Ohio Public Employees Retirement System

Investment Division

2003 Investment Plan

Domestic Equity	Global Bonds	Int'l Equity	Real Estate	Private Equity	Fund Services	DC Plans	Total Fund

December 2002

277 East Town Street, Columbus, Ohio 43215 ·· 614-644-9962 ·· 800-222-7377

THE PUBLIC EMPLOYEES RETIREMENT SYSTEM OF OHIO
277 EAST TOWN STREET, COLUMBUS, OHIO 43215

MEMORANDUM

TO: Board of Trustees

FROM: Neil V. Toth

RE: Final 2003 Investment Plan

DATE: 6 December 2002

COPY: Laurie Hacking, Executive Director

Summary
We are pleased to present the final 2003 Investment Plan. The changes discussed at the November meeting of the Investment Committee have been incorporated into the Plan, and are summarized in the final section of this memo.

Overview of Plan Document
The document is organized by asset class / department, with the first section, "Total Fund", describing overall asset management characteristics of the plan, strategies, organizational structure, resources, and finally, proposed initiatives for the year ahead.

The asset class sections generally follow a similar outline, as shown below:

- Asset Management
  - Strategy / Structure
  - Performance Objectives and Risk Control
  - Composition (Active/Passive, Internal/External)
- Resources
  - Organizational Structure
  - Staffing / Hiring
  - Asset Management Fees
  - Operating Budget
- Initiatives

At the end of the report in the appendix is the economic outlook for 2003, prepared by Macroeconomic Advisers.

Changes from Draft Plan

The important changes from the draft 2003 Investment Plan, presented in November, are highlighted in the accompanying table:

Area	Page(s)	Issue
Cover	NA	Added consultant letters behind cover memorandum. (EK+A, Townsend, and PCG)
Total Fund	1.6	Incorporated a summary of the relative valuation of asset classes to support our intended asset class biases in 2003 – Suggested by Richard Ennis.
Total Fund	1.9	Adjusted staffing tables to reflect a reduction of one hire in Private Equity and one hire in Domestic Equity.
Total Fund	1.9 – 1.12	Adjusted operating budget to reflect staffing reductions. Operating budget was reduced by $415,000.
Domestic Equity	2.6-2.7	Adjusted organization chart to show 25 employees. The Department removed one senior trader position.
Real Estate	5.1-5.2, 5.5, 5.7	Adjusted tables to reflect final 9/30/02 market values.
Private Equity	6.7	Added text at top of page to commit to researching and possibly hiring one or more discretionary managers in 2003.
Private Equity	6.10	Adjusted organization chart to show two employees. The Department will attempt to add an analyst through an internal transfer in 2003, with no net addition to total Divisional staffing.

Neil V. Toth

ENNISKNUPP

MEMORANDUM

To: Investment Committee
Public Employees Retirement System of Ohio
From: Brady O'Connell, Richard Ennis
Date: December 10, 2002

Re: Annual Investment Plan 2003

We have reviewed the revised Annual Investment Plan for 2003 and are of the opinion that it does a good job of establishing the strategies, objectives, risk controls, resources and initiatives for 2003. The current version of the plan also addresses issues raised at the November Investment Committee meeting in a satisfactory manner.

This document will allow the Board to accurately assess the success of the Investment department in addressing their initiatives and goals throughout the coming year. The Plan is also exceedingly thorough, allowing for accountability. Based on the content of the report, the Board will be equipped to make accurate assessments as to the staff's success in achieving objectives and initiatives within the specified costs and subject to the operational and risk budgets articulated in each section.

PACIFIC CORPORATE GROUP LLC

MEMORANDUM

To: Investment Committee
Public Employee Retirement System of Ohio

From: Tara A. Blackburn, Pacific Corporate Group

Date: December 6, 2002

Re: Annual Investment Plan 2003

We have worked closely with OPERS's Staff in reviewing and updating the private equity section of the 2003 Investment Plan. We believe the plan covers the critical elements necessary to embark upon and maintain a large-scale private equity program, including the appropriate strategy, process, investment pacing and structure.

We expect to work closely with OPERS' Staff throughout the year to bring suitable investment opportunities to Staff and the Board in keeping with this plan.

The Townsend Group

INSTITUTIONAL REAL ESTATE CONSULTANTS

Main Office:
M.K. Ferguson Plaza
1500 West Third Street
Suite 410
Cleveland, Ohio 44113
Telephone: (216) 781-9090
Fax: (216) 781-1407

Branch Office:
One Magnificent Mile
980 North Michigan Avenue
Suite 1400
Chicago, Illinois 60611
Telephone: (312) 214-3590
Facsimile: (312) 214-3510

December 9, 2002

Investment Committee
Public Employees Retirement System of Ohio
277 East Town Street
Columbus, Ohio 43215-4642

RE: 2003 Annual Real Estate Plan

Dear members of the Investment Committee:

The Townsend Group, as real estate consultant ("Townsend") to the Public Employees Retirement System of Ohio ("Ohio PERS"), has reviewed the final draft of the 2003 Real Estate Department Annual Real Estate Plan ("2003 Annual Plan). We understand the 2003 Annual Plan is submitted as part of the overall 2003 Investment Plan prepared by the Ohio PERS Investment Division.

We note the principal objectives of the 2003 Annual Plan are consistent with Townsend recommendations made in connection with our review of the real estate program earlier this year, as well as the strategic plan and policy recommendations set forth in the final draft of the Real Estate Strategy and Policy being presented for approval by the Investment Committee at the December 17th meeting.

We also concur with the two major initiatives scheduled for 2003: preparing an implementation plan to reposition the real estate program, and reviewing and preparing updated processes and procedures to match the new real estate program structure. These are important initiatives and we believe necessary to begin implementing the revised investment policy and strategy. We note that one subset of these initiatives includes reviewing the current investment advisors and determining if new advisors are required to reposition the program. Another important project included in these initiatives is evaluating the internal staffing structure, roles and responsibilities to ensure the staff is structured to effectively carry out the new investment policy and strategies adopted by Ohio PERS.

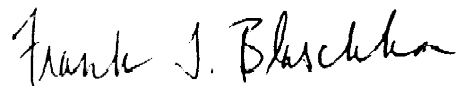
In connection with our review, we have discussed a number of the critical assumptions that drive the expected real estate activity in 2003, including proposed sales activities and projected new investments. We have discussed the source of the information for the projections, and

based upon our review, the projected activity appears reasonable for a portfolio of your size. We want to reiterate, however, that the ability to complete the proposed sales and to make new investments consistent with the 2003 Annual Plan is subject to suitable or appropriate investment opportunities arising in the market during the year and into 2004. While we believe that over the longer term the recommended structure will provide attractive risk adjusted returns that meet the goals and objectives of the real estate program, we are not advocating either fire sale liquidations of assets to achieve the policy ranges nor forcing capital into a sector that may not be attractively priced. Therefore, we believe the targets set are reasonable but achieving such goals will be subject to market opportunities.

I will be attending the December 17, 2002 Investment Committee meeting and will address any questions you may have. In the interim, please feel free to contact me if you have any questions.

Very truly yours,

The Townsend Group



Frank L. Blaschka
Principal

Total Fund

Summary

As we enter 2003, the investment program is stable and fundamentally sound. The program has been significantly transformed over the past two years as a result of the 2000/2001 Comprehensive Investment Review, and is well positioned to meet the new performance objectives. To put the annual plan for 2003 into perspective, it is helpful to review the key achievements over the last two years:

Investment Division Report Card

Asset Management

- ✓ The total fund asset allocation was changed in 2001. The program is now positioned for strong absolute returns in an improved investment environment and to achieve competitive results versus peer funds.
- ✓ The domestic equity and global bond asset classes now employ internal and external asset management, enabling staff to leverage relationships with leading investment managers.
- ✓ Internal active management has been redeployed in the domestic equity asset class.
- ✓ An assessment of the structure of the international equity asset class was completed. Changes to the asset class structure are in progress and will be completed in 2003.
- ✓ A private equity asset class has been formed, a consultant hired, and initial investments made.
- ✓ A real estate consultant has been retained and a comprehensive review of the real estate asset class is nearing completion. Real estate debt investments were liquidated.
- ✓ The Xylem investment is in the process of being transitioned to a new manager.
- ✓ Managers were hired for the defined contribution plan.
- ✓ A review of the securities lending has begun and will be completed in early 2003.

Technology / Infrastructure

- ✓ The installation of a trade order management system for internal asset management was completed.
- ✓ An investment intranet was developed and implemented.
- ✓ A fund accountant was hired and custody of global assets was transitioned.

Human Resources

- ✓ Key staff were hired including a Deputy Director, AIO – Domestic Equity, AIO – Private Equity, and a PM – Global Bonds.
- ✓ Compensation was adjusted to be competitive with an appropriate peer set, and the Incentive compensation plan was redeveloped.

Other

- ✓ An Investment Policy manual has been developed to cover all major aspects of the investment program.
- ✓ The Proxy Policy was redeveloped.
- ✓ A formal, annual investment report was published.
- ✓ An investment forum was held, in addition to regular Board Educational Retreats.
- ✓ Quarterly investment reporting was redeveloped.

With much having been accomplished over the past two years, the focus for 2003 will be less on program development and more on investment management -- the associated structures and strategies of the asset classes.

The following sections of this Total Fund report summarize the asset management characteristics of the overall program, the resources (in people and dollars) needed to run the program, and lastly, the major initiatives we propose for the coming year.

Asset Management

Asset Size and Expected Growth

The OPERS investment fund had assets of $45.2 billion at September 30, 2002. The expected average annual return of the OPERS asset mix over a long-term horizon is 7.34%, with an expected volatility of 12.58%. The net cash flow of the pension fund in 2003 (contributions less benefit payments) is estimated at $-0.890 million. The following table summarizes these statistics to arrive at a probability estimate of the ending value of the fund at December 31, 2003.

	Estimates of Investment Portfolio Ending Market Value		
	Est. Year End 2003		
	Costs in billions of dollars		
	Pessimistic Case	Base Case	Optimistic Case
Est. Beg. Market Value (10.1.02)	$ 45.172	$ 45.172	$ 45.172
Exp. Return %	-0.052	0.073	0.199
Exp. Return	-2.367	3.317	9.001
Est. Net Cash Flow	-0.890	-0.890	-0.890
Est. End. Mkt. Value (12.31.03)	**$ 41.915**	**$ 47.599**	**$ 53.283**

The table provides a confidence interval of the ending value of the investment portfolio at December 31, 2003. There is a 66% probability that the ending value will fall between the pessimistic estimate and the optimistic estimate. Statistically, there is a 17% chance that the ending value will fall below the pessimistic estimate, and a 17% chance that the ending value will be greater than the optimistic estimate.

Asset Allocation

The target asset allocation and ranges for 2003 is shown in the following table:

Asset Class	Target	Range	Peer Group
Domestic Equity	46%	+/- 3%	46%
International Equity	20%	+/- 3%	14%
Real Estate	9%	+/- 4%	4%
Private Equity	1%	+/- 3%	4%
Subtotal Equity	**76%**		**68%**
Global Bonds	23%	+/- 3%	29%
Cash	1%	NA	3%
Subtotal Debt	**24%**		**32%**
Total Fund	**100%**		**100%**

The preceding table shows that we have a level of exposure to domestic stocks that is consistent with our peer group. However, we have a materially higher commitment to equities overall versus our peer set due to our heavier allocation to international stocks.

A complete asset / liability study is scheduled for 2003, including the possible separate modeling of health care assets and liabilities.

Composition of Investment Portfolio

The following table displays OPERS' composition of internal and external asset management by asset class and in total, and compares our composition to a peer group of the top eleven public funds.

	Internal Management		External Management	
	OPERS	Peer Group	OPERS	Peer Group
Domestic Equity	85.0%	65.2%	15.0%	34.8%
International Equity	0.0%	33.0%	100.0%	67.1%
US Fixed Income	83.4%	86.5%	16.6%	13.6%
International Fixed Income	NA	13.8%	NA	86.2%
Real Estate	10.0%	18.6%	90.0%	81.4%
Private Equity	0.0%	10.0%	100.0%	90.0%
Weighted Averages	**60.8%**	**61.4%**	**39.2%**	**38.6%**

The table shows that OPERS is similar to the peer group in the high use of internal management for domestic equity and bonds, and the high use of external management for the more specialty asset classes such as real estate and private equity. We are somewhat dissimilar to the peer set in using external asset management exclusively in the international equity area. Overall, our internal / external management mix is very close to the average for the peer group.

The following table displays OPERS' composition of active and passive asset management by asset class and in total, and compares our composition to a peer group of the top eleven public funds.

	Active Management		Passive Management	
	OPERS	Peer Group	OPERS	Peer Group
Domestic Equity	28.8%	44.8%	71.2%	55.2%
International Equity	60.0%	68.7%	40.0%	31.3%
US Fixed Income	75.0%	85.2%	25.0%	14.8%
Weighted Averages	**52.8%**	**61.8%**	**47.2%**	**38.2%**

The table shows that OPERS is slightly lower than the peer group in the use of active management in the three publicly-traded asset classes shown. The largest difference appears in US equity, where OPERS has about 29% of the asset class actively managed versus nearly 45% for the peer group. Our greater use of passive management contributes to our lower implementation costs described later in this report.

Expected Fees

The following table depicts the expected annual external asset management fees per asset class, and for the fund in total. The estimate of fees is based on the "*Base Case"* estimate of year-end market value of $47.599 billion.

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
Domestic Equity	2.880	6.200	21.53
Global Bonds	1.933	5.309	27.47
International Equity	8.983	23.565	26.23
Real Estate	3.895	20.150	51.73
Private Equity	0.325	12.000	369.00
Short-Term Cash	0.000	0.000	0.00
Total Fund	**18.016**	**67.224**	**37.31**

We expect to incur $67.224 million in manager and advisor asset management fees in 2003, representing a cost of 37.31 basis points. Of the total amount of external fees, nearly two-thirds or $43.715 million is due to two asset classes, International Equity and Real Estate.

Fund and Asset Class Strategies

Performance Objective

The investment portfolio's performance objective is to earn a long-run rate of return that meets or exceeds the return of the policy benchmark. Where markets are generally efficient, such as domestic equity and domestic bonds, our out-performance goals are modest. In less efficient markets, such as International Equity and Real Estate, our goals for incremental return above the indexes are more aggressive.

The following schedule details the expected excess performance over the respective indexes, and displays the tracking error (volatility of returns) for each asset class and the overall investment portfolio.

The table shows that we expect the investment portfolio to out-perform the policy benchmark by 40 basis points annually, on average. The 50 basis points of estimated tracking error tells us that there is a 66% probability that our actual annual performance will be in a range of –10 basis points below the policy return to +90 basis points above the policy return. This confidence interval is arrived at by subtracting the tracking error statistic from the expected return to arrive at the lower bound, and adding the tracking error statistic to the expected return to arrive at the upper bound.

The statistics shown in the following table are rolled-up from the asset classes. The tracking error that results at the fund level is lower than the respective asset classes due to the diversifying effects of the asset classes on the total fund.

Schedule of Expected Performance and Volatility

	2003 Policy Allocation in Percent	Expected Performance Over Index in Bps	Contribution to Fund Performance in Bps	Estimated Tracking Error in Bps	Target Information Ratio
Domestic Equity	46.0%	20	9	50	0.40
Global Bonds	23.0%	30	7	60	0.50
International Equity	20.0%	75	15	175	0.43
Real Estate	9.0%	100	9	250	0.40
Private Equity	1.0%	NA	NA	NA	NA
Short-Term Cash	1.0%	NA	NA	NA	NA
Total Fund	**100.0%**		**40**	**50**	**0.80**

Total Fund Strategy

The investment discretion that is permitted at the total fund level relates to the rebalancing of the portfolio. Staff is permitted to rebalance toward, but not away from, policy targets. Further, staff is required to rebalance when asset allocations fall outside of prescribed ranges.

The economic and investment outlook, as forecasted by our economic advisor, Macroeconomic Advisors, calls for:

- Healthy economic growth in 2003/4 at 3.5%, supported by -
- continued low interest rates (fed funds expected to remain around 1.75%),
- low inflation (CPI expected to grow at 2.2% in 2003), and
- a continued strong housing market and a rebound in business investment spending.

Asset Class Outlook

Domestic Equities - favorable

- ✓ Favorable economic environment in 2003 should lead to earnings growth of 6 to 8%.
- ✓ Current equity market multiple (P/E of 18x) is in the "fair value range".
- ✓ Moderate GDP growth and low inflation environment could lead to return of 5% to 10% in 2003 after three straight years of negative returns.
- ✓ Investor sentiment improving.
- ✓ Geopolitical situation and terrorist threats pose risks.

International Equities - favorable

- ✓ International equity valuation is more attractive than the U.S on the basis lower P/E and P/B and higher yield.
- ✓ Economic situation in Europe and Asia-Pacific regions expected to improve with Central banks adopting accommodative monetary policies.
- ✓ Emerging markets are more attractively valued than developed markets.
- ✓ Dollar depreciation expected to favor un-hedged international equities.

Bonds - unfavorable

- ✓ The Lehman aggregate index currently yields 4.6%. With interest rates near 40-year lows, further price appreciation is unlikely.
- ✓ Monetary and fiscal stimulus will spur economic growth, leading to higher interest rates and price depreciation as the year progresses.
- ✓ High yield bonds are currently undervalued and will benefit from a stronger economy and lower defaults, resulting in strong relative performance.
- ✓ Corporate bonds are expected to outperform treasuries and agencies since spreads are wide and they will benefit from the stronger economy and the ongoing repair of corporate balance sheets.

Real Estate - unfavorable

- ✓ Over supply of capital in real estate due to lower interest rates and high investor interest.
- ✓ Declining property fundamentals in most property types.
- ✓ Expect further declines in property values in 2003.

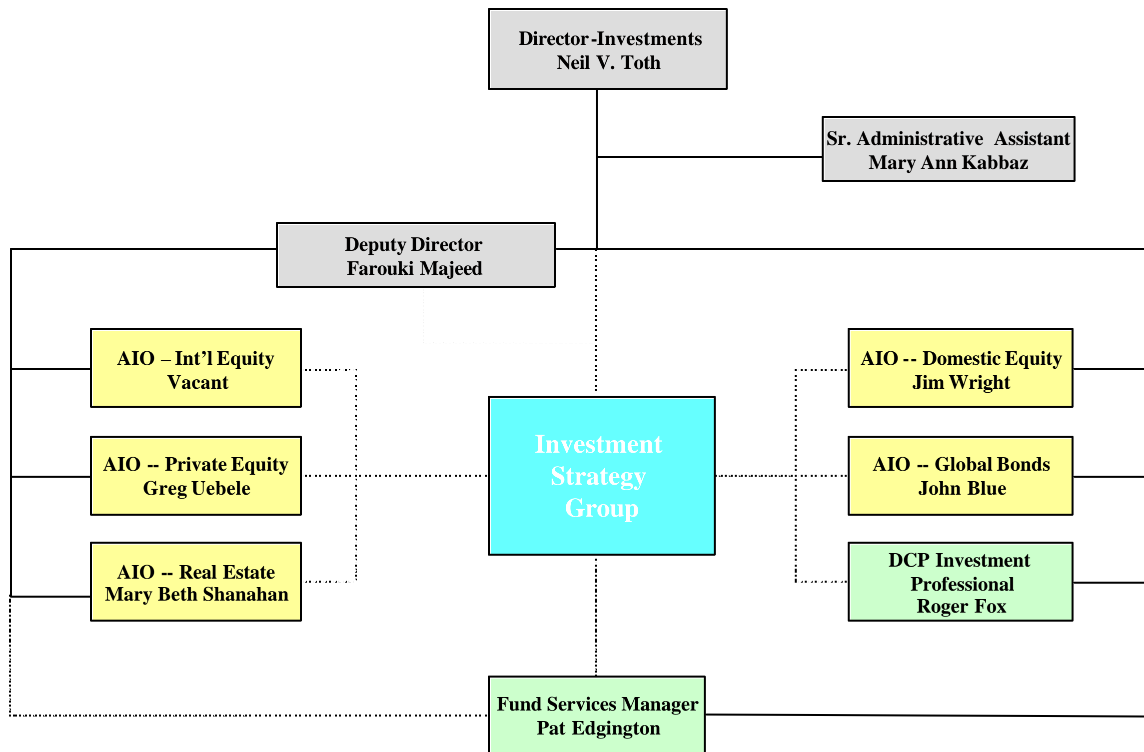
The risks to the forecast include a possible war with Iraq, which could weaken consumer confidence and spending, and the timing of the eventual shift by the Fed to higher interest rates. (Macroeconomic Advisers' complete 2003 Economic Outlook is provided in the appendix.)

