other two asset mixes. For the one year period, the range of possible outcomes is much more dispersed under policy #1 than it is under the other policies. Second, the diversification benefits of adding bonds, cash equivalents, and real estate to the asset mix are clear. The one year dispersion of results declines moving from policy #1 to policy #2 as bonds and cash equivalents are added to the asset mix. The one year dispersion is further reduced by adding real estate to policy #3. Third, adding bonds, cash equivalents, and real estate to the asset mix does reduce the downside one year results to tolerable levels. Ignoring the minimum returns (which in these types of simulations are usually aberrations), the 5th percentile one year return under policy #1 are a dismal -23.9%. Under policies #2 and #3, the 5th percentile one year return is a disappointing, but much more acceptable -13.5% and -8.1%, respectively.

Moving to the ten year annualized results, first, the 100% common stock asset mix is not nearly as volatile relative to the other two asset mixes for the ten year period as it is for the one year period. The dispersion of ten year results for policy #1 is similar to that of policies #2 and #3. Second, the diversification benefits of bonds, cash equivalents, and real estate are much less significant over ten years than over one year. Nevertheless, the diversified policies #2 and #3 do produce slightly higher 5th percentile returns than does policy #1, thus indicating some protection against unacceptably poor performance.

APPENDIX C

EXPLANATION OF ASSET CLASS TARGET RECOMMNEDATIONS

Section 3 presented staff's asset class target recommendations for each of the asset classes included in the Basic Funds' policy asset mix. The rationale behind each of these recommendations is discussed below.

COMMON STOCKS

None of the four target-restricting circumstances described in Section 3 currently applies to the domestic common stock component of the Basic Funds' policy asset mix. In the first case, the domestic common stock component is included in the policy asset mix to achieve maximum total returns. In the second case, for numerous reasons, it is impractical to avoid economic sectors of the stock market simply because they are highly correlated with Minnesota's tax revenue base. In the third case, there currently are no substantive legal restrictions on the Basic Funds common stock investments, although, as the later phases of the Board's South Africa resolution are implemented this situation will change. In the fourth case, there do exist certain documented sources of persistent above average returns in the stock market (e.g., low capitalization stocks, low price-to-book value stocks, low price-to-earnings stocks, etc.). Nevertheless, at this time staff is not prepared to recommend a specific strategy to exploit these market "anomalies." This may be a subject of future research by staff.

Given these considerations, staff believes there is no reason to limit the Basic Funds' investments in the domestic stock market. Therefore, staff recommends that the Wilshire 5000, which represents essentially the entire U.S. stock market, be used as the domestic common stock asset class target. [1]

BONDS

Of the four target-restricting cases, only the first applies to the bond component of the Basic Funds' policy asset mix. Bonds are included not to maximize total portfolio returns, but to provide deflation hedge and diversification benefits. As a result, it is not appropriate simply to use a broad bond market index as the asset class target. Rather, the target should reflect the special role that bonds play in the policy asset mix.

A true deflation hedge would be composed of only high quality, very long-lived bonds. For example, 30-year zero coupon Treasuries provide maximum portfolio protection in the event of a economic depression. But long-lived bonds also produce highly volatile returns under normal economic conditions. Further, the correlation of their returns with common stock returns is higher than that of shorter-lived bonds. Thus, the diversification benefits of long-lived bonds are not as great as those of shorter-lived bonds. The bond asset class target must take into account both the deflation hedge and diversification needs of the Basic Funds' bond component. Staff believes that the Salomon Brothers Large Pension Fund (LPF) Baseline Bond Index effectively balances the trade-off between these two requirements, and thus should be used as the bond asset class target.

The LPF Baseline Bond Index differs from conventional bond market indices, such as the Salomon Broad Investment-Grade Bond Index, in several respects. Most importantly, it has a longer, but not excessively long, duration (i.e., average life). The longer is a bond portfolio's duration, the more it will appreciate in value in a deflationary, declining interest rate environment. The LPF Baseline Bond Index also has a higher representation of corporate bonds and mortgage securities, and a lower Treasury representation than do the broad bond market indices. Thus, the LPF Baseline Bond Index has a lower average quality rating. However, because the corporate bonds in the LPF Baseline Bond Index, on average, possess a higher quality rating than do the corporate bonds in the broad bond market indices, the net diminution of quality is minimal. Overall, staff believes that the LPF Baseline Bond Index offers better deflation protection than do conventional bond market indices and essentially equivalent diversification benefits. (See Appendix D for a more detailed description of the LPF Baseline Bond Index.)

CASH EQUIVALENTS

Even though cash equivalents do not play a return maximizing role in the policy asset mix, the first target-restricting case is immaterial. Cash equivalents provide liquidity and diversification benefits. But by definition, cash equivalents are highly liquid, high quality, short-maturity fixed income assets. Therefore, the special purpose of cash equivalents in the Basic Funds' policy asset mix is satisfied by the entire range of securities in the cash equivalents market.

However, the third target-restricting case is relevant. That is, the asset class target should take into account statutory restrictions that limit the SBI's cash equivalents investment authority. For example, the SBI may only invest in cash equivalents issued by U.S. and Canadian governments and corporations. There are also certain quality restrictions on SBI cash equivalents investments.

Identifying a cash equivalents market index that satisfactorily matches the SBI's investment authority is difficult. Given the relatively small size of the policy allocation, the current prohibition on foreign investments, and the statutory quality restrictions, staff recommends that 90-day Treasury bills be used as an asset class target for cash equivalents. [2] While this choice admittedly is not ideal, the use of Treasury bills as an asset class target is conveniently implemented. Further, it is consistent with both the objectives underlying the inclusion of cash equivalents in the policy asset mix and the restrictions that affect the SBI's cash equivalents investments.

REAL ESTATE

Real estate acts primarily as an inflation hedge and a diversifier in the policy asset mix, rather than a return maximizing investment. But staff does not believe that real estate's special role requires limiting the range of investment opportunities. There is no comprehensive evidence that one type of real estate is significantly more inflation sensitive than another. Further, the more broad based is the real estate component the greater are the diversification benefits.

However, the real estate asset class target should reflect the limitations imposed by state statute on the SBI's investment authority. The Board is prohibited from entering into direct real estate investments in which it is the sole participant. The practical effect is that the Board participates in real estate almost entirely through commingled funds.

Staff recommends that one of the large, open-end insurance company commingled real estate funds be used as an asset class target for the Basic Funds' real estate component. These commingled funds reflect the types of real estate investments that the Board can make and are well-diversified across virtually the entire U.S. real estate market.

VENTURE CAPITAL

Venture capital is an off-shoot of common stocks in the policy asset mix. Venture capital represents equity participation in the formative stages of corporations who, if successful, will eventually have their securities traded in the public marketplace. For policy purposes, the Board also defines investments in leveraged buy-outs as a form of venture capital.

Venture capital, like common stocks, serves as a total return vehicle in the Basic Funds' policy asset mix. As a result, the venture capital asset class target should represent the entire range of investment opportunities. It should include investments in different stages of corporate development as well as a wide range of industries.

However, the third target-restricting case does apply to the venture capital component. State statutes restrict the types of venture capital investments that the Board can make. The effective result is that the Board's venture capital participation has been exclusively through limited partnerships. The asset class target should reflect the limiting effects of the SBI's investment authority.

Unfortunately, the venture capital market has not matured sufficiently such that widely-accepted market indices have been created. Of the few rudimentary indices that are available, the First Chicago Venture Capital Index is the most commonly referenced. Staff recommends that the First Chicago Index be used as the venture capital asset class target for the time being. However, staff also recommends that alternative indices be reviewed periodically as they become available. If a better indicator of the venture capital market is developed, the Board should consider changing its asset class target to that index.

RESOURCE FUNDS

The resource funds asset class is the least clearly defined of the asset classes in the Basic Funds' policy asset mix. To date, the Board's resource investments have been concentrated solely in the oil and gas industry. [3] Until that strategy changes, the resource funds asset class target should be consistent with that limitation.

Like real estate, the resource funds component of the Basic Funds' policy asset mix is designed to act as an inflation hedge and provide portfolio diversification. Further, the Board's resource funds investments are constrained by the statutory investment authority. Both these target-restricting situations ideally should be reflected in the resource funds asset class target.

However, like venture capital, the oil and gas market for institutional investors has not matured sufficiently to generate the development of broad market indices. Given the poor performance of the oil and gas industry in recent years, the likelihood of such an index being developed soon is remote.

In the absence of established oil and gas market indices, only crude proxies are available as an asset class target. Staff recommends that a portfolio of publicly traded energy company stocks be used as the resource funds asset class target.

FOREIGN COMMON STOCKS

Foreign common stocks would be included in the policy asset mix to maximize portfolio returns, just as domestic common stocks and venture capital are currently. Likewise, there are no overriding considerations that would recommend limiting the securities included in the foreign common stock asset class target. The target should be a broad representation of common stock investment opportunities available outside of the United States. The most widely-accepted foreign common stock index is the Morgan Stanley Capital International Europe, Asia and Far East index (EAFE). However, staff would recommend not adopting a specific index as an asset class target at this time. Staff will conduct considerably more research on the subject if the Board's legislation authorizing foreign securities investments becomes law.

FOOTNOTES

1. It can be argued that the Wilshire 5000 includes a number of securities essentially unavailable to large institutional investors because of the stocks' small capitalizations. An alternative to the Wilshire 5000 as an asset class target might be the Russell 3000 which includes only the largest 3000 stocks in the publicly-traded market place. Staff does not view this issue as terribly important, but will continue to review the development of "extended market" stock indices.
2. A money market fund, or index of money market funds, for which return and holdings data is publicly available is a possible alternative to Treasury bills. Staff intends to investigate this matter further.
3. A number of additional inflation-hedge resource investments could be considered. These include gold, timberland, and farmland. Staff hopes to conduct additional research in this area in the future.