The generally favorable economic outlook, combined with reasonable valuation levels in the US and international equity markets, will cause us to maintain a target or above-target allocation to equities, and a target to below-target allocation to fixed income. We are somewhat over-weight to real estate at present, and we intend to continue to pare our exposure opportunistically. The following table summarizes our anticipated re-balancing stance for 2003:

	Asset Allocation Rebalancing Bias			
	2003			
	Target	Upper Limit	Lower Limit	Rebalancing Bias
Domestic Equity	46.0%	49%	43%	+
Domestic Bonds	23.0%	26%	20%	-
International Equity	20.0%	23%	17%	+
Real Estate	9.0%	13%	5%	-
Private Equity	1.0%	4%	0%	NA
Short-Term Cash	1.0%	NA	NA	NA
Total Fund	100.0%			

Structure

The Investment Division is broadly structured as depicted in the chart below. A detailed organizational chart is included in each asset class section.



Responsibility for oversight of the Investment Division is shared between the Director and Deputy Director as depicted in the chart. The Investment Strategy Group (ISG) shown at the center of the chart is composed of the Director, Deputy Director, and the heads of the asset classes and departments. The ISG meets biweekly, or more frequently if needed, to evaluate pending actions and initiatives expected to have a material impact to the investment program. Typical topics of discussion in ISG meetings include:

- Portfolio rebalancing actions – timing and magnitude
- Sector over-weighting and under-weighting decisions
- Private market pending purchases, sales, or commitments
- Policy issues that impact strategy

The ISG is the primary means by which the senior management of the Investment Division evaluates, debates, and arrives at key decisions affecting performance or policy.

Resources

This major section reviews staffing and operating costs, and is divided into two sub-sections: Staffing and Operating Budget.

Staffing

The following table presents our anticipated full staffing at year-end 2003:

Schedule of Target Staffing at Year End 2003	Dom. Equity	Global Bonds	Int'l Equity	Real Estate	Private Equity	Fund Services	Admin	Defined Contrib	Total Inv. Div.
Current Staff (2002)	22	10	3	10	2	8	3	1	59
Vacant Positions	2	0	1	0	0	2	0	0	5
Est. Full Staff (2002)	24	10	4	10	2	10	3	1	64
Budgeted New Postions	0	1	0	0	0	0	0	0	1
+ / - Internal Transfers	0	0	0	0	0	0	0	0	0
Est. 2003 Full Staffing	**24**	**11**	**4**	**10**	**2**	**10**	**3**	**1**	**65**
Professional	21	9	3	9	2	7	2	1	54
Support	3	2	1	1	0	3	1	0	11

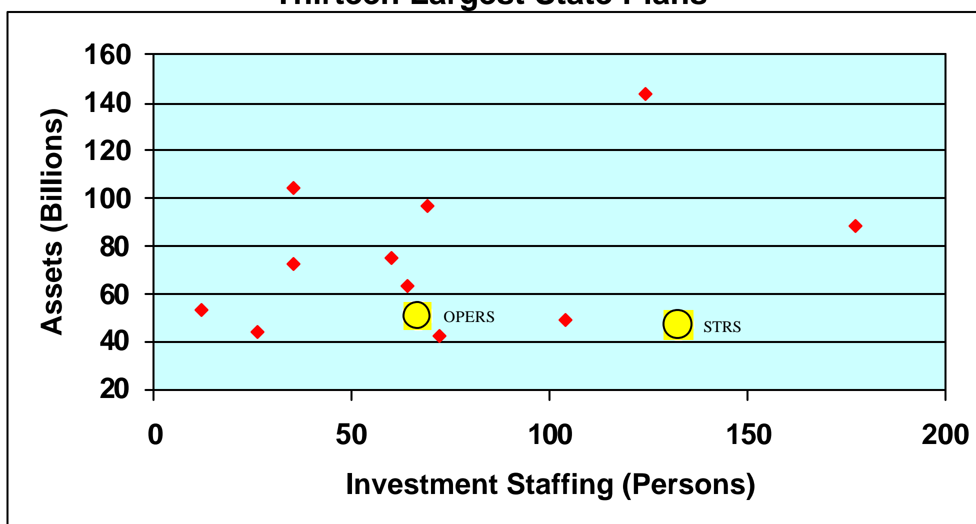
The Investment Department has five vacant positions resulting from turnover and budgeted-but-unfilled positions from 2002. We are budgeting for one new position within the department for 2003. We anticipate the addition of a private equity professional to be an internal transfer hired in the first quarter. Otherwise, an external candidate may be considered in the third quarter. At the end of 2003, we estimate the department will have 65 employees, composed of 54 investment professionals and 11 support persons.

The following table describes, by department and position, the vacant and budgeted new positions we will be addressing in the balance of 2002 and into 2003.

Status of Open Positions at Year End 2002	Position	Vacant	Newly Budgeted	Target Hire Date
Domestic Equity	Junior Quant Analyst	X		12/2002
	Active Equity Analyst	X		12/2002
Global Bonds	Portfolio Manager		X	06/2003
International Equity	AIO	X		12/2002
Fund Services	Cash Manager	X		06/2003
	Library Services Analyst	X		12/2003
Total	**6**	**5**	**1**	

The following chart compares OPERS' asset size and estimated year-end 2003 staffing to a peer set of the top twelve state pension funds. While implementation issues affect the relationship of asset size to staffing (for instance, the approach to real estate management at STRS), the chart provides a guide to our staffing relative to a peer set of funds.

The general conclusion from the chart is that we have sufficient staffing relative to our asset size to conduct the investment program. We have re-staffed from the depleted levels of a few years ago. Going forward, the appropriate focus of our senior management team should be on the productivity of existing staff.



The annual cost of salaries and benefits for the investment department, at the estimated 2003 full staffing level, is displayed in the following table:

	Schedule of Estimated 2003 Salary and Benefit Costs								
	Compensation dollars in millions								
	Dom. Equity	Global Bonds	Int'l Equity	Real Estate	Private Equity	Fund Services	Defined Contrib	Admin	Total Inv. Div.
Salaries	2.139	0.891	0.344	0.965	0.320	0.598	0.104	0.399	5.760
Benefits	0.805	0.317	0.116	0.366	0.119	0.209	0.040	0.169	2.142
Incentive Compensation	0.439	0.087	0.021	0.301	0.098	0.063	0.030	0.118	1.157
Recruit/Relocate & Temp	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.110	0.110
Total Compensation	3.383	1.295	0.481	1.632	0.537	0.870	0.174	0.796	9.169
Assets in $ billions	21.896	10.948	9.520	4.284	0.476	NA	NA	NA	47.599
Cost in Basis Points	1.55	1.18	0.51	3.81	11.29	0.18	NA	0.17	1.93

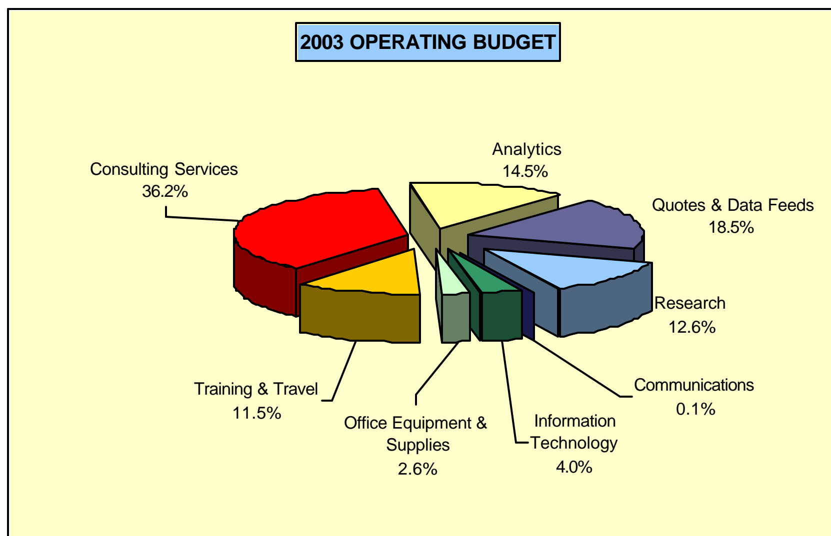
The comparable total figures for 2002 were $9.185 million and 1.64 basis points of assets. Aggregate compensation is expected to be up in 2003 due to the budgeted new hires. Compensation as a percent of assets is expected to increase due to higher aggregate compensation on a lower asset base.

Operating Budget

The Investment Department 2003 operating budget is set at $14.690 million. This represents an increase of $138,415 from the 2002 budget. Asset classes expecting increases in operating expenses include Global Bonds, Real Estate, Private Equity, Fund Services, and Defined Contribution. We expect decreases in Domestic Equity, International Equity, and Administration. The Domestic Equity area accounts for nearly 37% of the Investment Division operating budget.

	Schedule of Budgeted Operating Expenses by Department								
	Operating Budget in millions of dollars								
	Dom. Equity	Global Bonds	Int'l Equity	Real Estate	Private Equity	Fund Services	Defined Contrib	Admin	Total Inv. Div.
2002 Budget	5.816	1.707	1.021	1.905	0.873	0.904	0.114	2.211	14.551
2003 Budget	5.320	2.106	0.601	1.977	1.496	1.168	0.200	1.821	14.690
Percent Change	-8.5%	23.4%	-41.1%	3.8%	71.3%	29.2%	76.1%	-17.7%	1.0%
Percent of Total	36.2%	14.3%	4.1%	13.5%	10.2%	8.0%	1.4%	12.4%	100.0%
Asset Size ($ b)	21.896	10.948	9.520	4.284	0.476	NA	NA	NA	47.599
Budget in bps	2.43	1.92	0.63	4.61	31.43	0.25	NA	0.38	3.09

The preceding table shows that internal operating costs will exceed three basis points of total assets in 2003.



The accompanying pie chart displays the allocation of the operating expenses across major budget categories. The three main areas of operating expenses within Investments are consulting services, the combination of analytics + quotes & data feeds + research, and lastly, training and travel.

- The primary cost items in the Professional Services category include consulting fees for EK+A, as well as newly added costs for Real Estate and Private Equity consultants. In 2003, we estimate that consulting fees will total $2.330, composed of:
  - EK+A $580,000
  - PCG $1,000,000
  - Townsend $320,000
  - Special Projects $430,000

- The primary cost items in the Quote and Data Feeds category are Bloomberg and Bridge terminals. In 2003, we will be looking at ways to reduce quote-feed costs. In the category of Investment Analytics, the primary cost items are Factset, a market and company analytical package, BARRA, a risk measurement package for Domestic Equity, and StockVal, a company valuation package. In 2003, we will be assessing our use of FactSet to determine if we can lower costs for this package. In the category entitled "Research", the primary cost items are independent research services such as Thompson Financial, Intex, Moody's, IRRC, GEARS, & Bondscore.

- In training and travel, the primary cost item is business travel. Each asset class / department budgeted travel according to their estimated requirements. On average, estimated travel costs are $9,000 per professional employee in 2003.

Estimated Total Costs of Investment Program

As shown in the following table, the estimated total cost of the investment program in 2003 is $86.5 million or 18.2 bps of assets under management. The comparable figures in the 2002 Annual Plan were $89.3 million and 16.0 basis points. The decline in the size of the fund has caused the increase in the ratio of costs to total assets.

Schedule of Estimated Total Costs for Investment Department
Est. Year End 2003
Costs in millions of dollars

	Dom Equity	Global Bonds	Int'l Equity	Real Estate	Private Equity	Fund Services	DC Plans	Admin	Total Div.	% of Total
Staffing Costs	3.383	1.296	0.481	1.632	0.537	0.870	0.174	0.796	9.169	10.6%
Operating Budget	2.237	0.931	0.168	0.480	1.120	0.382	0.040	1.080	6.438	7.4%
Manager Fees	6.200	5.309	23.565	20.270	12.000	0.000	0.000	0.000	67.344	77.9%
Custody and Overhead								3.502	3.502	4.1%
Total	11.820	7.536	24.214	22.382	13.657	1.252	0.214	5.378	86.453	100.0%
Percent of Total	13.7%	8.7%	28.0%	25.9%	15.8%	1.4%	0.2%	6.2%	100.0%	
Asset Size ($ b)	21.896	10.948	9.520	4.284	0.476	NA	NA	NA	47.599	
Costs in bps to Asset Class	5.4	6.9	25.4	52.2	286.9	NA	NA	NA	NA	
Costs in bps to Total Fund	2.5	1.6	5.1	4.7	2.9	0.3	0.0	1.1	18.2	

The last row of the table displays the contribution of each asset class (or area) to the total estimated cost to run the Investment Division. The two asset classes with a high degree of external management, Real Estate and Non-US Equity, account for approximately 50% of the estimated total costs to run the investment program.

The 2001 Cost Effectiveness Measurement Survey of investment programs estimated the benchmark cost to run a program possessing the implementation characteristics of our fund to be $102 million or 18.5 basis points of assets (the survey used an asset base of $54 billion for OPERS).

Initiatives

The following text describes the proposed major initiatives that will be pursued in 2003. The list of proposed initiatives is shorter than in years past as we have addressed many of the findings of the Comprehensive Investment Review.

Division-Wide

1. **Conduct Mini Comprehensive Investment Review.** This initiative will be focused on assessing and enhancing the internal asset management functions within the division. A project consultant will be hired. This initiative will begin in the second-half of 2003.
2. **Conduct Asset - Liability Study.** The current asset allocation was determined during 2000. In the second half of 2003, a formal asset-liability study will be undertaken, conducted by our retainer investment advisor, Ennis Knupp. The separate modeling of health care assets and liabilities will be evaluated during the first half of the year.
3. **Implement Initial Risk Budgeting Approach.** This initiative, which is a holdover from 2002, is focused on adopting a more rigorous approach to evaluating, allocating, and reporting risk levels for the asset classes and total fund. The effort to develop a more rigorous approach to risk analysis was handicapped in the past due to the lack of full custody services, which now has been addressed with the hiring of a fund accountant. A project consultant will be retained to assist staff in this effort, which is expected to occur throughout the year. The board will be provided periodic updates and educational sessions as warranted.

Domestic Equity

4. **Evaluate Style Tilt.** This initiative is aimed at evaluating the possible benefits and risks associated with adopting a modest small and mid-cap style tilt to the overall portfolio. Research has found that over the long-term, small and mid-cap stocks tend to provide better returns than large cap stocks. However, small and mid-cap stocks can suffer long periods of underperformance relative to large caps. A report will be prepared by the third quarter.
5. **Evaluate Data Platforms.** A major portion of the divisional operating budget is devoted to quote and data feeds and financial information. This initiative is

focused on evaluating our mix of vendors and services, and reducing costs and any possible redundancies. This initiative is expected to take the better part of the year.

Global Bonds

6. **Evaluate Asset Allocation and External Managers.** The bond area suffered under-performance in 2002 arising from internal and external portfolios. This initiative is aimed at reassessing the current approach utilizing core, core plus, and specialty managers (high yield and emerging markets), and evaluating the current manager roster for possible changes. This effort will be conducted in the first half of the year.
7. **Evaluate Mortgage Dollar Rolls.** The mortgage dollar roll market offers OPERS an opportunity to add incremental return to the bond asset class as relatively low levels of risk. A report will be prepared in the first quarter in conjunction with the investment consultant, and a recommendation made to the Board on pursuing such a strategy.

International Equity

8. **Implement New Policy and Strategy.** In the third quarter of 2002, a policy was approved for the asset class that calls for a 60% allocation to active management, a 15% allocation to enhanced management, and a 25% allocation to passive management. Under this initiative, staff will reconfigure the asset composition to the new allocation through selective manager terminations / reductions, and new manager hires. The portfolio is expected to have a composition that is consistent with policy by the end of the second half of 2003.
9. **Evaluate Currency Overlay.** Research was conducted on currency hedging in 2001, with an informational report provided to the Board. This initiative seeks to finalize the initial research, working in conjunction with our investment advisor (EKA). The focus of the research will be on currency overlay programs, particularly for assets that are held in passive portfolios. A recommendation will be provided to the Board in the second half of the year.
10. **Portfolio Internalization Research.** In the 2002 Annual Plan, staff included an initiative to study the feasibility of internal management of international equity assets. This project was deferred due to the departure of the AIO for International Equity and the reassessment of priorities for the department under the direction of the Deputy Director-Investments. The formulation of the investment policy and strategy for the asset class and the development of staff capability to monitor the external portfolios became immediate priorities. Job delegation and staff training efforts are proceeding well. Once a decision is made about hiring an AIO for this department, it would be appropriate to revisit this issue in the 2004 plan.

Real Estate

11. **Prepare Plan to Reposition Assets.** Staff, working in conjunction with Townsend, will prepare a multi-year plan to reposition the real estate program along the lines of the policy that is expected to be adopted prior to year-end 2002. The repositioning plan will take into account market valuations, liquidity, existing manager capabilities, and other factors. The plan will be presented to the Board in the first quarter.
12. **Update Real Estate Processes.** This initiative is focused on evaluating the roles and responsibilities of staff and advisors under the new real estate structure. It is anticipated that in certain circumstances, staff and advisor roles may need to change to suit the new approach and strategy. Staff, working with Townsend, will prepare a report by the end of the first quarter.

Private Equity

13. **Evaluate Investment Tracking Package.** In conjunction with Fund Services and Investment Accounting, the private equity area will evaluate investment tracking software offered by State Street and third party vendors. While PCG currently offers investment tracking services to OPERS, we may choose to perform this function internally, assuming it is cost-effective, in order to not be entirely dependent on the consultant over the long-term. This effort will be conducted in the first half of the year.
14. **Prepare Position Paper on Co-Investments.** Working in conjunction with PCG and EK+A, the Private Equity department will prepare a paper on the advantages and risks of co-investing. Co-investing is the act of making direct investments in portfolio companies along side of the general partners. At present, our policy precludes us from entering into direct investments. The paper will outline key issues and provide a recommendation. This effort will be conducted in the second half of the year.

Defined Contribution

15. **Hire Independent Consultant.** The DC area will conduct a search for and retain a consultant to provide oversight and performance reporting to the Board for the DC assets. The consultants used in 2001/2 during the planning and implementation, Mercer and Callan, were hired under project mandates.

Fund Services Group

16. **Review Securities Lending Programs.** This initiative began in the third quarter of 2002 and will conclude in the first half of 2003. With the assistance of a project consultant (to be hired) we will evaluate all aspects of our lending programs. The Board will receive a comprehensive report. As a result of the report, the domestic programs may be re-bid.