APPENDIX D

SALOMON BROTHERS LARGE PENSION FUND BASELINE BOND INDEX

The Salomon Brothers Large Pension Fund (LPF) Baseline Bond Index was conceived as an alternative to existing market capitalization bond indices. [1] In designing the LPF Baseline Bond Index, Salomon Brothers sought to create a bond benchmark more representative of the investment objectives of large pension funds with long-term liabilities. Staff believes that the LPF Baseline Bond Index better reflects the deflation hedge and diversification objectives for which bonds have been included in the Basic Funds' policy asset mix than do standard bond market indices.

The distinguishing characteristics of the LPF Baseline Bond Index relative to market capitalization bond indices are:

- Longer duration
- Reduced call risk
- Higher yield
- Larger corporate and mortgage sector exposures
- Lower Treasury sector exposure

To be eligible for inclusion in the Index, Treasury and corporate bonds must satisfy the following criteria:

- Minimum $100 million outstanding
- Minimum quality: BAA
- Minimum five years to maturity
- Low call risk:
  - Security is not callable

    or
  - Effective call date more than three years away

    or
  - Current market price minimum two points below effective call price

Mortgages included must meet the following criteria:

- o Minimum $100 million outstanding
- o Coupon rate does not exceed yield to maturity by more than 150 basis points

Salomon Brothers has assigned weights to the Treasury, corporate, and mortgage sectors within the Index of 30%, 40%, and 30%, respectively. Within each sector, the securities are capitalization weighted. The LPF Baseline Bond Index is rebalanced monthly.

A summary comparison of the LPF Baseline Bond Index with the Salomon Brothers Broad Investment-Grade Bond Index is in Table C1. The Broad Investment-Grade Bond Index is used for comparisons because it is the best available representation of a market capitalization bond index.

In terms of performance, as would be expected due to its longer duration, the LPF Baseline Bond Index has outperformed the Broad Investment-Grade Bond Index in periods of declining interest rates and underperformed in periods of rising rates. Further, for similar reasons, the LPF Baseline Bond Index is more volatile than the Broad Investment-Grade Bond Index.

TABLE D1
Comparison of Large Pension Fund Baseline
Bond Index with Broad Investment Grade Bond Index

	Total		Treasuries		Corporates		Mortgages	
	Baseline	Broad	Baseline	Broad	Baseline	Broad	Baseline	Broad
Market Value	$898.8	$1,996	$467	$983	$148	$386	$284	$453
Weight	100	100	30	49.2	40.0	19.3	30.0	22.7
Quality	AAA	Agency	TSY	TSY	AA-	A+	Agency	Agency
Coupon	9.26%	9.68%	10.46%	9.99%	8.63%	9.31%	8.90%	9.91%
Maturity	14.51	9.08	15.37	8.20	19.48	15.20	7.04	5.62
Yield-to-Maturity	8.68%	7.88%	7.67%	7.01%	9.17%	9.30%	9.03%	8.84%
Duration	7.05	4.92	7.73	4.84	8.40	7.01	4.57	3.80

Source: Salomon Brothers

REFERENCES

1. Leibowitz, Martin, et. al., Introducing the Salomon Brothers Large Pension Fund Baseline Bond Index, 1987.

Tab D

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

February 24, 1987

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

FROM: Equity Manager Committee

SUBJECT: Committee Report

The Committee reviewed the recent performance of the Board's external equity managers. The Committee cannot identify any significant concerns that would call for immediate changes in the Board's external equity manager group. However, the Committee plans to work closely with staff over the next several months to develop comprehensive recommendations regarding the structure of the Board's common stock investment program.

Relative to their benchmarks the managers' results were mixed. BMI, Waddell & Reed, and Forstmann-Leff showed the best relative performance for the last year, while Beutel Goodman, Hellman Jordan, and Peregrine Capital produced the poorest relative results.

The Committee also reviewed the recent performance of the Board's internal equity manager. The internal manager's returns have been disappointing. In part, these returns are attributable to the manager's defensive "value" investment style. Most managers who use a "value" style of investing have performed poorly in recent quarters, and the internal manager has been no exeption.

However, the internal manager's poor results were also due to an investment approach that proved unsuccessful. For a portion of the assets under internal management, the manager attempted to implement selected recommendations of the Board's external managers and Wall Street research. The returns produced by this approach were quite unsatisfactory and the approach was discontinued in October. Internally managed assets are now invested solely according to the recommendations of two quantitative stock selections models that have a demonstrated history of successful performance. The Committee plans to continue to monitor the performance of the internal manager and will report again to the Board at its next meeting.

EQUITY MANAGER UPDATE INTERVIEWS
SUMMARY NOTES

I. STAFF COMMENTS AND RECOMMENDATIONS

Staff discussed several issues with the Board's equity managers at the recent set of meetings. In addition to the usual discussions of current investment strategy, the topics of benchmark (normal) portfolio construction, performance fees, and the continuing implementation of the Board's South Africa resolution were addressed.

No serious organizational or personnel problems have occurred at any of the Board's managers since the last set of meetings. Staff believes that the stated investment approaches of the managers continue to be implemented in accordance with their stated objectives.

Performance relative to benchmarks has been mixed. In aggregate, however, the equity managers continue to underperform the broad equity market. Staff recommends no immediate changes in the Board's group of active equity mangers be considered at this time. However, staff intends to make comprehensive recommendations regarding changes in equity manager structure at the Board's next meeting.

II. RECENT MEETING DATES

MANAGER	DATE OF MEETING
Fred Alger Management	February 24
Alliance Capital	February 23
BMI Capital	February 27
Beutel Goodman	February 23
Forstmann-Leff	March 3
Hellman Jordan	February 26
IDS Advisory	February 25
Investment Advisers	February 26
Lieber & Company	February 25
Peregrine Capital	February 27
Waddell & Reed	February 24

III. ORGANIZATIONAL CHANGES

Since the last set of equity manager meetings, the only significant organizational change took place at Forstmann-Leff. In late summer of 1986, the firm was purchased by Guinness Peat, a London merchant bank. Like many of the recent purchases of money management firms, the acquisition of Forstmann-Leff involved a revenue sharing arrangement and long-term employment contracts. Staff believes that this type of financial arrangement offers the best incentives for continued entrepreneurial efforts on the part of money managers after an acquisition. Staff does not believe that the acquisition of Forstmann-Leff is likely to adversely affect the firm's investment management operations.

IV. ASSET UNDER MANAGEMENT

	MARCH 1983		JUNE 1986		DECEMBER 1986	
	NUMBER	MARKET VALUE (MILL.)	NUMBER	MARKET VALUE (MILL.)	NUMBER	MARKET VALUE (MILL.)
Fred Alger	59	$1,645	67	$3,066	80	$3,208
Alliance	43	1,095	61	3,368	60	3,319
BMI Capital	5	160	12	240	10	243
Beutel Goodman	5	104	32	1,280	31	1,190
Forstmann-Leff	126	4,800	67	4,538	66	4,179
Hellman Jordan	22	440	34	1,351	32	1,158
IDS Advisory	87	3,361	69	3,932	71	3,815
Investment Advisors	79	1,001	92	2,132	93	2,064
Lieber & Co.	14	341	19	1,257	18	1,126
Peregrine	3	49	6	284	2	109
Waddell & Reed	6	471	8	931	7	903

Assets under management of the Board's equity managers have remained essentially stable over the last six months. Accounts under management have declined somewhat largely due to plan terminations on the part of a number of corporations. Account or asset growth currently is not a problem at any of the Board's equity managers.

V. STAFF CHANGES

No significant personnel changes have occurred at any of the Board's equity managers since the last set of meetings.

VI. BENCHMARK PORTFOLIOS

Staff reviewed with each equity manager the benchmark (normal) portfolio assigned to that manager. Staff strongly encouraged the managers to participate more extensively in the on-going construction of the benchmarks.

Staff believes that benchmark portfolios are necessary tools for managing the risk and assessing the results of the Board's active equity management program. Any restructuring of the program will rely heavily upon the benchmark portfolios.

VII. PERFORMANCE FEES

Staff proposed a change in the existing performance fee structure. Currently, the base fee is calculated at a flat 50 basis points, irrespective of assets under management. Because of equity market performance many of the managers have exceeded the $100 million under management level. The large size of these accounts called for lower management fees on the margin. Staff proposed that the manager's sliding fee schedule, based upon assets under management, be incorporated into the performance fee calculation. Staff will report to the Board regarding progress on this matter at the June meeting.

VIII. SOUTH AFRICA

Staff reviewed with each manager the Board's resolution regarding investment in companies doing business in South Africa. In particular, staff discussed the potential increase in the number of prohibited companies when Phase III of the Board's resolution is implemented. Staff currently provides each manager with an updated list of prohibited companies as changes occur.

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

February 18, 1987

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

FROM: Alternative Investment Committee

SUBJECT: Alternative Investment Strategy

As a 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 $675 million of the $4.5 billion Basic Retirement Fund 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.

STRATEGY FOR INVESTMENTS

VENTURE CAPITAL

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 ten commingled venture capital funds for a total commitment of $143.5 million. These commitments substantially complete the SBI's current venture capital asset allocation.

Currently, the Alternative Investment Committee is reviewing the benefits/costs of venture capital consulting services. Specific areas of review will include monitoring, performance measurement and due diligence capabilities. Recommendations regarding venture capital consultants will be made to the SBI when appropriate.

During the last quarter, the Alternative Investment Committee met with and conducted annual review sessions with three of the SBI's venture capital managers: Norwest, Summit and First Century.