17. **Evaluate Cash Management.** This initiative, which overlaps with the securities lending review, is aimed at evaluating and improving the management of short-term cash at OPERS. Possible changes include where the function reports, the interaction with OPERS Accounting, and the guidelines used for cash reinvestment. A report will be prepared and shared with the Board by the end of the second-half.

Domestic Equity

Asset Management

Strategy

The Domestic Equity asset class is expected to produce a return, net of expenses, equal to or greater than that of the Russell 3000 Index while incurring a comparable degree of volatility. In calendar year 2003, the asset allocation to the Domestic Equity asset class will be set at a target level of 46%. Last year, the target allocation was set at 47%. The difference is a result of a higher targeted allocation for the Private Equity asset class in 2003.

The Domestic Equity asset class utilizes both index (passive) and active management styles. Given the relative efficiency of the domestic equity markets and the total size of assets under management ($22 billion), a majority of the domestic equity program will be managed on an index or passive basis. Within a policy range of 65 – 75% for the passive allocation, we have set a single point target of 71% for the Domestic Equity asset class in 2003. The remaining 29% will be actively managed.

Our strategy for 2003 will incorporate both internal and external managers for the designated portfolios. External managers are used for index, large cap active and small cap active mandates. PERS' internal staff manages index and large cap active mandates. Both the external large and small cap managers are used for their "core" management approaches. These managers are expected to achieve their "alpha" or outperformance, primarily from their emphasis on bottom-up fundamental analysis and subsequent stock selections. Internally, the Research Portfolio combines a quantitative ranking system along with fundamental analysis and insights provided by the Domestic Equity staff of analysts. This "intersection" provides the recommendations for the Portfolio Committee and the primary source of "alpha" in this particular portfolio.

In 2003, we plan on researching the strategies of introducing style tilts in the Domestic Equity asset class. This will be one of the Initiatives scheduled for the Domestic Equity department in 2003. Historically, small and mid cap stocks have outperformed their larger cap brethren by 150 to 200 basis points per annum. Even with the recent period (last two years) of outperformance, we still believe there is the potential to capture more alpha by over-weighting the small and mid cap sectors.

The following paragraphs briefly describe the specific strategies within the four (active – internal, active – external, index – internal and index – external) main pillars of the Domestic Equity asset class.

Active Portfolios – Internal

The Research Portfolio represents 20% of the total assets within the Domestic Equity asset class. This enhanced product has been structured to achieve outperformance in a broadly diversified portfolio by utilizing a Quintile Ranking based Stock Selection System (SSS) in combination with a risk management process that results in a low tracking error. Stocks that pass the above screening process are candidates to be overweighted, while issues that rank at the bottom of the SSS and the validation screens are candidates to be sold entirely or underweighted.

Active Portfolios – External

We will continue with the five external managers that were selected in November 2001. The two large capitalization managers are benchmarked to the Russell 1000 while the three small capitalization managers are benchmarked to the Russell 2000. On a combined basis, these managers will be responsible for approximately 9.0% of the Domestic Equity asset class.

We are using managers that are typically referred to as "core" portfolios. As such, most of the portfolios will not exhibit significant style biases.

The following is a brief description of each externally managed active portfolio and each manager's benchmark.

Manager	**Benchmark**
AllianceBernstein Institutional Investment Mgmt.	**Russell 1000**

Blend of growth and value portfolios managed largely independently by Alliance and Bernstein resulting in a structured, style neutral portfolio

Wellington Management Company — **Russell 1000**

Sector neutral approach managed by Wellington's 38 Global Industry Analysts

Capital Guardian Trust Company — **Russell 2000**

Very experienced portfolio managers and analyst team manage a well-diversified portfolio utilizing "multiple portfolio manager" strategy

Fidelity Management Trust Co. — **Russell 2000**

Seasoned portfolio manager supported by a dedicated team of small cap analysts focused on financially strong companies selling at valuations at or below the market

INVESCO, INC. — **Russell 2000**

Structured, quantitative process that neutralizes all bets except active stock bets

Index Portfolio – Internal

There will be one internally managed index portfolio in 2003. The R3000 Index portfolio will fall under the direction of the Manager of Passive Investments.

The Russell 3000 Index portfolio is managed to produce index-like returns, while preserving the assets of the portfolio by maintaining a low-cost profile. Replicating the index as closely as possible, though with fewer securities than are in the Index, results in low turnover, accurate tracking and low costs.

The expected tracking error ceiling is 10 basis points, except at Russell reconstitution time when tracking error may increase to as much as 35 basis points. The benefits of this methodology include: a broad exposure to the domestic equity market is maintained, turnover and transaction costs are minimized, and the performance goal matching the benchmark is achieved.

Index Portfolio – External

The portfolio managed by Barclays Global Investors (BGI) is benchmarked to the Russell 3000 Index and maintains an expected tracking error below 10 basis points. BGI provides sophisticated passive management strategies and offers PERS the educational opportunities that a partnership with an experienced index portfolio management team provides. The Domestic Equity staff has worked closely with BGI to compare the strategies utilized for the PERS internal portfolio on a daily basis and at reconstitution time with the externally managed portfolio. PERS' strategies and procedures have improved as a result of the interaction with BGI.

Performance Objectives & Risk Control

The Domestic Equity asset class uses the broad, Russell 3000 Index as a benchmark. The allocation between actively and passively managed funds establishes the overall risk and return profile within the Domestic Equity asset class. The *passive component* (Russell 3000 Passive) will be benchmarked to the overall Russell 3000 Index. The general strategy is to manage this portfolio to deliver near-index returns. As such, the passive component is not expected to deliver excess returns, or alpha, going forward. Therefore, the outperformance expectations for the Domestic Equity department will primarily be dependent upon the efforts and composition of the *active component* of the portfolio.

Based upon risk tolerances established at the overall fund level, Domestic Equity is allocated a risk budget of 50 basis points. We believe our current strategy and the resulting mix of portfolios can deliver an excess return or alpha of 20 basis points in calendar year 2003 with an estimated tracking error of 37 basis points. As a result, we are targeting an information ratio (or a level of alpha per unit of risk) for the Domestic

Equity asset class of 0.55. These results were computed with Barclay's PortfolioWorks software.

The following schedule details the tracking error budget for each portfolio in the Domestic Equity asset class and the corresponding excess performance expectations.

Schedule of Expected Performance and Volatility

Index	Portfolio Expected Allocation ($ billions)	% of Total Portfolio	Benchmark	Expected Performance Over Index in Bps	Estimated Tracking Error in Bps	Target Information Ratio
R3000 Index	14.591	66.6%	*Russell 3000*	0	0	0.00
Barclays R3000 Index	0.990	4.5%	*Russell 3000*	0	0	0.00
Total Index	15.582	71.2%	*Russell 3000*	0	0	0.00
Internal Active						
Research Portfolio	4.334	19.8%	*Russell 1000*	38	150	0.25
Total Internal Active	4.334	19.8%	*Russell 3000*	38	150	0.25
External Active						
Large Cap						
AllianceBernstein	0.793	3.6%	*Russell 1000*	141	470	0.30
Wellington	0.754	3.4%	*Russell 1000*	105	350	0.30
Small Cap						
Capital Guardian	0.134	0.6%	*Russell 2000*	210	600	0.35
Fidelity	0.150	0.7%	*Russell 2000*	260	650	0.40
Invesco	0.148	0.7%	*Russell 2000*	140	350	0.40
Total External Active	1.980	9.0%	*Russell 3000*	141	274	0.51
Total Fund	21.896	100.0%	*Russell 3000*	20	37	0.55
Goal	21.896	100.0%	*Russell 3000*	20	50	0.40

Note: Estimated tracking errors and target information ratios for the external active managers were derived from the manager's own historical results and peer group comparisons.

Composition

The following table summarizes the Domestic Equity characteristic information at the end of 2002, and the estimated characteristic information at the end of 2003.

Estimate of Internal/External and Active/Passive Composition

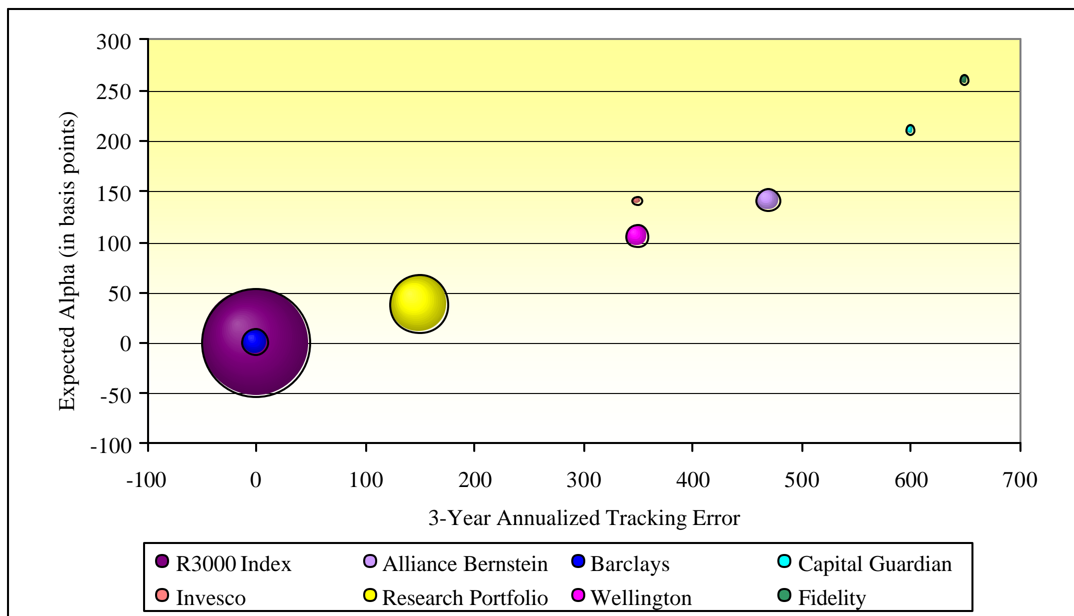
		Est. Year End 2002			Est. Year End 2003		
		Active	Passive	Total	Active	Passive	Total
Domestic Equities	Internal	20.0%	65.0%	85.0%	19.8%	66.6%	86.4%
	External	10.0%	5.0%	15.0%	9.0%	4.6%	13.6%
	Total	***30.0%***	***70.0%***	***100.0%***	***28.8%***	***71.2%***	***100.0%***

The following schedule details the average assets under management by individual portfolio along with the expected fees or costs associated with each of the portfolios. For the internally managed portfolios, the cost components consisted of the department's total compensation and operating budget for 2003. The time spent by each staff member on the respective internal portfolios was the metric selected to allocate the total costs.

Schedule of Portfolio, Size & Estimated Fees

	Mandate	Benchmark	Average Assets Under Management ($ millions)	Estimated Annual Fee ($ millions)	Estimated Annual Fee (bps)
Internal					
Research Portfolio	LC Core	Russell 1000	$4,203	4.172	9.93
R3000 Index	Passive	Russell 3000	$14,151	1.466	1.04
External					
Alliance Bernstein	LC Core	Russell 1000	$769	1.923	25.00
Wellington	LC Core	Russell 1000	$731	1.901	26.00
Fidelity	SC Core	Russell 2000	$146	0.920	63.00
Invesco	SC Core	Russell 2000	$143	0.715	50.00
Capital Guardian	SC Core	Russell 2000	$130	0.455	35.00
Barclays Global	Passive	Russell 3000	$961	0.288	3.00
Total		Russell 3000	$21,234	11.838	5.58

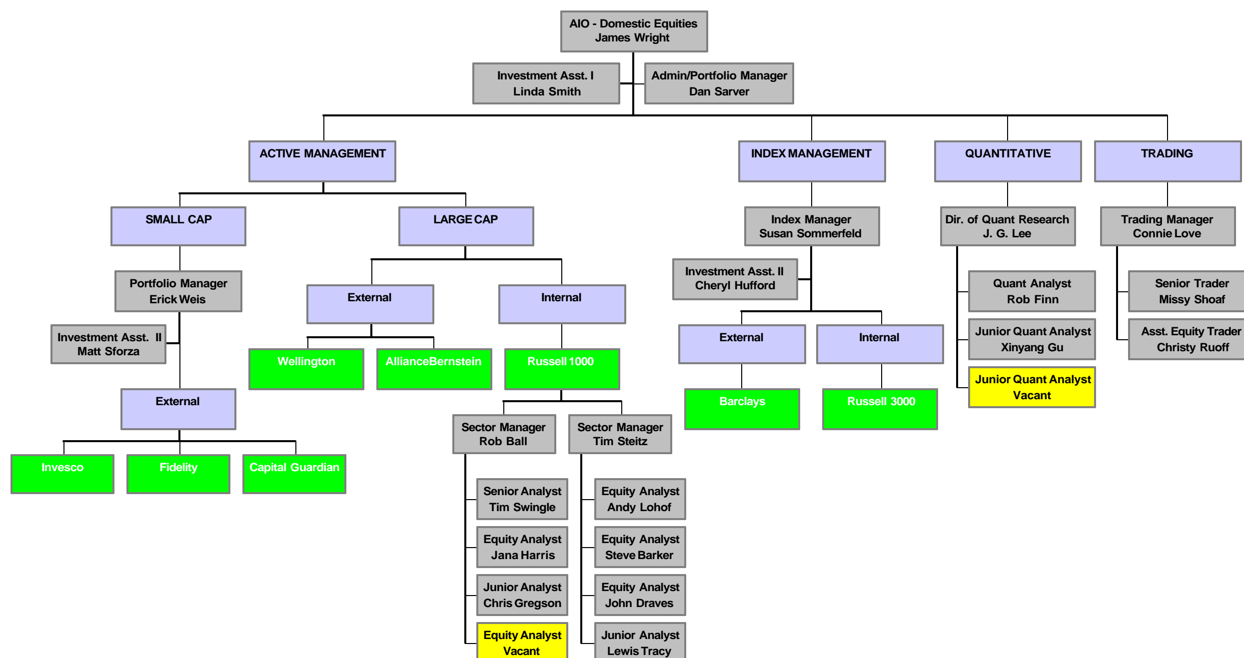
The following exhibit displays the expected alphas and tracking errors of the individual Domestic Equity portfolios in a "Bubble Chart" format.



Resources

Organizational Structure

The accompany chart displays the projected organizational structure as of the middle of calendar year 2003.



The Domestic Equity department is currently arranged with five managers reporting to the Assistant Investment Officer – Domestic Equity. The five areas of responsibility are: Active Management, Index Management, Quantitative Research, Trading and Administration. The responsibility of monitoring the external active managers is shared by the Manager of Active Investments (who covers the small cap area) and the Admin/Portfolio Manager (who covers the large cap managers).

The internally managed large cap portfolio (Research Portfolio) was started up in October 2002. A Portfolio Committee consisting of the AIO – DE, the Manager of Active Investments, the two Sector Managers and the Admin/Portfolio Manager are responsible for the overall management of the Research Portfolio. The Admin/Portfolio Manager is also responsible for the monitoring and oversight of the external large cap managers. The two Sector Managers oversee the Fundamental Analytical staff, which consists of seven current members. One additional analyst with experience covering the Financial Services companies is expected to be hired before year-end 2002 to fill a vacancy.

The Manager of Index Investments is responsible for the entire passively managed component of the Domestic Equity portfolio including both internal and external monies.

The Quantitative Manager currently oversees two quantitative analysts. One additional junior analyst is expected to be hired before year-end 2002. This vacant position was originally slotted in the Index Management area. This individual will still spend a considerable amount of their time providing quantitative support to the Manager of Index Investments. However, the increasing department needs for quantitative assistance justified moving the responsibility of this position over to the Quantitative Manager. The Quantitative staff provides the research support (backtesting, risk control, maintenance of the quintile ranking Stock Selection System and other tasks) for all the managers in the Domestic Equities asset class. In addition, the Quant group provides the specific day-to-day backup support to the Index Management component.

The Trading Manager heads up a three-person department, responsible for executing the passive program trades and trading both the internally managed Research and Small Cap Active portfolios.

Staffing / Hiring

The Domestic Equity department currently has 22 members on staff, with two additional members expected to be hired before year-end 2002. With these hiring's, the Domestic Equity staff will consist of 21 professionals and 3 support personnel, for a total of 24 staff members.

Schedule of Target Staffing at Year End 2003

	Domestic Equity
Current Staff (2002)	22
Vacant Positions	2
Est. Full Staff (2002)	24
Budgeted New Postions	0
+ / - Internal Transfers	0
Est. 2003 Full Staffing	24
Professional	21
Support	3

Assuming full staffing levels at year-end 2003, the following chart details the annual cost of salaries, benefits and incentive compensation paid in 2003 (assuming the target payout level) for the Domestic Equity asset class.

Schedule of Estimated 2003 Salary and Benefit Costs	
Compensation dollars in millions	
	Domestic Equity
Salaries ($ mm)	2.139
Benefits ($ mm)	0.805
Incentive Comp. ($ mm)	0.439
Total Comp. ($ mm)	3.383
Assets in $ billions	21.896
Cost in Basis Points	1.55

The projected compensation costs of the Domestic Equity staff as a percent of total managed assets is 1.55 basis points.

Asset Management Fees

The Domestic Equity asset class utilizes both internal as well as external managers to achieve the performance objectives, as detailed in this plan. The estimated external asset management fees for 2003 are shown on the accompanying table.

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
Russell 3000 Passive	0.961	0.288	3.00
Russell 1000 Large Caps	1.500	3.824	25.50
Russell 2000 Small Caps	0.419	2.087	49.80
Total Domestic Equity	**2.880**	**6.200**	**21.53**

Operating Budget

The Domestic Equity department 2003 operating budget is set at $5.320 million, an 8.5% decrease versus the 2002 budget of $5.816 million. This amount represents 2.43 bps of our total Domestic Equity assets of $21.896 billion. The schedule of Budgeted Operating Expenses is presented below. Research Services is a category within the budget that is expected to see a significant increase in 2003 relative to 2002. Four service providers basically account for the entire increase ($231,000 of the $238,442) within this category.

We will be utilizing a quality of earnings analysis service called Center for Financial Research & Analysis or "CFRA" to help identify companies that employ unusual or aggressive accounting practices. In addition, we will be employing Global Equity Analytics & Research Services (GEARS) to deliver comparable, historical time-series data that will be used for ratio calculations by the fundamental research staff and the data will be used as inputs into our quintile ranking Stock Selection System (SSS). Finally, several of the new database platforms require additional investment information feeds from Thomson Financials. The additional costs associated with this service account for the rest of the budgeted increase.

	Schedule of Budgeted Operating Expenses						
	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$3,784,390	$3,083,495	(700,895)	-18.52%	57.96%		
Investment Consulting Services	$0	$0	-	-	0.00%		
Quotes & Data Feeds	$706,741	$686,300	(20,441)	-2.89%	12.90%		
Research Services	$168,258	$406,700	238,442	141.71%	7.64%		
Analytics	$771,541	$654,500	(117,041)	-15.17%	12.30%		
Communications	$0	$500	500	-	0.01%		
Information Technology	$0	$114,750	114,750	-	2.16%		
Office Equipment & Supplies	$2,730	$18,900	16,170	592.31%	0.36%		
Training & Travel Expenses	$382,050	$355,085	(26,965)	-7.06%	6.67%		
Total	$5,815,710	$5,320,230	(495,480)	-8.52%	100.00%	$21.896	2.43

The following table lists the total cost estimates for managing the Domestic Equity portfolio. The total costs for internal management is projected to reach 3 basis points of the internal Domestic Equity assets under management. The total external management costs (fees) are estimated at 20.9 basis points of the external Domestic Equity assets under management. As a percent of the total Domestic Equity portfolio, internally managed assets will account for 86.4% and the external assets under management will make up the remaining 13.6%.

	Schedule of Estimated Total Costs		
	Est. Year End 2003		
	Costs in Millions of Dollars		
	Internal	External	Total
Staffing Costs	3.383	-	3.383
Operating Budget	2.237	-	2.237
Manager Fees	-	6.200	6.200
Total Costs	5.620	6.200	11.820
Assets Under Management	18,925.0	2,971.0	21,896.0
Costs in Bps	3.0	20.9	5.4

Initiatives

Evaluate Style Tilt

- This initiative is aimed at evaluating the possible benefits and risks associated with adopting a modest small and mid-cap style tilt to the overall portfolio. Research has found that over the long-term, small and mid-cap stocks tend to provide better returns than large cap stocks. However, small and mid-cap stocks can suffer long periods of underperformance relative to large caps. A report will be prepared by the third quarter.

Evaluate Data Platforms

- A major portion of the divisional operating budget is devoted to quote and data feeds and financial information. This initiative is focused on evaluating our mix of vendors and services, and reducing costs and any possible redundancies. This initiative is expected to take the better part of the year.

Global Bonds

Asset Management

Strategy

The Global Bond Asset Class uses a combination of internal and external management to optimize potential return given a budgeted amount of allowable risk, while maintaining an attractive cost structure. Internal staff actively manages the active "core" portfolio, focusing on investment grade securities. External managers specializing in the management of high yield and emerging market debt augment the active core portfolio. These portfolios were initially funded according to their representation in the Lehman Universal Index. Going forward, their allocation will be managed to ensure the combined fixed income asset class remains within the parameters stated in the Global Bond Investment Policy (to be presented to Board in early 2003).

The Global Bond Department also utilizes two external managers with "core plus" mandates benchmarked to the Lehman Universal Index. These managers were hired to add incremental performance and to provide the internal staff with insights to aid with internal management. In 2003, the allocation between core and non-core fixed income assets will be reviewed to optimize Global Bond portfolio performance. External managers will be assessed to make sure they continue to provide value-added services to the Global Bond Department.

The current structure, which was recommended by Ennis Knupp as part of the Comprehensive Investment Review, was implemented near the end of 2001. In October 2002, Ennis Knupp recommended indexing a portion of the Global Bond portfolio. Currently, the Global Bond Department is reviewing the merits and costs of implementing this strategy.

Performance Objectives & Risk Control

The Global Bond Asset Class uses the Lehman Universal Index as its benchmark. Based upon risk tolerances established at the overall fund level, Global Bonds is allocated a risk budget of 60 basis points. This risk is referred to as tracking error and corresponds to the expected performance relationship between the Global Bond portfolio and that of the Lehman Universal Index. The negative correlation of the portfolios' excess returns leads to a reduction in overall asset class risk. This results in an overall expected information ratio that is higher than those achieved by individual managers.

A tracking error of 60 bps means that 66% of the time, the asset class portfolio will be within 60 bps of the benchmark, on an annualized basis. Based on the expected excess return of 30 bps and the 60 bps tracking error, the targeted information ratio is 0.5.

	Schedule of Expected Performance and Volatility					
Internal	Portfolio Expected Allocation ($ billions)	% of Total Portfolio	Benchmark (Lehman)	Expected Performance Over Index in Bps	Estimated Tracking Error in Bps	Target Information Ratio
Internal Core	9.054	82.7%	Aggregate	25	60	0.42
External						
Metropolitan West	0.525	4.8%	Universal	75	300	0.25
Morgan Stanley	0.569	5.2%	Universal	75	200	0.38
Shenkman Capital	0.296	2.7%	High Yield	100	500	0.20
W.R. Huff	0.197	1.8%	High Yield	100	500	0.20
Capital Guardian	0.175	1.6%	Emerging Market Debt	100	500	0.20
Salomon Asset Management	0.131	1.2%	Emerging Market Debt	100	600	0.17
Total Active	10.948	100.0%				
Passive - Index	-	0.0%	Aggregate	0	0	
Total Global Bonds	10.948	100.0%	Universal	30	60	0.50

The portfolios will be re-balanced as needed so that the overall structure remains within the ranges specified in the Global Bond Investment Policy. Staff may rebalance to take advantage of longer-term opportunities in the market.

Core – Internal

The Core portfolio represents the majority of the assets within the Global Bond Asset Class. The Global Bond internal investment staff actively manages the core portfolio benchmarked to the Lehman Brothers Aggregate Index. This portfolio utilizes a "core" strategy with a high proportion of assets invested in securities contained in the index and duration deviations relative to the index are less than 10%. The projected tracking error of the portfolio will be maintained at less than 60 basis points.

Core Plus – External

External managers benchmarked against the Lehman Brothers Universal Index manage approximately 10% of Global Bond assets. These portfolios maintain higher risk profiles than the core portfolio because they hold both high yield and emerging market debt securities. These portfolios may also deviate significantly from the index in terms of duration, sector, and credit quality. Issuer position limits are relatively high compared to the internal portfolio, allowing each manager to add value through security selection. The risk of higher issuer limits is mitigated by the fact that each manager manages approximately 5% of total Global Bond assets. Tracking error for the core plus managers has historically been 200 to 300 bps, although they do not manage to a tracking error target.

High Yield Debt - External

High yield securities represent approximately 4.5% of the Universal Index. Due to the high level of credit risk in this sector, external "specialists" are used for the

high yield debt portfolio. The outperformance comes from security selection, which is supported by labor-intensive credit research. Portfolio guidelines for the managers allow broad discretion in the high yield universe. Tracking error targets do not apply to high yield managers, however historical tracking error has been near 500 bps.

Emerging Market Debt - External

Emerging market debt securities represent approximately 2.5% of the Universal Index. External specialty managers are used for the emerging market debt sector due to its high volatility and the political risk inherent in these securities. The emerging market debt managers' primary source of value added is country selection. Tracking error targets do not apply to emerging market debt managers, however historical tracking error has been between 500 bps and 600 bps.

Global Bond Composition

The following table summarizes the allocation of the Global Bond portfolio between the internal and external managers. Currently, there is no allocation for a passive or index portfolio.

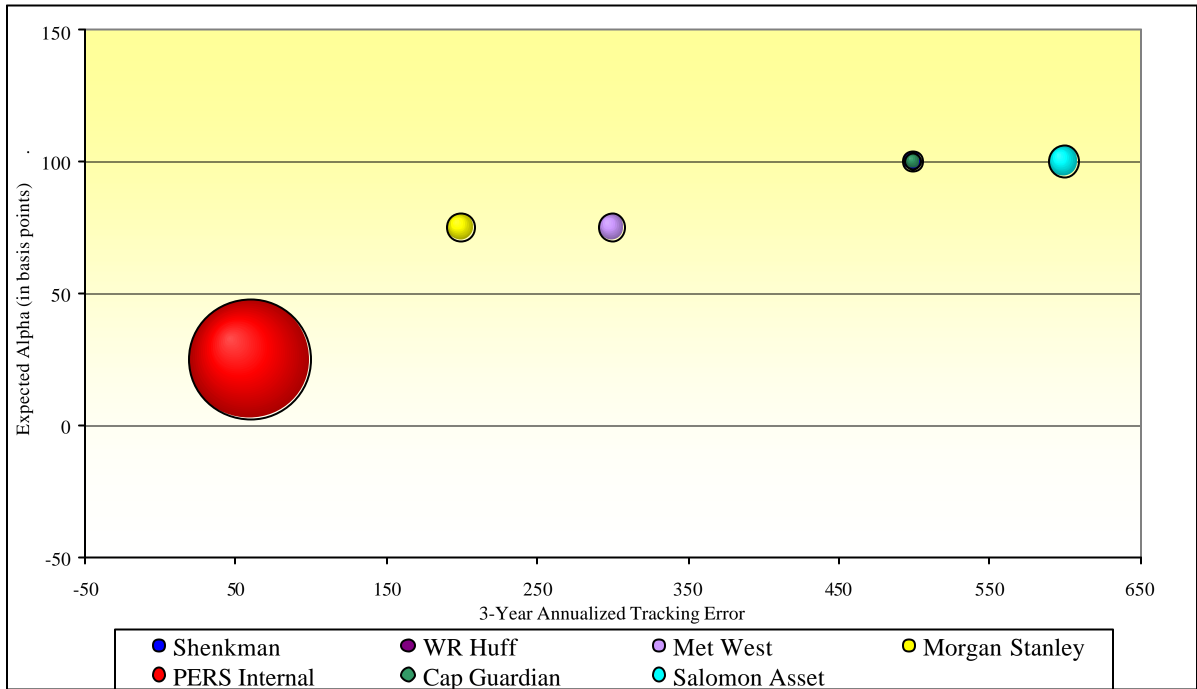
		Estimated Year End 2002			Estimated Year End 2003		
		Active	Passive	Total	Active	Passive	Total
Global Bonds	Internal	83.4%	0.0%	83.4%	82.7%	0.0%	82.7%
	External	16.6%	0.0%	16.6%	17.3%	0.0%	17.3%
	Total	*100.0%*	*0.0%*	*100.0%*	*100.0%*	*0.0%*	*100.0%*

In calendar year 2003, the asset allocation to the Global Bond asset class will remain near the target of 23%. The 23% target was achieved at the end of 2001 and has been maintained throughout 2002. The total Global Bond allocation now stands at approximately $10.5 billion, and assuming growth at the investment consultant’s long-term growth rate, would reach $10.945 at the end of 2003. The capital markets assumptions contained in Ennis Knupp’s asset/liability study cited an expected return of 4.5% for fixed income securities.

	Mandate	Benchmark	Average Assets Under Management ($ millions)	Estimated Annual Fee ($ millions)	Estimated Annual Fee (bps)
Internal					
Internal Core	Core	**Lehman Aggregate**	$9,012	-	-
External					
Metropolitan West	Core Plus	**Lehman Universal**	$546	0.93	17.00
Morgan Stanley	Core Plus	**Lehman Universal**	$601	1.02	17.00
Shenkman Capital	High Yield	**Lehman High Yield**	$299	1.26	42.00
W.R. Huff	High Yield	**Lehman High Yield**	$184	0.92	50.00
Capital Guardian	Emerging Market Debt	**Lehman Emerging Market**	$175	0.61	34.70
Salomon Asset Management	Emerging Market Debt	**Lehman Emerging Market**	$128	0.58	45.00
Total Active			$10,945		
Passive - Index	Passive Index	**Lehman Aggregate**	-	-	-
Total		**Lehman Universal**	$10,945	5.31	4.85

Table title: **Schedule of Portfolio, Size & Estimated Fees**

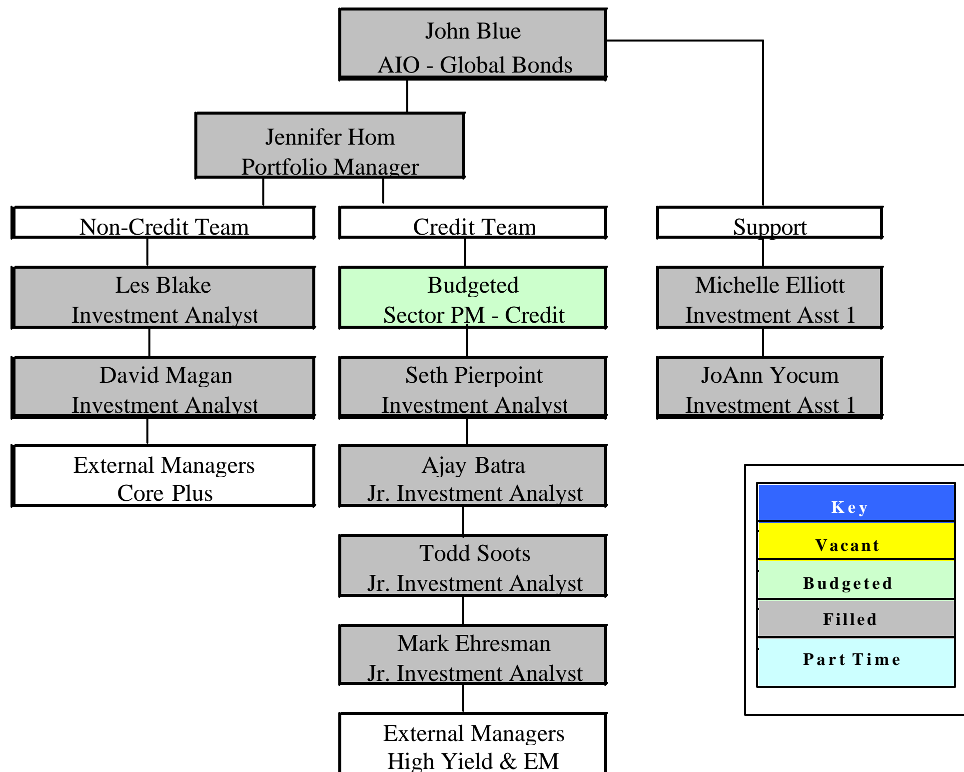
The following exhibit displays the expected alphas and tracking errors of the individual Global Bonds portfolios in a “Bubble Chart” format**.**



Resources

Organizational Structure

The current organizational structure is as follows:



Staffing / Hiring

The Global Bond department currently employs eight professionals and two support personnel. The professionals in the fixed income department are broken into two teams: a Credit Team and a Non-Credit Team. The Credit Team is responsible for the credit sector including credit research and security selection. The Credit Team is also responsible for monitoring the high yield and emerging market debt managers. The Non-Credit Team is responsible for the treasury, agency, mortgage, CMBS, and ABS sectors. The Non-Credit Team is responsible for monitoring the core plus managers.

The Portfolio Manager is responsible for risk control and ensuring the investment process is followed in a disciplined manner. The AIO and PM have oversight responsibility over both teams (including approval of all trading activity), and are responsible for duration, curve, and sector positioning. This structure makes each professional accountable for decisions within their area of expertise.

While junior members of staff are assigned to a team, they also spend a considerable amount of time learning the other sectors of the market in order to become familiar with all aspects of the fixed income market.

The team-oriented organizational structure reduces the potential negative impact of the departure of any one employee. Analysts on each team understand all security types covered by their team, and serve as a back up when necessary. In the upcoming year, we intend to designate a sector portfolio manager or senior analyst to formally lead each of the two teams. This will better allow the AIO and PM to focus on higher-level investment issues and risk control, while focusing the teams on security selection and research.

All positions are currently filled. In the last 15 months, no individuals have left the department. During that time we added four professionals, including two with significant experience. In the upcoming year, we intend to add an experienced professional to provide depth to our Credit Team.

Schedule of Target Staffing at Year End 2003

	Global Bonds
Current Staff (2002)	10
Vacant Positions	0
Est. Full Staff (2002)	10
Budgeted New Postions	1
+ / - Internal Transfers	0
Est. 2002 Full Staffing	11
Professional	9
Support	2

Assuming full staffing levels at year-end 2003, the following chart details the estimated annual cost of salaries, benefits and incentive compensation (assuming the target payout level) for the Global Bond asset class.

Schedule of Estimated 2003 Salary and Benefit Costs

Compensation dollars in millions

	Global Bonds
Salaries ($ mm)	0.891
Benefits ($ mm)	0.317
Incentive Comp. ($ mm)	0.087
Total Comp. ($ mm)	1.296
Assets in $ billions	10.948
Cost in Basis Points	1.18

Asset Management Fees

The Global Bond asset class utilizes both internal as well as external managers to achieve the performance objectives, as detailed in this plan. The estimated external asset management fees for 2003 are shown on the accompanying table.

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
Core Internal	0.000	0.000	-
Passive-Index	0.000	0.000	-
Core Plus	1.147	1.950	17.00
High Yield	0.483	2.176	45.05
Emerging Market Debt	0.303	1.183	39.05
Total Global Bonds	**1.933**	**5.309**	**27.46**

Operating Budget

The Fixed Income Department's operating budget is $2,106,305 (1.92 bps on our estimated year-end $10.95 billion asset allocation). This represents an increase from the $1,707,266 budget in 2002. The increase in quotes and data feeds is the key contributor. Research costs likewise increased due to the addition of services supporting our internal research efforts (including CMBS and ABS research), as well as the addition of third-party credit research such as the *Egan Jones Credit Rating Service* and the *BondScore* quantitative credit default model. Finally, the information technology of the Macgregor trade order management system added $65,250 to the Global Bond operating budget.

	Schedule of Budgeted Operating Expenses						
	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$962,000	$1,175,230	213,230	22.17%	55.80%		
Investment Consulting Services	$0	$0	-	0.00%	0.00%		
Quotes & Data Feeds	$232,548	$328,400	95,852	41.22%	15.59%		
Research Services	$234,312	$301,500	67,188	28.67%	14.31%		
Analytics	$177,240	$148,000	(29,240)	-16.50%	7.03%		
Communications	$0	$0	-	0.00%	0.00%		
Information Technology	$0	$65,250	65,250	-	3.10%		
Office Equipment & Supplies	$1,360	$0	(1,360)	-100.00%	0.00%		
Training & Travel Expenses	$99,810	$87,925	(11,885)	-11.91%	4.17%		
Total	$1,707,270	$2,106,305	185,805	23.37%	100.00%	$10.948	1.92

The following table lists the total cost estimates for managing the Global Bonds portfolio. The total costs for internal management is projected to reach 2.5 basis points of the internal Global Bonds assets under management. The total external management costs (fees) are estimated at 28.0 basis points of the external Global Bonds assets under management. As a percent of the total Global Bonds portfolio, internally managed assets will account for 82.7% and the external assets under management will make up the remaining 17.3%.

	Schedule of Estimated Total Costs		
	Est. Year End 2003		
	Costs in Millions of Dollars		
	Internal	External	Total
Staffing Costs	1.296	-	1.296
Operating Budget	0.931	-	0.931
Manager Fees	-	5.309	5.309
Total Costs	2.227	5.309	7.536
Assets Under Management	9,053.8	1,894.0	10,947.8
Costs in Bps	2.5	28.0	6.9

Initiatives

Evaluate Asset Allocation and External Managers

- The bond area suffered under-performance in 2002 arising from internal and external portfolios. This initiative is aimed at reassessing the current approach utilizing core, core plus, and specialty managers (high yield and emerging markets), and evaluating the current manager roster for possible changes. This effort will be conducted in the first half of the year.

Evaluate Mortgage Dollar Rolls

- The mortgage dollar roll market offers OPERS an opportunity to add incremental return to the bond asset class as relatively low levels of risk. A report will be prepared in the first quarter in conjunction with the investment consultant, and a recommendation made to the Board on pursuing such a strategy.

International Equity

Asset Management

Strategy

At the September 2002 Investment Committee Meeting a new strategy for the International Equity asset class was approved. Highlights of this investment strategy are detailed below.

- Active management is set at sixty percent (60%) of the total portfolio.
- Enhanced Index strategies will be reduced to fifteen percent (15%) of total assets from 25%.
- Twenty-five percent (25%) of the portfolio will continue to be passively managed.
- The international equity program will include a five percent (5%) strategic allocation to emerging markets. This will be achieved through the use of dedicated active emerging market managers.
- The total portfolio's maximum exposure to emerging markets will be limited to the MSCI ACWIF x US Index emerging market weighting plus three percent (3%).
- The portfolio will seek a three percent (3%) allocation to small capitalization companies through the use of dedicated active small cap managers.
- The total portfolio will seek to be style neutral. Allocations to active growth and value managers in the ACWIFxUS category will be kept within a range of plus or minus five percent (5%) of each other.
- OPERS' allocation to International equities will continue to represent 20% of the total fund.
- The International Equity program will continue to be 100% managed by external investment managers.