Norwest and Summit, both with over 30% of their total capital invested, are actively working with existing portfolio companies and investing new capital. Most of their underlying portfolio investments are currently valued at or near cost.

First Century, on the other hand, has invested capital at a slower than expected pace. Some turnover among junior staff members has slowed new investment activities. Currently, however, senior management is close to resolving the staffing problems and resuming a more normal investment rate.

REAL ESTATE

The real estate investment strategy involves three steps. The first 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 $370.0 million to eleven commingled real estate funds. The Alternative Investment Committee is considering other investments for the SBI's real estate allocation.

The Alternative Investment Committee is currently conducting a real estate consultant review similar to the review underway for venture capital. In addition, the Committee is considering common stock investments in Real Estate Investment Trusts (REITS), managed by a specialized REIT equity manager. Investment in REITs could broaden the SBI's universe of potential real estate investments and add liquidity to the overall real estate portfolio. Recommendations concerning real estate consultants and REIT managers will be made to the SBI when appropriate.

RESOURCE 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. The Alternative Investment Committee is considering other ways of completing the SBI's remaining resource allocation.

The Alternative Investment Committee is currently conducting a resource consultant review similar to the review underway for venture capital and real estate. Also, the Committee is considering an investment in resource common stocks, managed by a specialized resource equity manager. This potential investment, like REITs, could expand the universe of available investments and add some liquidity to the current resource portfolio. When appropriate, recommendations concerning resource consultants and resource equity managers will be made to the SBI.

During the latest quarter, the Alternative Investment Committee conducted annual review sessions with the SBI's two resource managers: Apache Corporation (Apache funds I, II and III) and First Reserve Corporation (Amgo funds I and II).

Apache Fund I (Apache Equipment Loan) has not been significantly invested due to delays in developing and equipping oil and gas prospects in the Apache/Shell joint venture. Shell, the operator of the venture, is awaiting improved oil and gas pricing before significantly accelerating development of the indicated discoveries in the Gulf of Mexico.

Apache Fund II (Apache 1985 Acquisition - Notes) financed the acquisition of certain developed and partially developed oil and gas properties. Similar to the first Apache fund, development activities have been cutback or suspended as a result of unsatisfactory market conditions for oil and natural gas.

Apache Fund III (Apache 1986 Acquisition - NPI) was formed in December 1986 and, therefore, has no significant operational history.

First Reserve has been very active working with existing Amgo I and II portfolio companies to improve their operations, obtain necessary financing or to restructure. New investment activity, however, has generally been slow. In most cases, First Reserve's bids for new deals were either too low to interest sellers or to compete with higher bids.

In 1986, two staff members left First Reserve to join another organization. First Reserve, however, feels that the departures will not significantly affect investment operations. One of the departing staff members will remain on First Reserve's board of directors.

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY
January 15, 1987 Meeting

FUND NAME:	Norwest Venture Partners
FIRM NAME:	Norwest Venture Capital Management
CONTACT:	Dan Haggerty, John Whaley
ACCOUNT INCEPTION:	January, 1984
SBI CURRENT INVESTMENT (COST):	$9,682,394
SBI CURRENT INVESTMENT (MARKET VALUE):	$9,703,451
SBI TOTAL COMMITMENT:	$10,000,000

INVESTMENT DESCRIPTION: Norwest Venture Capital Management, a wholly owned subsidiary of Norwest Corp., is the general partner and manager of the partnership. Norwest Venture Capital also manages the Norwest Growth Fund, an SBIC, and Norwest Equity capital, a leveraged buyout fund. Norwest Venture Partners' investment focus is on high technology companies in the early stages of corporate development. However, the partnership's portfolio also includes investments in expansion stage firms and is diversified by the location and industry type of its portfolio companies. Norwest Venture Management has offices in Minneapolis, Phoenix, and Portland, Oregon. Northwest Venture Partners I was formed in January 1984 and has a term of ten years.

PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
32	$27,553,757

LOCATION		STAGE OF DEVELOPMENT	
East:	14.5%	Early Stage	68.2%
Midwest:	23.5	Expansion Stage	31.8
South:	0.0	Mezzanine Stage	0.0
West:	62.0	Leveraged Buyouts	0.0

INDUSTRY:	
Computer-related	63.1%
Medical/Healthcare	8.1
Consumer-related	7.6
Communications	1.1
Industrial/Machinery	3.3
Other	16.8

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY
January 15, 1987 Meeting

FUND NAME:	First Century Partnership III
FIRM NAME:	Smith Barney
CONTACT:	Jack Dulaney
ACCOUNT INCEPTION:	December, 1984
SBI CURRENT INVESTMENT (COST):	$2,500,000
SBI CURRENT INVESTMENT (MARKET VALUE):	$2,625,125
SBI TOTAL COMMITMENT:	$10,000,000

INVESTMENT DESCRIPTION: First Century III was formed in December 1984 and has a term of ten years. The general partner and manager of the partnership is Smith Barney Venture Corp., a subsidiary of Smith Barney Harris Upham and Co. Smith Barney Venture has offices in New York and San Francisco. This is the third fund formed by the firm since 1972. The partnership invests primarily in early stage, high technology companies. Investments are diversified by location and industry group.

PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
9	$9,696,074

LOCATION		STAGE OF DEVELOPMENT	
East:	42%	Early Stage	50%
Midwest:	7	Expansion Stage	29
South:	21	Mezzanine Stage	12
West:	30	Leveraged Buyouts	0

INDUSTRY:

Computer-software	7%
Medical/Healthcare	28
Consumer-related	12
Electronic/Instrumentation	11
Electronic/Semiconductor	25
Electronic/Publishing	6
Electronic/Factory Automation	11

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY
January 15, 1987 Meeting

FUND NAME:	Summit Ventures
FIRM NAME:	Stamps, Woodsum & Co.
CONTACT:	Roe Stamps, Steve Woodsum
ACCOUNT INCEPTION:	December, 1984
SBI CURRENT INVESTMENT (COST):	$7,483,627
SBI CURRENT INVESTMENT (MARKET VALUE):	$7,133,738
SBI TOTAL COMMITMENT:	$10,000,000

INVESTMENT DESCRIPTION: Summit Ventures was formed in December 1984 by Stamps, Woodsum & Co., the managing general partners of the fund and Shearson/American Express. Stamps and Woodsum focus on profitable, expansion stage firms that have not yet received any venture backing. The majority of the partnership's investments are in high tech firms. Investments are diversified by location and industry type. Stamps, Woodsum operates out of offices in Boston, Atlanta, and Southern California. Summit Ventures has a ten year term.

PORTFOLIO COMPOSITION

# OF PORTFOLIO COMPANIES	MARKET VALUE PORTFOLIO COMPANIES
23	$39,416,442

LOCATION	
East:	29%
Midwest:	17
South:	4
West:	50

STAGE OF DEVELOPMENT	
Early Stage	9%
Expansion Stage	81
Mezzanine Stage	0
Leveraged Buyouts	10

INDUSTRY:	
Computer-related	62%
Medical/Healthcare/Enviornmental	21
Consumer-related	4
Communications	8
Industrial/Machinery/Defense	5

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY
January 15, 1987 Meeting

FUND NAME:	Apache Equipment Loan Apache 1985 Acquisition - Notes Apache 1986 Acquisition - Net Profits Interest	
FIRM NAME:	Apache Corporation	
CONTACT:	Charlie Hann	
ACCOUNT INCEPTION:	Apache Equipment Loan	May, 1984
	Apache 1985 - Notes	October, 1985
	Apache 1986 - NPI	December, 1986
SBI CURRENT INVESTMENT (COST):	Apache Equipment Loan	$537,617
	Apache 1985 - Notes	$22,285,466
	Apache 1986 - NPI	$30,000,000
SBI CURRENT INVESTMENT (MARKET VALUE):	Apache Equipment Loan	$537,617
	Apache 1985 - Notes	$22,170,469
	Apache 1986 - NPI	$30,000,000
SBI DISTRIBUTIONS RECEIVED:	Apache Equipment Loan	$219,683
	Apache 1985 - Notes	$2,917,352
	Apache 1986 - NPI	$0
SBI TOTAL COMMITMENT:	Apache Equipment Loan	$22,500,000
	Apache 1985 - Notes	$23,000,000
	Apache 1986 - NPI	$30,000,000

INVESTMENT DESCRIPTION:

- Apache Equipment Loan

The Apache Corp. 10% Equipment Financing Notes are a $150 million private placement to finance Apache's portion of production facility expenditures. The expenditures were made under the terms of a series of offshore joint ventures in the Gulf of Mexico. The joint ventures were organized by Shell Oil Company. In addition to fixed interest payments of 10% per annum, noteholders will receive additional interest of 2% of Apache's share of gross revenues from the joint ventures. Principal and interest on the notes are estimated to be repaid by 1992. The 2% additional interest will be paid to noteholders throughout the life of producing properties. Apache Corp. has offices in Minneapolis and Denver.

- Apache 1985 Acquisition - Notes

  The Apache 1985 Properties Acquisition Notes are a $118 million private placement to finance the acquisition and tangible development costs related to certain producing oil and gas properties, of which some are fully developed and some are partially developed. In addition to fixed interest payments of 10% per annum, noteholders will receive additional interest of 2% of Apache's share of gross revenues from the properties. Principal and interest on the notes are estimated to be repaid by 1996. The 2% additional interest will be paid to noteholders throughout the life of producing properties.