Performance Objectives & Risk Control

The objective of the International Equity asset class is to outperform the Morgan Stanley Capital International All Country World Index Free excluding the United States (*MSCI ACWI x US*) by at least 75 basis points annualized over a three-to-five year market cycle, net of fees. Based upon the risk tolerances established at the overall fund level, International Equity is allocated a risk budget of 175 basis points. As a result, staff expects the information ratio (*or a level of alpha per unit of risk*) to be 0.43.

The following table illustrates each existing portfolio, its expected performance objective and forecasted contribution to the total International Equity portfolio return.

	Schedule of Expected Performance and Volatility					
	Portfolio Expected Allocation ($ billions)	% of Total Portfolio	Benchmark	Expected Performance Over Index in Bps	Estimated Tracking Error in Bps	Target Information Ratio
Passive						
Barclays	2.676	28.1%	ACWIFxUS	0	0	0
Enhanced Passive						
Barclays	1.174	12.3%	ACWIFxUS	50	100	0.50
Baring	0.951	10.0%	ACWIFxUS	50	100	0.50
Active						
Babson Stewart Ivory	0.109	1.1%	EMF	150	400	0.38
Bank of Ireland	0.444	4.7%	ACWIFxUS	100	300	0.33
Brandes	0.726	7.6%	ACWIFxUS	150	350	0.43
Boston Company	0.155	1.6%	EMF	150	400	0.38
Capital Guardian	0.856	9.0%	ACWIFxUS	125	350	0.36
Driehaus	0.276	2.9%	ACWIFxUS	200	500	0.40
Harris	0.026	0.3%	WorldxUS Small Cap	125	400	0.31
Lazard	0.228	2.4%	EMF	150	400	0.38
Marvin & Palmer	0.500	5.3%	ACWIFxUS	200	450	0.44
J.P. Morgan	0.291	3.1%	EAFE	100	200	0.50
Nicholas-Applegate	0.370	3.9%	ACWIFxUS	125	350	0.36
Nicholas-Applegate Sm Cap	0.024	0.3%	WorldxUS Small Cap	125	350	0.36
Oechsle	0.347	3.6%	ACWIFxUS	150	400	0.38
TT Int'l.	0.368	3.9%	ACWIFxUS	150	400	0.38
Total Fund	9.520	100.0%	ACWIFxUS	75	175	0.43

Composition

In 2003, there will be no change to the portfolio's active/passive management composition.

		Estimate of Internal/ External and Active/Passive Composition					
		Est. Year End 2002			Est. Year End 2003		
		Active	Passive	Total	Active	Passive	Total
International Equity	**Internal**	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	External	75.0%	25.0%	100.0%	75.0%	25.0%	100.0%
	Total	***75.0%***	***25.0%***	***100.0%***	***75.0%***	***25.0%***	***100.0%***

As previously mentioned, a reduction will be made to International's commitment to enhanced index strategies. Presently, International has approximately 20% of its assets with two ACWIFxUS enhanced index managers: Barclays and Baring. To comply with the new investment strategy[1], staff is expected to recommend the termination of Baring portfolio. Funds from that portfolio (currently valued at $844 million) will be deployed to other active management strategies in conformity with the department's policy and strategy.

Because enhanced index portfolios are less costly than active management, staff is tentatively forecasting a $2.2 million, or 8.6%, increase in external management fees due to the adoption of the new investment strategy guidelines.

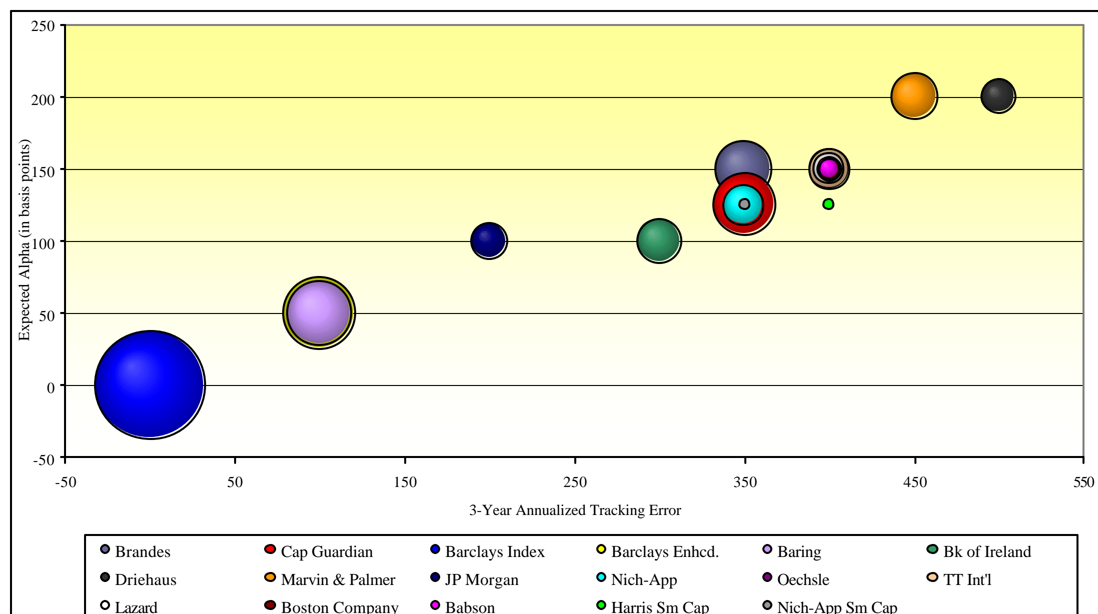
[1]Requires funds allocated to enhanced index strategies be reduced to 15% of the total International Equity portfolio.

The following table details the size and fees associated with each mandate in the portfolio. All fees projected for 2003 reflect the current cadre of managers utilized in the International Equity portfolio.

Schedule of Portfolio, Size & Estimated Fees

	Mandate	Benchmark	Average Assets Under Management ($ millions)	Estimated Annual Fee ($millions)	Estimated Annual Fee (bps)
Passive					
Barclays	Passive	ACWIFxUS	$2,525	0.758	3.0
Enhanced Passive					
Barclays	Enhanced	ACWIFxUS	$1,108	1.523	13.8
Baring	Enhanced	ACWIFxUS	$898	1.234	13.8
Active					
Babson Stewart Ivory	Emerging Markets	EMF	$102	0.756	74.0
Bank of Ireland	EAFE Value	ACWIFxUS	$419	1.297	31.0
Brandes	EAFE+ Value	ACWIFxUS	$685	3.769	55.0
Boston Company	Emerging Markets	EMF	$147	1.173	80.0
Capital Guardian	EAFE+ Core	ACWIFxUS	$808	3.150	39.0
Driehaus	EAFE+ Growth	ACWIFxUS	$260	0.886	34.0
Harris	Small Cap Value	WorldxUS Small Cap	$24	0.205	85.0
Lazard	Emerging Markets	EMF	$215	0.859	40.0
Marvin & Palmer	Growth	ACWIFxUS	$472	2.359	50.0
J.P. Morgan	EAFE Core	EAFE	$275	0.687	25.0
Nicholas-Applegate	EAFE+ Growth	ACWIFxUS	$350	1.468	42.0
Nicholas-Applegate Small Cap.	Small Cap Growth	WorldxUS Small Cap	$22	0.157	70.0
Oechsle	EAFE+ Growth	ACWIFxUS	$327	1.373	42.0
TT Int'l.	EAFE Growth	ACWIFxUS	$348	1.912	55.0
Total	Active/Passive	ACWIFxUS	$8,983	23.57	26.2

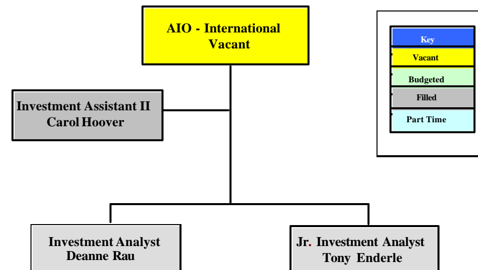
The following exhibit displays the expected alphas and tracking errors of the individual International Equity portfolios in a “Bubble Chart” format.



Resources

Organizational Structure

The International Equity department organizational structure for 2003 will be the following:



International's professional staff is composed of two research analysts reporting to an Assistant Investment Officer ("AIO-International" or "AIO-IE"). Each analyst is charged with monitoring and reporting on the external managers assigned to him or her. Analysts are also called upon to compose research pieces and participate in department-wide initiatives. The AIO-IE job is to provide guidance to analysts and oversight to the total portfolio. In addition to managing staff and the day-to-day affairs of the department, AIO-International is expected to:

- Represent the asset class to OPERS Board.
- Keep senior investment staff abreast of significant activity in the portfolio.
- Develop strategies that will maximize the portfolio's return given its risk profile.

Staffing / Hiring

The International Equity department currently employs two professionals and one administrative assistant with a new AIO projected to be hired in early 2003. No additional staff will be added in 2003.

Schedule of Target Staffing at Year End 2003

	International Equity
Current Staff (2002)	3
Vacant Positions	1
Est. Full Staff (2002)	4
Budgeted New Postions	0
+ / - Internal Transfers	0
Est. 2003 Full Staffing	4
Professional	3
Support	1

The following chart details the annual cost of salaries, benefits and incentive compensation to be paid in 2003[2] for the International Equity asset class at full staffing levels.

Schedule of Estimated 2003 Salary and Benefit Costs	
Compensation dollars in millions	
	International Equity
Salaries ($ mm)	0.344
Benefits ($ mm)	0.116
Incentive Comp. ($ mm)	0.021
Total Comp. ($ mm)	0.481
Assets in $ billions	9.520
Cost in Basis Points	0.51

The projected compensation costs for the International Equity staff, as a percent of total managed assets, is 0.51 basis points.

Asset Management Fees

The International Equity portfolio exclusively uses external management. Expected fees for 2003--assuming the existing manager structure--are detailed in the table below:

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
Passive	2.525	0.758	3.00
Enhanced Passive	2.005	2.757	13.75
Active	4.453	20.050	45.03
Total International	**8.983**	**23.565**	**26.23**

However, with the expected termination of the Baring portfolio, staff's current forecast of external management fees is shown in the accompanying table.

[2] Assuming the target payout level.

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
Passive	2.525	0.758	3.00
Enhanced Passive	1.108	1.524	13.75
Active	5.350	25.948	48.50
Total International	**8.983**	**28.229**	**31.42**

Operating Budget

The total 2003 department budget is $601,065, which is a 41% reduction from the $1,021,210 budgeted in 2002. The decline in expenses is primarily due to:

- Reducing the number of Bloomberg licenses from four to one.
- Trimming the number of users for analytical products (*such as BARRA).*
- Not hiring a Senior Investment Analyst.

In 2003, the department will create a stand-alone research station that will be shared by all staff members. By adopting a “kiosk-style” approach to receiving information, International will save $154,505.00 annually in operating expenses.

A detailed schedule of department expenses is presented below. These costs represent 0.63 basis points of total assets.

	Schedule of Budgeted Operating Expenses						
	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$631,240	$433,070	(198,170)	-31.39%	72.05%		
Investment Consulting Services	$0	$0	-	0.00%	0.00%		
Quotes & Data Feeds	$123,105	$22,600	(100,505)	-81.64%	3.76%		
Research Services	$53,535	$41,000	(12,535)	-23.41%	6.82%		
Analytics	$125,000	$71,000	(54,000)	-43.20%	11.81%		
Communications	$0	$1,500	1,500	100.00%	0.25%		
Information Technology	$0	$0	-	100.00%	0.00%		
Office Equipment & Supplies	$1,020	$0	(1,020)	-100.00%	0.00%		
Training & Travel Expenses	$87,310	$31,895	(55,415)	-63.47%	5.31%		
Total	$1,021,210	$601,065	(420,145)	-41.14%	100.00%	$9.520	0.63

The total cost of operating the International Equity portfolio is estimated in the table below. These figures incorporate both the internal expenses as well as current external management fees. Overall, the total portfolio expense is forecasted to be 25.4 basis

points, or approximately $24,214,000. Of this amount, 24.8 basis points, or 97.3% of the cost, is due to external management fees.

	Schedule of Estimated Total Costs Est. Year End 2003 Costs in Millions of Dollars		
	Internal	External	Total
Staffing Costs	0.481	-	0.481
Operating Budget	0.168	-	0.168
Manager Fees	-	23.565	23.565
Total Costs	0.649	23.565	24.214
Assets Under Management		9,519.8	9,519.8
Costs in Bps		24.8	25.4

However, given the modification in the department's investment strategy, the total cost of operating the portfolio may rise to 30.3 basis points.

	Schedule of Estimated Total Costs Est. Year End 2003 Costs in Millions of Dollars		
	Internal	External	Total
Staffing Costs	0.481	-	0.481
Operating Budget	0.168	-	0.168
Manager Fees	-	28.229	28.229
Total Costs	0.649	28.229	28.878
Assets Under Management		9,519.8	9,519.8
Costs in Bps		29.7	30.3

Initiatives

Implement New Policy and Strategy

- In the third quarter of 2002, a policy was approved for the asset class that calls for a 60% allocation to active management, a 15% allocation to enhanced management, and a 25% allocation to passive management. Under this initiative, staff will reconfigure the asset composition to the new allocation through selective manager terminations / reductions, and new manager hires. The portfolio is expected to have a composition that is consistent with policy by the end of the second half of 2003.

Evaluate Currency Overlay

- Research was conducted on currency hedging in 2001, with an informational report provided to the Board. This initiative seeks to finalize the initial research, working in conjunction with our investment advisor (EKA). The focus of the research will be on currency overlay programs, particularly for assets that are held in passive portfolios. A recommendation will be provided to the Board in the second half of the year.

Portfolio Internalization Research

- In the 2002 Annual Plan, staff included an initiative to study the feasibility of internal management of international equity assets. This project was deferred due to the departure of the AIO for International Equity and the reassessment of priorities for the department under the direction of the Deputy Director-Investments. The formulation of the investment policy and strategy for the asset class and the development of staff capability to monitor the external portfolios became immediate priorities. Job delegation and staff training efforts are proceeding well. Once a decision is made about hiring an AIO for this department, it would be appropriate to revisit this issue in the 2004 plan.

Real Estate Department

Asset Management

Strategy

The role of the Real Estate asset class is to provide stable returns and diversification to the total PERS investment fund. Real Estate traditionally has exhibited low to negative correlation with stocks and fixed income investments. Real Estate has also served as a potential inflation hedge. The current Real Estate target allocation is 9%, with a range of plus or minus 4%. The range is intended to allow the Real Estate asset class to execute its tactical investment strategies in an illiquid asset class.

The Real Estate portfolio currently consists of three major components: the private, directly held portfolio at 78% of the asset class; the commercial mortgage portfolio at 3% of the asset class; and the public REIT portfolio at 19% of the asset class.

As a result of the Townsend review and recommendations and the new Real Estate Investment Policy and Strategic Plan, the primary focus of the department in 2003 and 2004 will be to rebalance the asset class. Townsend has recommended that 90% of the asset class consist of investments in private, directly held real estate and 10% of the asset class consist of public REITs.

Within the private investment portfolio, Townsend has recommended a target of 60% Stable investments, 20% Enhanced investments, and 10% High Return investments. Each of these style sectors has a target allocation with a range that allows a certain level of flexibility. As shown in the following table, the current real estate portfolio consists of 19% REITs, 30% Stable, 31% Enhanced, 17% High Return, and 3% Mortgages. In 2003, we will begin the process of rebalancing the portfolio to bring it within the new policy guidelines. We will do that by reducing our exposure to REITs, Mortgages, Enhanced, and High Return as well as increasing our exposure to Stable.

	Schedule of Projected Portfolio and Size - Rebalancing					
Internal	9.30.2002 Portfolio Allocation ($ billions)	% of Real Estate Portfolio	Projected 2003 Dispositions ($ billions)	Projected 2003 Acquisitions ($ billions)	Projected 12.31.2003 Portfolio Allocation ($ billions)	% of Real Estate Portfolio
REITs	0.922	19%	0.494	-	0.428	10%
External						
Direct Equity - Stable Return	1.455	30%	0.159	0.490	1.787	42%
Direct Equity - Enhanced Return	1.518	31%	0.255	0.075	1.339	31%
Direct Equity - High Return	0.820	17%	0.239	0.150	0.731	17%
Mortgage Portfolio	0.140	3%	0.140	-	-	0%
Total Active	4.856	100%	1.287	0.715	4.284	100%
Total Asset Class	4.856	100%	1.287	0.715	4.284	100%
Goal	4.065	100%	1.287	1.505	4.284	100%

Real Estate is an illiquid asset class and this affects the ability to restructure and rebalance the portfolio. It will take time to complete the necessary transactions to rebalance within the three major components to reach the goals of the new strategic plan. Acquisitions and sales will be a function of pricing opportunities over the next year. Currently, there appears to be an oversupply of capital to stable assets.

The first half of 2003 the department focus will be upon refining our policies and processes, determining which managers are best suited to help us achieve our rebalancing goals as well as manage the assets on an ongoing basis. If necessary, we will conduct a search for a new manager to assist us in this process. We expect to accomplish the bulk of the transactions during the second portion of 2003. These transactions will enable us to begin the process of rebalancing, which we expect to take through the end of 2004. We will evaluate investment opportunities within the context of achieving rebalancing within two years. If staff determines that more time is necessary to accomplish the rebalancing in a prudent fashion, we will notify the Board.

The following table illustrates our internally and externally managed real estate investments by property type as of September 30, 2002. To meet the policy guidelines, we will need to increase our exposure to the retail and office categories and reduce our exposure to the specialty and REIT categories. The primary reduction to the specialty category will come from selected hotel sales. Acquisition and sales of selected property types will be a function of pricing opportunities over the next year.

Real Estate Portfolio by Property Type

	As of 9.30.02 ($ millions)	% of Total	Target Range	NCREIF Allocation as of 9.30.02	Difference
Industrial	851	17.52%	10%-30%	19.11%	-1.59%
Multi-family	933	19.21%	9%-26%	17.36%	1.85%
Office	810	16.68%	20%-60%	40.67%	-23.99%
Retail	396	8.15%	10%-30%	19.73%	-11.58%
Specialty*	944	19.44%	0%-20%	3.13%	16.31%
REITS	922	18.99%	5%-15%		
Total	4,856	100%		100%	

**Includes Hotels, Single-family, Healthcare, Storage, Movie Studio and Land.*

Performance Objectives & Risk Control

The Real Estate asset class is expected to produce a return equal to or greater than 100 bps, annualized over a full market cycle, above that of the custom benchmark which is comprised of 90% NCREIF Property Index (NPI) and 10% Wilshire Real Estate Securities Index (WRESI). The active management of the Stable component is intended to generate a limited portion of the targeted excess return. The main source of excess return is from the allocation to the Enhanced, High Return, and REIT components, which are intended to provide the ability to take advantage of tactical and

other higher return investment opportunities to produce excess returns over the benchmark for the Real Estate asset class.

The objective for each advisor is to exceed, on a cumulative basis, returns for comparable portfolios in the industry. Each advisor is compensated on a performance basis in addition to the base asset management fee. The performance-based fees are structured with a series of hurdles, so that as PERS makes more money, on a cumulative cash basis, the advisor can achieve a higher percentage level of compensation.

The following chart delineates the expected out-performance of the Real Estate portfolio to its benchmark.

	Schedule of Expected Performance and Volatility					
	Portfolio Expected Allocation ($ billions)	Benchmark	Expected Real Estate Allocation	Expected Performance Over Index in Bps	Estimated Tracking Error in Bps	Target Information Ratio
Internal						
REITs	0.428	WRESI	10.0%	100	400	0.25
External						
Direct Equity - Stable Return	1.787	NPI	41.7%	50	200	0.25
Direct Equity - Enhanced Return	1.339	NPI	31.2%	150	300	0.50
Direct Equity - High Return	0.731	NPI	17.1%	300	650	0.46
Mortgage Portfolio	-	N/A	0.0%	0	0	0.00
Total Active	4.284	Custom	100.0%	129	172	0.75
Total Fund	4.284	Custom	100.0%	129	172	0.75
Goal	4.284	Custom	100.0%	100	250	0.40

Risk Control Policy

In the financial community, risk is defined as the variability in asset returns. The price of risk is defined as the premium over what could be returned on a risk-free investment. More specifically, risk is the difference between the actual income and appreciation return and the expected income and appreciation return. As a public pension fund, our risk tolerance may be different than that of other investors, and controlling risk is just as important as seeking higher returns. The Townsend Group has used quantitative models to allocate and control risk across investment sector styles. The optimal portfolio from these models is a mixture of Stable, Enhanced, High Return, and Public REIT investments. It is important to follow a policy that seeks to build a well-diversified portfolio, including diversification by property type, location, and investment advisor. To manage risk, the Real Estate asset class implements a diversification strategy on a portfolio-wide basis and executes policies and procedures throughout the due diligence, acquisition, and asset management processes.

Risk Control Procedures

With data limitations, illiquidity, transaction costs, and other concerns, the real estate market does not provide the information or efficiency needed to quantify risk using methods normally found in the stock and bond markets. The Real Estate asset class controls risk through alternative methods, which include diversification strategies, leverage policies, valuation standards, acquisition and disposition processes, and asset and insurance risk management. Further detail for each risk control method can be found in the Real Estate Policies and Procedures.

Composition

In 2003, we will assess the capabilities of our current advisors and identify those advisors able to assist us with our goal to rebalance the portfolio. During the first half of 2003, we will also assess our processes, procedures, and staffing for consistency with the new real estate strategy and policy. If we determine that new advisors are needed to implement our rebalancing goal, we will conduct a manager search and will inform the Board of the search process.

The following table summarizes the Real Estate asset class characteristic information as of the end of 2002, and the estimated characteristic information at the end of 2003.

		Estimate of Internal/External and Active/Passive Composition					
		Est. Year End 2002			Est. Year End 2003		
		Active	Passive	Total	Active	Passive	Total
Real Estate	Internal	20.0%	0.0%	20.0%	10.0%	0.0%	10.0%
	External	80.0%	0.0%	80.0%	90.0%	0.0%	90.0%
	Total	*100.0%*	*0.0%*	*100.0%*	*100.0%*	*0.0%*	*100.0%*

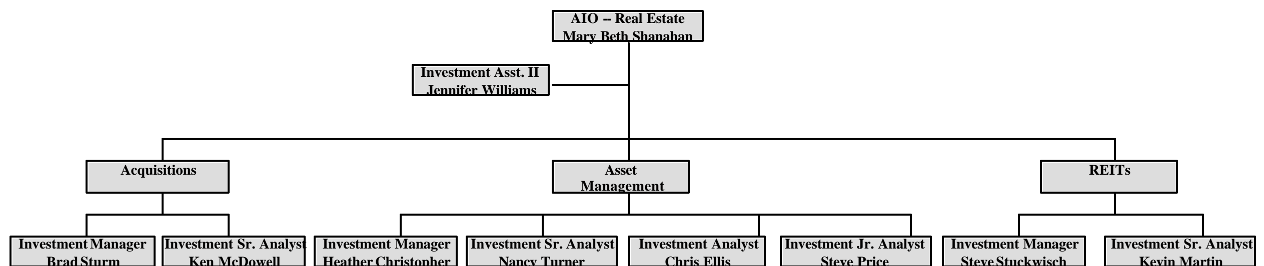
At September 30, 2002, the estimated value of the Real Estate portfolio stood at $4.856 billion, or 10.7% of the overall PERS' portfolio. Our goal is to meet our target allocation of 9%.

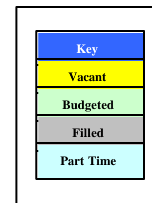
	Schedule of Portfolio, Size & Estimated Fees				
	Mandate	Benchmark	Average Assets Under Management ($ millions)	Estimated Annual Fee ($ millions)	Estimated Annual Fee (bps)
Internal					
REITs	REIT	WRESI	$922	0.345	5
External					
AFL-CIO	Mortgage	NPI	$78	0.159	41
Bristol Group	Mixed	NPI	$714	3.534	50
CBA Huntoon Hastings	Mortgage	NPI	$7	0.014	38
Faison & Associates	Mixed	NPI	$343	2.302	54
Great Point Investors	Mixed	NPI	$60	0.283	54
Legg Mason	Mixed	NPI	$59	0.295	51
Liberty Lending Services	Mortgage	NPI	$52	0.134	51
Lowe Enterprises	Mixed	NPI	$689	3.153	53
Rothschild Realty	Mixed	NPI	$833	5.344	63
Sentinel Real Estate Corp	Mixed	NPI	$564	2.275	44
TGM & Associates	Stable	NPI	$536	2.655	43
Total	Mixed	Custom	$4,856	20.493	52

Resources

Organization Structure

The following is a projected organizational structure as of the start of calendar year 2003.





As part of the 2003 initiatives, the staff will assess whether the internal structure should be re-configured to better carry out the new investment policy and strategies developed by the Townsend Group. As part of this initiative, we will examine the optimum allocation of resources as well as the proper level of discretion to delegate to managers.

Staffing / Hiring

The Real Estate department currently has 10 members on staff, consisting of 9 professionals and 1 support personnel.

Schedule of Target Staffing at Year End 2003

	Real Estate
Current Staff (2002)	10
Vacant Positions	0
Est. Full Staff (2002)	10
Budgeted New Positions	0
+ / - Internal Transfers	0
Est. 2003 Full Staffing	10
Professional	9
Support	1

No positions are currently vacant in the Real Estate area, and we have not budgeted any new positions for 2003.

Assuming full staffing levels at year-end 2003, the following chart details the annual cost of salaries, benefits and incentive compensation paid in 2003 (assuming the target payout level) for the Real Estate asset class.

Schedule of Estimated 2003 Salary and Benefit Costs

Compensation dollars in millions

	Real Estate
Salaries ($ mm)	0.965
Benefits ($ mm)	0.366
Incentive Comp. ($ mm)	0.301
Total Comp. ($ mm)	1.632
Assets in $ billions	4.284
Cost in Basis Points	3.81

Asset Management Fees

The Real Estate Department staff continues to contain its costs by competitively negotiating advisor fees and by eliminating undesirable potential acquisition deals earlier in the process before significant due diligence costs are incurred. The following chart illustrates projected fees for 2003.

	Estimate of External Management Fees in Dollars and Basis Points		
	Est. Year End 2003		
	Average Assets External ($ billions)	Estimated Annual Fee ($ millions)	Fees of External Assets (Bps)
AFL-CIO	0.039	0.159	41
Bristol Group	0.707	3.534	50
CBA Huntoon Hastings	0.004	0.014	38
Faison & Assoc.	0.424	2.302	54
Great Point Investors	0.052	0.283	54
Legg Mason Real Estate Services	0.057	0.295	51
Liberty Lending Services	0.026	0.134	51
Lowe Enterprises	0.596	3.153	53
Rothschild Realty	0.855	5.344	63
Sentinel Corp	0.519	2.275	44
TGM Associates	0.616	2.655	43
Stable Return Total	1.627	7.575	47
Enhanced Return Total	1.417	7.600	54
High Return Total	0.781	4.657	60
Mortgage Portfolio	0.070	0.314	45
Total Real Estate	3.895	20.15	52

Operating Budget

The Real Estate department 2003 budget is $1,976,695, a 3.8% increase versus the 2002 budget of $1,904,610. The decreases in the Quotes & Data Feeds, Research, and Analytics categories resulted by reducing the number of Bloomberg exchange fees, deleting Barra access, and deleting a real estate research program with the expectation that The Townsend Group will provide those needs. The Information Technology category includes $8,000 for the Macgregor system and $1,800 for a flat panel monitor. The Training & Travel Expenses category decreased $44,195 from a reduction in travel, conference fees, membership dues, and periodical subscriptions.

	Schedule of Budgeted Real Estate Operating Expenses						
	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expenses	$1,363,175	$1,496,550	133,375	9.78%	75.71%		
Investment Consultant Services	$330,000	$330,000	-	0.00%	16.69%		
Quotes & Data Feeds	$58,622	$45,200	(13,422)	-22.90%	2.29%		
Research	$23,593	$12,750	(10,843)	-45.96%	0.65%		
Analytics	$3,835	$600	(3,235)	-84.35%	0.03%		
Communications	$0	$800	800	NA	0.04%		
Information Technology	$0	$9,800	9,800	NA	0.50%		
Office Equipment & Supplies	$340	$145	(195)	-57.35%	0.01%		
Training & Travel Expenses	$125,045	$80,850	(44,195)	-35.34%	4.09%		
Total	$1,904,610	$1,976,695	72,085	3.78%	100.00%	$4.284	4.61

	Schedule of Estimated Total Costs Est. Year End 2003 Costs in Millions of Dollars		
	Internal	External	Total
Staffing Costs	1.632	-	1.632
Operating Budget	0.480	-	0.480
Manager Fees	-	20.270	20.270
Total Costs	2.112	20.270	22.382
Assets Under Management	428.4	3,855.5	4,283.9
Costs in Bps	49.3	52.6	52.2

Initiatives

Prepare Plan to Reposition Assets

- Staff, working in conjunction with Townsend, will prepare a multi-year plan to reposition the real estate program along the lines of the policy that is expected to be adopted prior to year-end 2002. The repositioning plan will take into account market valuations, liquidity, existing manager capabilities, and other factors. The plan will be presented to the Board in the first quarter.

Update Real Estate Processes

- This initiative is focused on evaluating the roles and responsibilities of staff and advisors under the new real estate structure. It is anticipated that in certain circumstances, staff and advisor roles may need to change to suit the new approach and strategy. Staff, working with Townsend, will prepare a report by the end of the first quarter.

Private Equity

Asset Management

Performance Objectives & Risk Control

The private equity policy establishes the asset class objectives and are restated below:

> "The asset allocation study also establishes the long-term net expected return for private equity. The asset allocation study conducted in 2000 requires a mature portfolio to return a net 10.5% over the long-term. This return is based on a mature portfolio consisting of aged exposures and new commitments that are a drag on short-term performance. Thus, the required final net rate of return on each private equity commitment is higher than 10.5% and is closer to 15%. Investment opportunities require a minimum expected rate of return of 15% to generate a blended mature portfolio expected rate of return of 10.5%."

The private equity policy establishes the program risk controls listed below. Please refer to the approved private equity policy for details.

Risk Management

- Liquidity
- Targeted Portfolio Structure
- Vintage Risk
- Manager Risk
- Firm Risk
- Currency
- Industry
- Leverage

Investable Securities and Restricted Investments

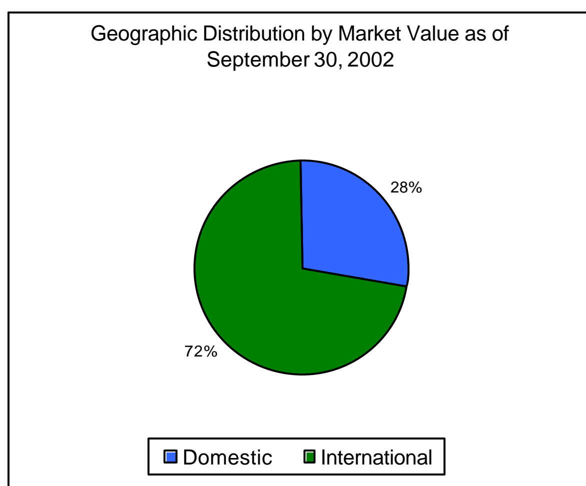
- Investment Types
- Co-Investments and Direct Placements
- Hedge Funds
- Derivatives
- SBIC
- Real Estate
- Ohio and Regional
- Stock Distributions
- Child Labor
- Other Restrictions

Composition

The private equity portfolio has a market value of $275.2 million as of September 30, 2002. These market values represent unaudited June 30, 2002 figures adjusted for cash flows through September 30, 2002. The following table and charts show the composition of the market value and outstanding commitments. Note that Special Situations - International includes $182 million of timber exposure that we are selling in the coming years.

Schedule of PERS' Private Equity Portfolio by Vintage ($millions)

Fund	Type	Vintage	Commitment	Capital Called	Outstanding	Market	% Market
Primus Capital Fund II	Venture Capital	1987	10.0	10.0	0.0	0.2	0.1%
Blue Chip Capital I	Venture Capital	1992	15.0	15.0	0.0	2.5	0.9%
Northwest Ohio Venture Fund	Venture Capital	1992	5.0	5.0	0.0	0.9	0.3%
Primus Capital Fund III	Venture Capital	1993	10.0	10.0	0.0	1.8	0.7%
UBS Timber I	Special Situations - Sector	1994	234.3	234.3	0.0	154.5	56.2%
AIG Global Emerging Markets Fund	Corporate Finance	1997	$50.0	$27.2	$22.8	$16.0	5.8%
UBS Timber II	Special Situations - Sector	1997	63.7	63.7	0.0	28.0	10.2%
Blue Chip Capital II	Venture Capital	1997	15.0	15.0	0.0	9.3	3.4%
Primus Capital Fund IV	Venture Capital	1997	15.0	14.6	0.4	8.2	3.0%
Linsalata Capital Partners Fund III	Corporate Finance	1998	15.0	15.0	0.0	14.6	5.3%
MCM Capital Partners	Corporate Finance	1998	15.0	11.3	3.7	12.2	4.4%
Blue Chip Capital III	Venture Capital	1999	25.0	23.8	1.2	11.5	4.2%
Linsalata Capital Partners Fund IV	Corporate Finance	2000	25.0	6.7	18.3	6.0	2.2%
Blue Chip Capital IV	Venture Capital	2000	25.0	6.2	18.8	4.7	1.7%
Primus Capital Fund V	Venture Capital	2000	25.0	7.3	17.7	5.0	1.8%
Blackstone Capital Partners IV	Corporate Finance	2002	175.0	0.0	175.0	0.0	0.0%
Coller International Partners IV	Special Situations - Secondaries	2002	75.0	0.0	75.0	0.0	0.0%
Total			$788.0	$455.1	$332.9	$275.0	100.0%



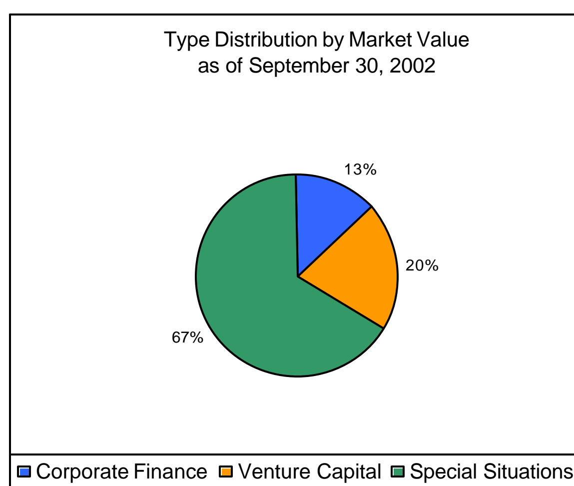


Table 1. Actual Portfolio Fair Market Value vs. Target Fair Market Value ($ millions)

	Domestic			International			Total		
	Actual FMV	Target FMV	Difference	Actual FMV	Target FMV	Difference	Actual FMV	Target FMV	Difference
Corporate Finance									
Large	$0.0	$68.8	($68.8)	$0.0	$27.5	($27.5)	$0.0	$96.4	($96.4)
Mid/Small	32.8	41.3	(8.5)	0.0	13.8	(13.8)	$32.8	55.1	(22.3)
Total	$32.8	$110.1	($77.3)	$0.0	$41.3	($41.3)	$32.8	$151.4	($118.6)
Venture									
Early	$22.6	$13.8	$8.8	$0.0	$0.0	$0.0	$22.6	$13.8	$8.8
Diversified	21.4	13.8	7.6	0.0	6.9	(6.9)	$21.4	20.6	0.8
Late	0.0	27.5	(27.5)	0.0	6.9	(6.9)	$0.0	34.4	(34.4)
Total	$44.0	$55.1	($11.1)	$0.0	$13.8	($13.8)	$44.0	$68.8	($24.8)
Special Situations	$0.0	$41.3	($41.3)	$198.5	$13.8	$184.7	$198.5	$55.1	$143.4
Total	$76.8	$206.5	($129.7)	$198.5	$68.8	$129.7	$275.3	$275.3	$0.0

Unaudited values at June 30, 2002 adjusted for cash flows through September 30, 2002.

Strategy

The private equity strategy was approved as a stand-alone document by the Board in June 2002 and because private equity is a new asset class, some elements of the strategy superceded the private equity section of the 2002 Annual Investment Plan. Now that the private equity program is well established, the strategy will be updated through this and future Annual Investment Plans. The stand-alone private equity strategy document is superceded and will cease to exist.

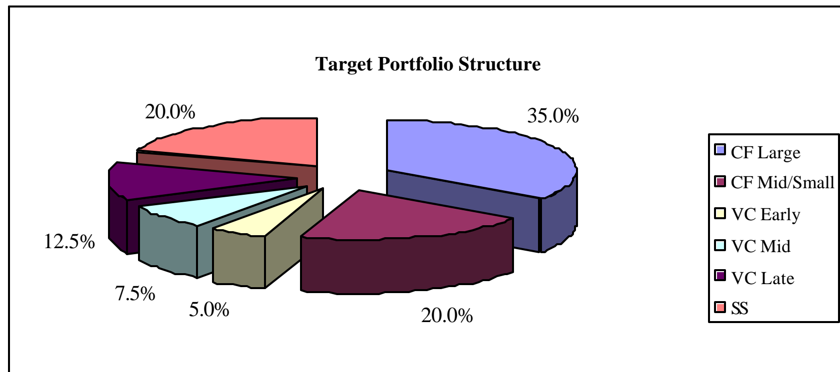
PERS seeks to establish a top-tier private equity program generating leading risk-adjusted long-term returns. The following sections describe our short and long-term strategic efforts for achieving this objective.

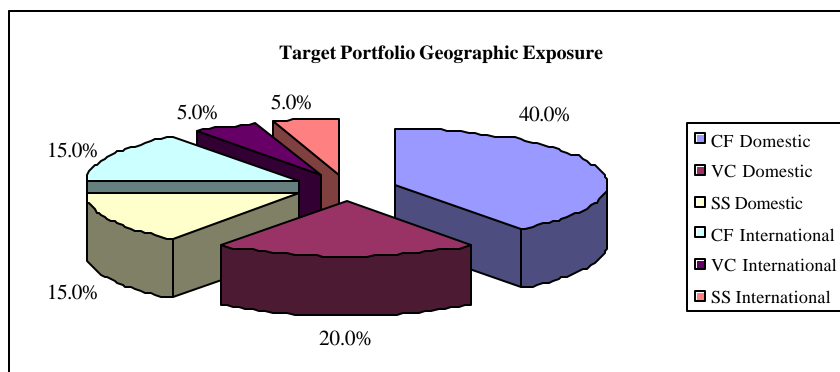
Targeted Portfolio Structure

The private equity exposure will be built over time and balances the need for exposure with investment opportunities and vintage risk. The figures presented within this section are best approximations and are designed to achieve the target portfolio structure by December 31, 2008. [Note that the targets are bounded by +/- 5%.]