- Apache 1986 Acquisition - Net Profits Interest

  The Apache 1986 Acquisition Net Profits Interest is a $190 million private placement to acquire a non-operating interest in the net profit generated by oil and gas properties acquired in 1986 from Occidental Petroleum Company. Investors will receive a 85% net profits interest in the financed share of producing properties until the cumulative total of such payments equals the investment cost plus 8% per year return on investment (the "Payout"). However, if the cumulative net profit discounted at 10% should fail to exceed a defined cumulative cash flow comparably discounted, investors will receive a 90% net profits interest until Payout. After Payout, investors will receive a 75% net profits interest for the life of the producing properties. Payout is expected in 1991.

GEOGRAPHIC PROPERTY DISTRIBUTION

	APACHE EQUIPMENT LOAN	APACHE 1985 ACQUISITION	APACHE 1986 ACQUISITION
Louisiana	50%	26%	26%
Oklahoma		13	44
Texas	50	18	11
Wyoming		36	5
Other		7	14

ALTERNATIVE INVESTMENT MANAGER INFORMATION
ANNUAL REVIEW SUMMARY
January 15, 1987 Meeting

FUND NAME:	AMGO I-II	
FIRM NAME:	First Reserve	
CONTACT:	John Hill	
ACCOUNT INCEPTION:	AMGO I	July 1981
	AMGO II	February 1983
SBI CURRENT INVESTMENT (COST):	AMGO I	$14,845,601
	AMGO II	$6,626,500
SBI CURRENT INVESTMENT (MARKET VALUE):	AMGO I	$4,500,000
	AMGO II	$5,500,000
SBI DISTRIBUTIONS RECEIVED:	AMGO I	$2,699,770
	AMGO II	$1,152,300
SBI TOTAL COMMITMENT:	AMGO I	$15,000,000
	AMGO II	$7,000,000

INVESTMENT DESCRIPTION:

- AMGO I:

  Amgo I was formed in July 1981 and has a term of twenty years. The general partner and manager of the fund is First Reserve Corp. The general partner's long-term investment strategy is to create a diversified portfolio of oil and gas investments for the fund. The portfolio is diversified across four dimensions: location, geological structure, investment type, and operating company.

- AMGO II:

  Formed in December 1982, Amgo II has a nineteen year term. First Reserve Corp. of New York is the general partner and manager of both Amgo I and Amgo II. First Reserve's strategy for Amgo II is similar to that of Amgo I. The portfolio is diversified across the same four dimensions as AMGO I.

AMGO I PORTFOLIO COMPOSITION

# OF INVESTMENTS	MARKET VALUE PORTFOLIO INVESTMENTS
22	$43,750,000

GEOLOGICAL AREA		TYPE OF INVESTMENT	
Louisiana	17.2%	Royalty	22.0%
Oklahoma	21.2	Acreage	7.0
Oklahoma/Texas	1.8	Drilling	11.1
Rocky Mountains	12.5	Equity	6.9
Gulf Coast	5.6	Production	22.7
Texas	20.3	Surface Facilities	0.0
New Mexico	1.6	Conv. Notes and Preferred	29.8
Mississippi	8.8	Other	0.6
West Virginia	0.9		
California	7.4		
Miscellaneous	2.7		

AMGO II PORTFOLIO COMPOSITION

# OF INVESTMENTS	MARKET VALUE PORTFOLIO INVESTMENTS
10	$27,500,000

GEOLOGICAL AREA		TYPE OF INVESTMENT	
Louisiana	12.1%	Royalty	10.5%
Oklahoma	14.2	Acreage	0.0
Oklahoma/Texas	6.2	Drilling	0.0
Rocky Mountains	11.2	Equity	15.4
Gulf Coast	17.9	Production	17.5
Texas	24.1	Surface Facilities	0.0
New Mexico	3.4	Conv. Notes and Preferred	56.7
Mississippi	3.0		
West Virginia	2.1		
Miscellaneous	5.8		