Targets by Percentage

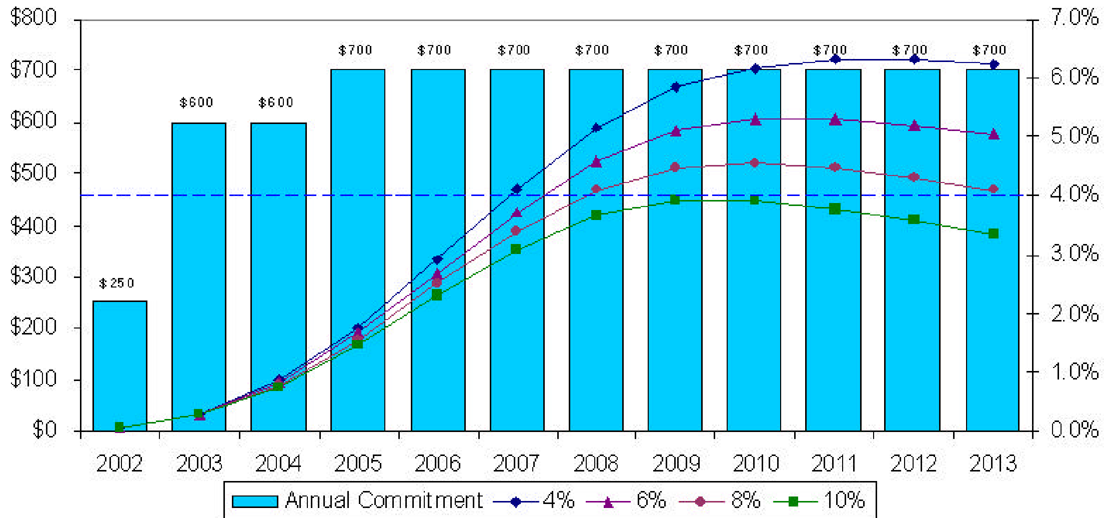
The private equity policy reaffirms the 4% private equity market value established by the asset allocation and the long-term target portfolio structure is incorporated in Table 1 above. The following charts depict the long-term targeted portfolio exposure by asset class and geography. These targets are each bounded by +/- 5%.



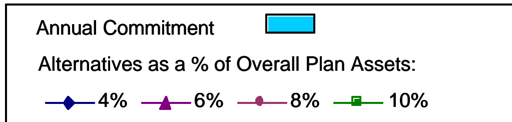


Investment Pacing

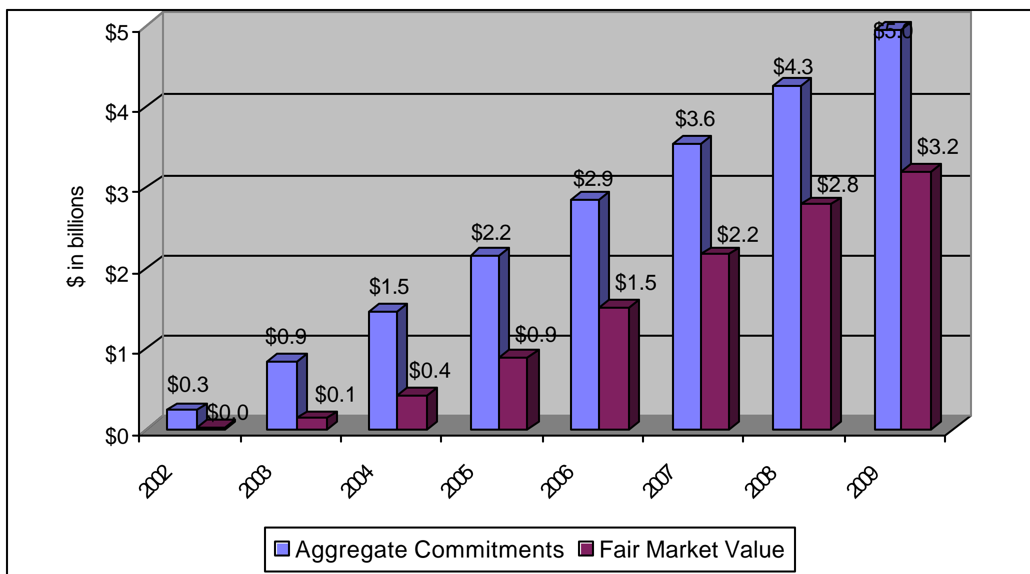
Investment pacing controls the commitment budget. Multi-factored models are used to determine the rate of commitments to achieve a target market value exposure in a period of time. The graph below depicts the new investment pacing model in millions of dollars per year to achieve a 4% target (+/- 3%) market value exposure by the end of 2008. This new investment pacing is materially different from the strategy approved in June 2002. The two primary reasons for the revised investment pacing are the lower total fund assets and a lengthened time (6 years) to achieve target exposure. The investment pacing is reviewed annually with this strategy. While the investment pacing graph indicates precise annual commitments, the actual annual commitments will be in the range of $450-$750 million and will be approximately $4 billion from 2002 - 2008.



Assumptions:
- OPERS overall portfolio value of $48 billion at 12/31/02.
- Overall portfolio grows at 4%, 6%, 8%, 10% (represented by lines on secondary axis).
- Underlying funds return 1.9x invested capital and 18.6% IRR.



The graph below illustrates aggregate commitments and fair market value for the portfolio, based on the following projected commitment schedule: $250 million in 2002, $600 million in 2003 and 2004, $700 million thereafter.



Targets by Commitments

Applying the $4 billion of commitments from the investment pacing model to the long-term targeted portfolio structure generates the long-term targeted commitments through 2008 as shown in Table 2. The current outstanding commitments are shown and the difference indicates the long-term commitment needs. Note that the targets are bounded by ± 5% for each sub-class.

Table 2. Current and Long-Term Target Commitments through December 31, 2008 ($ millions).

	Domestic			International			Total		
	Current Outstanding Commitment	Target Commitment	Difference	Current Outstanding Commitment	Target Commitment	Difference	Current Outstanding Commitment	Target Commitment	Difference
Corporate Finance									
Large	$175.0	$1,000.0	($825.0)	$0.0	$400.0	($400.0)	$175.0	$1,400.0	($1,225.0)
Mid/Small	$22.0	$600.0	($578.0)	$0.0	$200.0	($200.0)	$22.0	$800.0	($778.0)
Total	$197.0	$1,600.0	($1,403.0)	$0.0	$600.0	($600.0)	$197.0	$2,200.0	($2,003.0)
Venture									
Early	$1.6	$200.0	($198.4)	$0.0	$0.0	$0.0	$1.6	$200.0	($198.4)
Diversified	$36.5	$200.0	($163.5)	$0.0	$100.0	($100.0)	$36.5	$300.0	($263.5)
Late	$0.0	$400.0	($400.0)	$0.0	$100.0	($100.0)	$0.0	$500.0	($500.0)
Total	$38.1	$800.0	($761.9)	$0.0	$200.0	($200.0)	$38.1	$1,000.0	($961.9)
Special Situations	$0.0	$600.0	($600.0)	$97.8	$200.0	($102.2)	$97.8	$800.0	($702.2)
Total	$235.1	$3,000.0	($2,764.9)	$97.8	$1,000.0	($902.2)	$332.9	$4,000.0	($3,667.1)

Primary Partnership Commitment Size

Table 3 shows the typical commitment range for primary partnerships and discretionary mandates. Commitments to discretionary managers will be allocated by vintage years of the underlying partnerships.

Table 3. Commitment Range for Each Primary Partnership ($ millions).

Sub-Class	Typical Commitment Range
Corporate Finance	$50 - $100
Venture Capital	$50 - $75
Special Situations	$50 - $100
Discretionary Mandates	$50 - $200

Strategic Implementation and Number of Commitments

Capital will be invested through private equity partnerships and discretionary managers investing in private equity partnerships. Selecting the appropriate mix of primary partnerships and discretionary mandates requires a balancing of several factors including maximizing performance, creating appropriate diversification, increasing negotiating leverage and minimizing the administrative burden. Table 4 shows the

expected blend of primary partnership and discretionary mandate commitments from 2002 through 2008. [Note that two commitments were made in 2002.]

Discretionary managers will be used to gain exposure to relatively small or niche portfolio components and may be used for broad market mandates. Each discretionary manager will make commitments to multiple primary partnerships over several years, further improving the portfolio diversification. An overview of the proposed use of discretionary managers will be presented to the Investment Committee in the first quarter of 2003.

Table 4. Estimated Number of Commitments 2002 - 2008.

	Domestic	International	Total
Corporate Finance			
Large	8 - 10	4 - 6	12 - 16
Mid/Small *	8 - 10	Discretionary	8 - 10
Total	16 - 20	4 - 6	20 - 26
Venture			
Early	Discretionary	Discretionary	
Diversified *	8 - 10	Discretionary	8 - 10
Late	8 - 10	Discretionary	8 - 10
Total	16 20		16 - 20
Special Situations	10 - 12	4 - 6	14 - 18
Total	42 - 52	8 - 12	50 - 64

* Discretionary managers will also be used for Domestic exposure.

General Partners

General partner selection is critical for outperformance and we will proactively seek relationships with experienced, top-tier general partners. Working with the private equity advisor, peers and all available sources, we will filter and review the general partners in each subclass and initiate a dialogue regarding potential participation in their new partnerships, even if they are not expected in the market for years. Further, we will limit exposure to first-time general partners. The private equity procedures describe the due diligence process and factors for consideration.

We will contain the number of general partners for several reasons. We want to maximize our commitment size per general partner to increase the likelihood of advisory roles and improved negotiating leverage. Meaningful allocations also increase access to general partners, improving market knowledge and the opportunity for co-investment rights. Containing the number of general partners also minimizes the administrative burden and allows continued meaningful participation in a mature program.

The vast majority of our commitments will be through primary participation in general partnerships.

Discretionary Managers

Separate account or fund-of-fund discretionary managers may be used to invest in broad market mandates or to target market niches where large primary commitments are inappropriate given the diversification benefit of discretionary management. The maximum commitment to discretionary managers in aggregate is 10% of commitments or $400 million through 2008.

Co-Investments and Directs

We seek to develop capabilities to invest in co-investment and direct opportunities. Consistent with the private equity procedures, we are prohibited from co-investments or direct placements until these capabilities are established.

Commitments in 2003

The 2003 investment pacing targets $600 million in commitments with a range from $450 - $750 million. At this time, $400 - 600 million is expected to be committed to primary partnerships, including Corporate Finance, Venture and Special Situations. The remaining $50 - 150 million is expected to be committed to one or more discretionary managers. The actual 2003 commitments are dependent on market opportunities and may vary from the anticipated commitments shown in Table 5.

Table 5. Anticipated Commitments in 2003 ($millions).

	Domestic			International			Total		
Corporate Finance									
Large	$75	-	$150	$75	-	$100	$150	-	$250
Mid/Small	75	-	150	0	-	0	75	-	150
Total	$150	-	$300	$75	-	$100	$225	-	$400
Venture									
Early									
Diversified *	$125	-	$225	$0	-	$0	$125	-	$225
Late									
Total	$125	-	$225	$0	-	$0	$125	-	$225
Special Situations	$100	-	$125	$0	-	$0	$100	-	$125
Total	$375	-	$650	$75	-	$100	$450	-	$750

* Mix of general partnerships and discretionary managers is not determined yet. Also, the venture capital life stage mix is not determined yet.

Strategic Intangibles

The following items describe additional approaches for developing a competitive private equity program.

Staff Development

As we staff the private equity department, we will build core competencies. Initially, these will include performing due diligence, administering advisory roles and monitoring portfolio compliance. Longer-term, we anticipate developing capabilities to capture the economic advantages of co-investment and direct opportunities.

Networking

Information is critical and we will maximize our market knowledge by participating in industry conferences and actively networking with peers, including public and corporate plans, endowments, foundations and financial institutions.

Active Participation in Partnerships

We will exercise our partnership rights including participation in advisory boards and valuation committees. We will also participate in all meetings and actively monitor partnership compliance.

Remain Opportunistic

While operating consistently within the private equity policy, we will remain alert and rapidly assess unforeseeable opportunities. As markets evolve, situations may arise that require timely, critical analysis, and contrarian approaches. We must remain open to new ideas and unique investment structures.

Maintain Patience

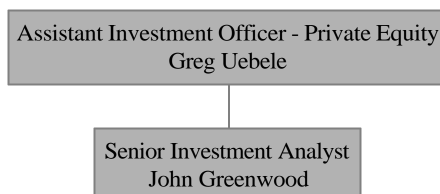
PERS has a competitive advantage in the marketplace with the ability to provide long-term, patient capital. We will remain committed to our policy and strategy and resist pressures to disrupt investment pacing or force sales.

Media Relations and Reputation

PERS has a unique opportunity to establish a reputation as a preferred partner in the private equity marketplace. We recognize the importance of this reputation and seek to enhance our standing through appropriate conduct. Relations will be managed professionally and discreetly.

Resources

Organizational Structure



Staffing/Hiring

The Private Equity department currently consists of an AIO and a Senior Investment Analyst. We anticipate the addition of a private equity professional to be an internal transfer hired in the first quarter. Otherwise, an external candidate may be considered in the third quarter.

Asset Management Fees

The fees for private equity consist of two parts, the annual management fee, typically ranging from 1.5 to 2.5% of commitment, and a carried interest which is taken from realized profits. The management fees are generally paid quarterly or semi-annually and are taken as capital calls. Discretionary managers or fund-of-funds have an additional layer of fees, generally about 1%. Partnership management fees may be offset, deferred or waived periodically and carried interest varies with time and success. The following table estimates the private equity asset management fees for 2003.

Estimate of Management Fees - 2003 ($millions and bps)	
Estimated Average Commitments	$800
Estimated Average Market Value	$325
Estimated Average Fee	1.50%
Estimated Management Fee ($millions)	$12.0
Estimated Management Fee (bps)	369

Operating Budget

The Private Equity department 2003 operating budget is set at $1.496 million, a 71.3% increase versus the 2002 budget of $.873 million. The increase in Personnel Expense includes the cost of living/merit eligibility of existing employees. Investment Consulting Services dollars go toward the consultant PCG for an independent portfolio review, assistance with policy & strategy, and to perform due diligence. Training & Travel Expenses will aid with due diligence and portfolio monitoring.

Schedule of Budgeted Operating Expenses							
	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$277,530	$376,245	98,715	35.57%	25.15%		
Investment Consulting Services	$475,000	$1,000,000	525,000	-	66.84%		
Quotes & Data Feeds	$19,060	$22,000	2,940	15.42%	1.47%		
Research Services	$8,080	$3,000	(5,080)	-62.87%	0.20%		
Analytics	$12,000	$20,000	8,000	66.67%	1.34%		
Communications	$0	$480	480	-	0.03%		
Information Technology	$0	$3,850	3,850	-	0.26%		
Office Equipment & Supplies	$340	$9,350	9,010	2650.00%	0.62%		
Training & Travel Expenses	$81,390	$61,185	(20,205)	-24.82%	4.09%		
Total	$873,400	$1,496,110	622,710	71.30%	100.00%	$0.476	31.43

Initiatives

Evaluate Investment Tracking Package

- In conjunction with Fund Services and Investment Accounting, the private equity area will evaluate investment tracking software offered by State Street and third party vendors. While PCG currently offers investment tracking services to OPERS, we may choose to perform this function internally, assuming it is cost-effective, in order to not be entirely dependent on the consultant over the long-term. This effort will be conducted in the first half of the year.

Prepare Position Paper on Co-Investments

- Working in conjunction with PCG and EK+A, the Private Equity department will prepare a paper on the advantages and risks of co-investing. Co-investing is the act of making direct investments in portfolio companies along side of the general partners. At present, our policy precludes us from entering into direct investments. The paper will outline key issues and provide a recommendation. This effort will be conducted in the second half of the year.

Fund Services Department

Asset Management

Fund Services Overview

The Fund Services Group is a service group within Investments established to provide services across all asset classes. The objective of the group is to provide quality support to the internal investment organization with integral middle office and operational activities. The ultimate goal of the group is to centralize common functions and build efficient processing capabilities.

The use of extensive internal management materially reduces investment costs, but requires on-going effort and capital investment to avoid giving some of the savings back through inefficient operations. The Fund Services Group is charged with implementing efficient operations through (1) implementing enhanced policies and procedures and (2) installing information technology aimed at better risk control, greater information flow across the various asset classes, and improved efficiencies in the investment program. A specific IT group staffed with technology professionals has been assigned to Investments to assist with Investment's technology needs. During 2003, depending on budget approval, the IT group will expand and include business system analyst(s). System analyst(s) will serve as liaisons, working with the business users and IT to effectively address projects identified by the business users.

The Fund Services Group's primary responsibilities are:

- Reporting
  - Coordination of performance reporting between various consultants and custodians
  - Preparation of financial and informational reports, including Investment section of the CAFR
  - Responding to surveys and external information requests

- Budgeting

- Operations
  - Trade processing
  - Compliance
  - Securities Lending
  - Cash Management
  - Proxy Voting

- Integrate State Street fund accountant platform into the investment management and investment accounting environment

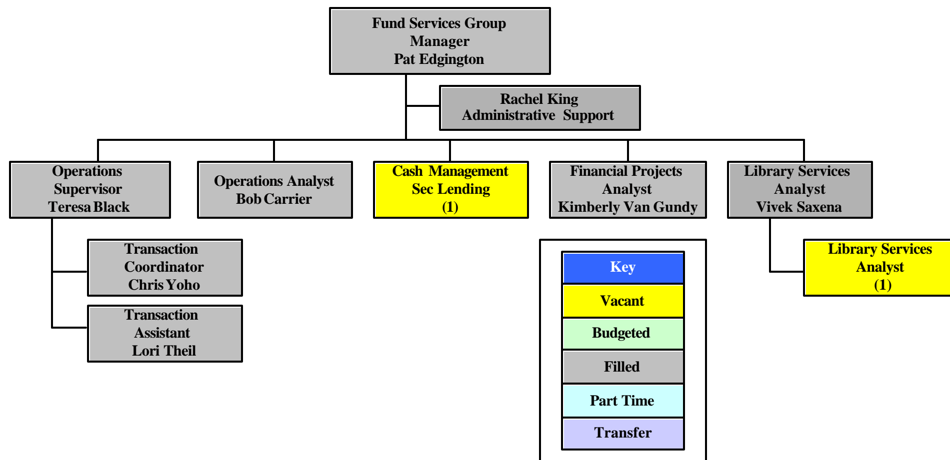
- Information Technology
  - Act as liaison between Investment professionals and IT to build necessary technologies
  - Maintain and enhance the Investment Intranet

During 2003, the Fund Services Group will continue to focus on adding value to the organization through projects described below in the initiatives section.

Resources

Organizational Structure

The following is a projected organizational structure as of the start of 2003.



Two positions, the Library Services Analyst and a departmental receptionist, were filled during 2002.

Staffing / Hiring

The Fund Services department currently has eight members on staff, consisting of five professionals and three support personnel.