ALTERNATIVE EQUITY INVESTMENTS

FUND	COMMITMENT (millions)	FUNDED (millions)	INCEPTION DATE	FUND SIZE (millions)	TYPE/ STRATEGY
REAL ESTATE:					
Equitable	$ 40.0	$ 40.0	10/81	$3124.0	Open end diversified
Aetna	40.0	40.0	4/82	1664.0	Open end diversified
Prudential	40.0	40.0	9/81	5316.0	Open end diversified
RREEF	75.0	67.0	4/84	773.0	Closed end diversified
Heitman I	20.0	20.0	6/84	113.0	Closed end diversified
Heitman II	30.0	30.0	10/85	238.0	Closed end diversified
Heitman III	20.0	10.0	11/86	200.0	Closed end diversified
TCW I	40.0	40.0	7/85	216.0	Closed end specialized investment vehicle
TCW II	30.0	9.0	9/86	250.0	Closed end specialized investment vehicle
State Street I	20.0	20.0	7/85	103.0	Closed end specialized investment vehicle
State Street II	15.0	10.0	7/86	86.0	Closed end specialized investment vehicle
Total:	$370.0	$325.0			
Target:	($450 Million or 10% of Basic Retirement Funds)				
VENTURE CAPITAL:					
Norwest	$ 10.0	$ 10.0	1/84	$ 60.0	Hi-tech early stage MN/OR/AZ offices
KKR I	25.0	25.0	3/84	1000.0	Lo-tech mature NY/CA offices
KKR II	50.0	19.0	12/85	2000.0	Lo-tech mature NY/CA offices
Summit	10.0	7.5	12/84	93.0	Hi-tech later stage MA office
First Century	10.0	2.5	12/84	100.0	Hi-tech early stage NY/CA offices
DSV	10.0	10.0	4/85	60.0	Hi-tech early stage NJ/CA offices
Matrix	10.0	4.0	7/85	70.0	Hi-tech early stage MA/CA offices
Inman/Bowman	7.5	2.0	6/85	44.0	Hi-tech early stage CA office
Allied	5.0	1.6	7/85	40.0	Lo-tech later stage DC office
Superior Venture	6.0	1.5	6/86	35.0	Hi-tech early stage MN office
Total:	$143.5	$ 83.1			
Target:	($112.5 Million or 2.5% of Basic Retirement Funds)				
RESOURCE:					
Amgo I	$ 15.0	$ 15.0	7/81	$ 144.0	Debt with royalty or equity
Amgo II	7.0	7.0	2/83	36.0	Debt with royalty or equity
Apache I	22.5	0.5	5/84	150.0	Debt with royalty or equity
Apache II	23.0	22.4	10/85	180.0	Debt with royalty or equity
Apache III	30.0	30.0	12/86	190.0	Net profits interest
Total:	$ 97.5	$ 74.9			
Target:	($112.5 Million or 2.5% of Basic Retirement Funds)				

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

February 25, 1987

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

FROM: Howard Bicker

SUJBECT: Update on Pending Legislation

Since the 1987 Legislative Session began, several bills of interest to the SBI have been introduced. The attached report summarizes the status of these bills as of Friday, February 20, 1987.

This summary is updated weekly and provided to the deputy or designee of each Board member.

BILLS OF INTEREST TO THE MINNESOTA STATE BOARD OF INVESTMENT - 1987 LEGISLATIVE SESSION

Includes Action Through 2/20/87

DESCRIPTION OF BILL	HF/SF #	AUTHOR	CURRENT STATUS
Consolidating state constitutional offices	HF - None SF - 81	None Pogemiller	House - None Senate - Rules and Administration Committee
Pre - 73 retirees lump sum adjustment ($25 for 1987 & 1988 only)	HF - 112 SF - 98	Simoneau Wegscheid	House - Governmental Operations Committee Senate - Governmental Operations Committee
Pension guarantee for public employees	HF - 113 SF - None	Sviggum None	House - Governmental Operations Committee Senate - None
Pension system membership as enforceable contractual right for public employees	HF - 122 and HF - 458 SF - None	Riveness Simoneau None	House - Governmental Operations Committee House - Governmental Operations Committee Senate - None
Northern Ireland MacBride Principles	HF - 453 SF - None	O'Connor None	House - Governmental Operations Committee Senate - None
PERA - 5 year vesting	HF - 463 SF - None	Simoneau None	House - Governmental Operations Committee Senate - None
Voluntary consolidation for police and firefighter retirement plans	HF - None SF - 317	None D. Moe	House - None Senate - Governmental Operations Committee
Normal retirement at age 62 for MSRS, PERA, TRA	HF - None SF - 489	None D. Moe	House - None Senate - Governmental Operations Committee

BILLS OF INTEREST TO THE MINNESOTA STATE BOARD OF INVESTMENT - 1987 LEGISLATIVE SESSION

Includes Action Through 2/20/87

DESCRIPTION OF BILL	HF/SF #	AUTHOR	CURRENT STATUS
Rule of 85 - 2 year extension	HF - 149 SF - 160	O'Connor Metzen	House - Governmental Operations Committee Senate - Governmental Operations Committee
Pre - 73 retirees annual lump sum adjustment ($50 each year, permanent increase)	HF - None SF - 130	None Pehler	House - None Senate - Governmental Operations Committee
Reimbursement to pension funds for 2% shift in 1983	HF - 72 SF - None	O'Connor None	House - Governmental Operations Committee Senate - None
Rule of 85 - permanent extension (effective 6/30/87)	HF - None SF - 194	None Pehler	House - None Senate - Governmental Operations Committee
Rule of 85 - permanent extension (effective upon passage)	HF - 310 SF - 180	Jaros Solon	House - Governmental Operations Committee Senate - Governmental Operations Committee
SBI Bill	HF - 186 SF - 314	Simoneau Pogemiller	House - Amended on House Floor and re-referred to Governmental Operations Senate - General Orders
MSRS - increase contributions and improve benefit formula	HF - None SF - 431	None D. Moe	House - None Senate - Governmental Operations Committee