Schedule of Target Staffing at Year End 2003	Fund Services Group
Current Staff (2002)	8
Vacant Positions	2
Est. Full Staff (2002)	10
Budgeted New Postions	0
+ / - Internal Transfers	0
Est. 2003 Full Staffing	10
Professional	7
Support	3

Two positions are currently vacant in the Fund Services area. In 2003, staff will evaluate the need to add a library services position to provide back-up support and assistance for the newly created Investment Intranet. A second professional position is slated to assume cash management responsibilities for all asset classes in early 2003. This professional will report to Fund Services Manager because the scope of the position is across all asset classes but will rely on the credit expertise of the internal Global Bond resources. This position will also assume responsibility for fund-wide securities lending. The exact securities lending responsibilities will be determined after the securities lending review project is complete First Quarter 2003. If possible, we will fill the two vacant positions internally in order to avoid staffing increases. Staff vacant positions are noted below:

- Cash Manager/Securities Lending Analyst
- Library Services Analyst Assistant

The annual cost of salaries and benefits including incentive compensation for the Fund Services Group at 2003 full staffing level is displayed in the following chart:

Schedule of Estimated 2003 Salary and Benefit Costs

Compensation dollars in millions

	Fund Services Group
Salaries	0.598
Benefits	0.209
Incentive Comp.	0.063
Total Comp.	0.870
Assets in $ billions	N/A
Cost in Basis Points	N/A

Operating Budget

The Fund Services department 2003 operating budget is set at $1.168 million, a 29% increase versus the 2002 budget of $.904 million.

Schedule of Budgeted Operating Expenses

	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$720,740	$786,020	65,280	9.1%	67.3%		
Investment Consulting Services	$0	$80,000	80,000	100.0%	6.8%		
Quotes & Data Feeds	$92,740	$67,800	(24,940)	-26.9%	5.8%		
Research Services	$430	$50,000	49,570	11527.9%	4.3%		
Analytics	$17,380	$16,000	(1,380)	-7.9%	1.4%		
Communications	$0	$480	480	100.0%	0.0%		
Information Technology	$0	$62,600	62,600	100.0%	5.4%		
Office Equipment & Supplies	$1,360	$24,200	22,840	1679.4%	2.1%		
Training & Travel Expenses	$71,420	$81,195	9,775	13.7%	6.9%		
Total	$904,070	$1,168,295	264,225	29.2%	100.0%	N/A	N/A

Variances are as follows:

- The increase in Personnel Expense includes the cost of living/merit eligibility of existing employees.
- Investment Consulting Services consists Macgregor OMS on-going operating charges and a securities lending consultant.
- The decline in the Quotes & Data Feeds category reflects a reduction in certain data services.
- The increase in Research Services & Professional Subscriptions reflects increased services from IRRC.
- Items in Information Technology and Office Equipment & Supplies did not fall under the Investment budget in previous years.
- The increase in Training & Travel Expenses reflects the additional training needed to maintain the Investment Intranet.

Initiatives

Review Securities Lending Programs.

- This initiative began in the third quarter of 2002 and will conclude in the first half of 2003. With the assistance of a project consultant (to be hired) we will evaluate all aspects of our lending programs. The Board will receive a comprehensive report. As a result of the report, the domestic programs may be re-bid.

Evaluate Cash Management.

- This initiative, which overlaps with the securities lending review, is aimed at evaluating and improving the management of short-term cash at OPERS. Possible changes include where the function reports, the interaction with OPERS Accounting, and the guidelines used for cash reinvestment. A report will be prepared and shared with the Board by the end of the second-half.

Defined Contribution Group

Asset Management

Strategy

The Defined Contribution Group ("DC Group") is expected to provide investment options to members of the OPERS Member-Directed Plan and the OPERS Combined Plan ("DC Plans") that cover the risk/return spectrum, exceed the risk-adjusted net returns of their benchmarks, have institutional pricing, and offer members meaningful, independent control of their assets.

Investment Structure

The DC Plans will begin on January 2, 2003. Until that time, there will be no assets in the plans and the cash flows into the plan from that point forward are difficult to predict. Other state retirement plans that have recently introduced similar Defined Contribution Plans have received significantly lower cash flows than originally estimated. The best estimate for OPERS, and what is used for the Defined Contribution Department budget, is that the plans will grow to approximately $100 million by the end of 2003 and that an additional $100 million will be added to the plans in each of the following four years.

A significant contribution to the performance and risk management of the investment options will come from managing the relatively small and unpredictable cash flows. The DC Group will work closely with the underlying investment managers, the DC Plans' record keeper CitiStreet, and the investment options master record keeper – StateStreet, to keep each investment option fully invested at the lowest total cost.

The DC Plans will have six asset class funds ("funds") that provide exposure to the major asset classes and three pre-mixed portfolios ("portfolios") that combine the six asset class funds to provide exposure across the entire risk/return spectrum.

For the Stable Value and US Stock Index options, alternatives include single managers. In the other four categories, the alternatives included a combination of managers.

- Single manager structures are preferred for Stable Value and US Stock Index because the value of achieving scale with a single manager outweighs the value of diversifying business risk. There is there is virtually no strategy risk because strategies are very similar across managers and will be customized to Ohio PERS' specifications.
- Multiple manager structures are preferred for the other four categories because strategy risk can be significant and the value of achieving scale can be efficiently offset with commingled portfolios, which adequately accommodate the portfolio guidelines established by Ohio PERS.

- Index "slivers" are included where necessary to manage daily liquidity needs. This strategy facilitates institutional investment management and pricing within a daily-valued DC environment with small asset size.

Performance Monitoring and Benchmarks

Performance and risk management of the investment options will come independently from the underlying investment managers. The managers were selected for their ability to contribute to the meeting of objectives and guidelines of the OPERS Funds and will be evaluated accordingly. Monitoring of investment managers will be conducted in close association with the monitoring of an investment managers for the Defined Benefit Plan.

The following table illustrates the underlying managers, their target mixes, performance benchmarks, and tracking error guidelines. Performance and tracking error will be managed at the Funds level by monitoring performance and tracking error for both the funds and the underlying managers.

OPERS Funds	Combined Fee	Index Benchmark	Tracking Error	Peer Universe	Target Mix	Underlying Manager	Underlying Fees
Stable Value	18	GIC Master 3-5 Years	NA [5]	SS GIC Database	100%	Invesco IRT, to Separate Account [1]	18
Bond	18	Lehman Brothers Universal	1.25%	SS FI Core Plus	50%	Fidelity Broad Market Duration CA [2]	20
					50%	Morgan Stanley Core Plus SA	17
Stock Index	3	Russell 3000	0%	NA	100%	BGI Russell 3000 CA	3
Large Cap	33	Russell 1000	6%	SS Large Cap Core	37%	GMO US Core MF	48
					57%	Wellington LC Research SA	26
					6%	BGI R1000 Index CA	10
Small Cap	40	Russell 2000	12%	SS Small Cap	47%	Capital Guardian US Small Cap SA	35
					47%	Invesco Structured Small Cap SA	50
					6%	BGI R2000 Index CA	10
Non-US	48	MSCI ACWI xUS	8%	SS Non-US Equity	57%	Capital Guardian SA	37
					37%	Goldman Sachs MF [3]	101
					6%	BGI EAFE CA [4]	20

(1) Index will be customized to a pooled fund and migrated into a separate account.
(2) Index will be Lehman Brothers Aggregate until asset size allows migration to Lehman Brother Universal
(3) Index will be MSCI EAFE until asset size allows migration to MSCI ACWIxUS.
(4) Index will be MSCI EAFE.
(5) Stable Value risk management is better monitored by duration management, rate responsiveness, and contract quality.

The following table illustrates the asset allocation targets and ranges for each of the pre-mix portfolios. The allocations will be rebalanced monthly, if outside their range, and will be initiated by the DC Group by instructing the custodian to rebalance portfolios to targets.

OPERS Pre-mix Portfolios	Index Benchmark	Conservative Portfolio Target/Range		Moderate Portfolio Target/Range		Aggressive Portfolio Target/Range	
OPERS Stable Value	GIC Master 5 Years	35%	2%	20%	1%	10%	1%
OPERS Bond	Lehman Brothers Universal	35%	2%	20%	1%	10%	1%
OPERS Stock Index	Russell 3000	12%	2%	25%	4%	30%	5%
OPERS Large Cap	Russell 1000	10%	2%	20%	3%	25%	4%
OPERS Small Cap	Russell 2000	3%	1%	5%	1%	10%	3%
OPERS Non-US Stock	MSCI ACWI xUS	5%	1%	10%	2%	15%	3%

New Responsibilities

Interact with DC Investment Consultant – The DC Group will work with the Investment Consultant to ensure they have all necessary information and to implement their suggestions for improving the program. Initiative 1 below details the process for hiring the Investment Consultant.

Due Diligence Visits – In addition to monitoring the performance of investment managers and investment options as outlined above, the DC Group will be responsible for conducting due diligence visits with all the investment managers in the program.

Rebalancing Investment Options – In conjunction with the Master Record Keeping, the Custodian, and the DC Record Keeper, the DC Group will be responsible for all investment option rebalancing. The policies for rebalancing are outlined in the DC Plans' Statement of Objectives and Policies.

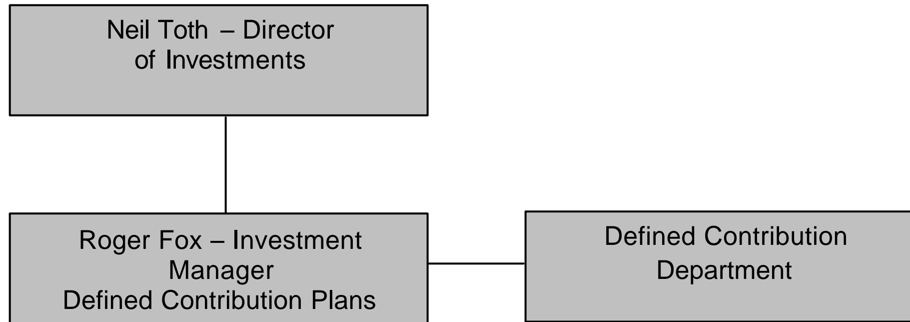
Coordination of External Managers – The Defined Contribution investment structure includes external investment managers from each of the major public market asset classes. To facilitate coordination of oversight of external managers for the Defined Benefit Plan, the DC Group will be responsible for ensuring consistency of reporting and documentation for all external managers within the OPERS investment program.

Education and Communication Materials – The DC Group will provide investment content to the education and communication departments for the Defined Contribution Plans.

Resources

Organizational Structure

The following is a projected organizational structure as of the start of 2003.



Staffing / Hiring

The Defined Contribution Group currently has one staff member.

Schedule of Target Staffing at Year End 2003	
	Defined Contributions
Current Staff (2002)	1
Vacant Positions	0
Est. Full Staff (2002)	1
Budgeted New Postions	0
+ / - Internal Transfers	0
Est. 2003 Full Staffing	1
Professional	1
Support	0

The annual cost of salaries and benefits including incentive compensation for the Defined Contribution Group at 2003 full staffing level is displayed in the following chart:

Schedule of Estimated 2003 Salary and Benefit Costs	
Compensation dollars in millions	
	Defined Contributions
Salaries	0.104
Benefits	0.040
Incentive Comp.	0.030
Total Comp.	0.174
Assets in $ billions	0.100
Cost in Basis Points	17.4

Operating Budget

The DC Group operating budget for 2003 is set at $199,890. Comparisons to the 2002 budget are not relevant because the group was entirely dedicated to completing initiatives (implementing the DC Plans) under the budget of the Investment Division and the new Defined Contribution department.

Schedule of Budgeted Operating Expenses	2002 Budget	2003 Budget	Dollar Change	Percent Change	Percent of Total	Asset Size ($ b)	Budget in bps
Personnel Expense	$113,505	$159,870	46,365	40.85%	79.98%		
Investment Consulting Services	$0	$0	-	0.00%	0.00%		
Quotes & Data Feeds	$0	$0	-	0.00%	0.00%		
Research Services	$0	$0	-	0.00%	0.00%		
Analytics	$0	$27,500	27,500	NA	13.76%		
Communications	$0	$0	-	0.00%	0.00%		
Information Technology	$0	$0	-	0.00%	0.00%		
Office Equipment & Supplies	$0	$1,500	1,500	NA	0.75%		
Training & Travel Expenses	$0	$11,020	11,020	NA	5.51%		
Total	$113,505	$199,890	86,385	76.11%	100.00%	$0.100	20

Initiative

Hire independent consultant

- The DC area will conduct a search for and retain a consultant to provide oversight and performance reporting to the Board for the DC assets. The consultants used in 2001/2 during the planning and implementation, Mercer and Callan, were hired under project mandates.

The Outlook in Brief

- The Commerce Department reported that the U.S. economy grew at a trend-like 3.1% annual rate in the third quarter, somewhat less than was generally expected just before the release of the official tally[1]. However, growth flagged considerably in late summer and early fall as motor vehicles sales and production fell from elevated levels in July and August. This, combined with the recent softening in orders for capital goods and evidence that momentum in consumer spending is also waning outside of motor vehicles, points to significantly slower growth in the fourth quarter, closer to a 1% annual rate.

- Still weighing on the expansion are the heightened uncertainty associated with an increasingly likely military engagement in Iraq, continued investor concerns about earnings reports and projections, uncertainty about the strength of the expansion, and household concerns over employment prospects. The recent rebound in equity prices, should it continue as expected, is a welcome antidote to much of the uncertainty, but it is too early to have much confidence that this nascent rally will be sufficient to lift the economy out the doldrums.

- Macroeconomic Advisers (MA) expects growth to strengthen to roughly 2% in the first quarter of next year, and continue to build, reaching 3.3% measured fourth quarter over fourth quarter in 2003, followed by 3.8% growth in 2004. While this is a plausible “best guess” forecast, the risks around this outlook are weighted toward the downside.

- The high degree of uncertainty in the outlook, recent indications that the economy has lost considerable momentum heading into the fall, and the risk that military action in Iraq could result in a distinctly weaker economy in the near term than portrayed here, motivated the 50 basis-point reduction in interest rates engineered by the Fed on November 6.

- The global economy continues to look tepid as other industrialized economies face many of the same challenges, as does the U.S. This suggests a near-term continuation of sluggish growth abroad and little zip in U.S. exports until the middle of next year. Once foreign growth rebounds convincingly and the threat of war in Iraq is removed, either through a peaceful resolution of the crisis or by effective prosecution of the action against Saddam Hussein’s regime, the dollar is expected to resume a gradual downward trend that will help to boost U.S. exports and restrain imports.

[1] Unless otherwise noted, all quarterly growth rates are expressed as compound annual rates; all yearly growth rates are quoted as the percent change from the fourth quarter of the previous year to the fourth quarter of referenced year; all components of GDP are quoted in terms of “real” chained 1996 dollar values.

- Soft labor markets have helped to restrain wage gains, but rising benefit costs — both in the form of higher insurance costs and necessary corporate contributions to build-up assets inside defined-benefit plans — may contribute to “above-inflation” increases in other employee costs and squeeze profit margins. To the extent that firms can offset higher labor costs with continued improvements in productivity, business can expect rising profitability, even in this very low inflation environment. MA expects that productivity growth will be sufficient to keep core inflation tame, while allowing corporate profits to enjoy moderate growth over the next couple of years.

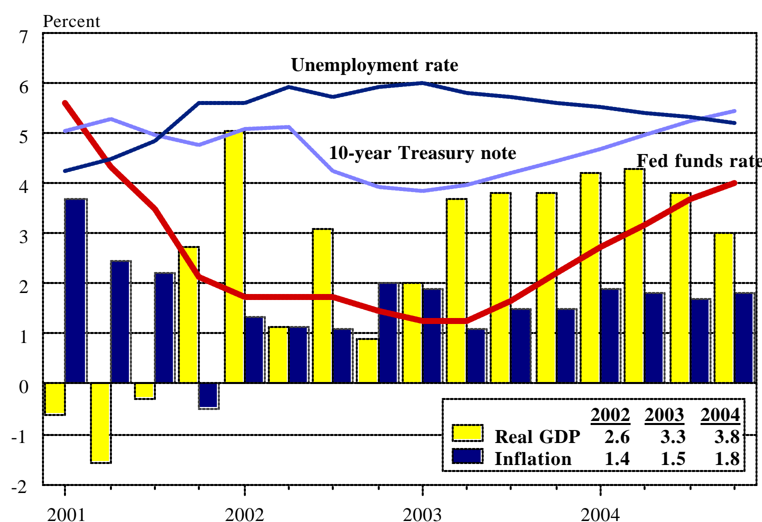
The Outlook in Full

In the year ended in the third quarter the U.S. economy grew, on average, at roughly a 3% rate. Although unspectacular for the first year of an economic recovery, growth this strong was remarkable given the challenges the economy faced over this period: the stock market meltdown that began in early 2000 continued through September of this year, the unwinding of an overly exuberant investment boom has kept capital spending weak, the shock of 9/11, while largely overcome, continues to restrain travel-related industries, the disclosures of corporate malfeasance have weakened investor confidence in equities, and a synchronous slowdown in the world’s major economies left the U.S. to pull itself out of its doldrums. The U.S. economy suffered only a mild recession over the first three quarters of last year, despite all that it had to overcome, and exhibited modest “trend-like” growth over the past year.

The official report of growth in the third quarter put the advance at a 3.1% rate, but more recent data suggest the pace of growth was closer to 3½%. However, the profile of growth suggests that the economy carried little forward momentum into the fourth quarter and that growth will be closer to 1%. We do not view this valley in growth as a precursor to an extended slowdown. Several factors will support a rebound in growth next year: 1) the cut in the Fed funds rate target of 50 basis points, 2) the dissipation of negative wealth effects that have been restraining consumer spending as equities continue a broad recovery, 3) continued solid growth of labor productivity that will continue to fuel healthy gains in real wages, 4) falling energy prices that will add to the growth of real incomes, 5) some acceleration in inventory building to prevent continued declines in inventory/sales ratios, and, 6) the tentative and scattered improvement in capital spending seen this year is expected to intensify and broaden once uncertainties with respect to Iraq and the sustainability of the recovery are reduced. GDP growth is expected to pick up to roughly 2% in the first quarter of next year, then 3.8% over the final three quarters of 2003 and 3.8% in 2004.

Two quarters of growth averaging less than 2% will likely be insufficient to generate enough employment gains to keep the unemployment from drifting a few tenths higher. We expect an average unemployment rate in the fourth quarter of 5.9%, followed by 6% in the first quarter. Indeed, the tilt in the forecast toward somewhat more near-term weakness and a rise in the unemployment rate was an important motivation for the Fed

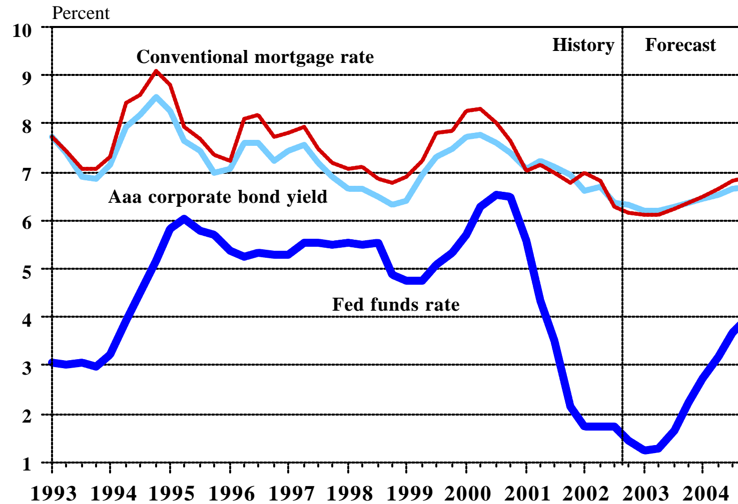
to lower the target federal funds rate to 1.25%. By the second quarter, production ramps up sufficiently to put the unemployment rate under modest downward pressure that returns it to 5.6% by the end of 2003 and 5.2% by the end of 2004.



The soft labor market has restrained and will continue to restrain the pace of wage gains and help to keep inflation in prices of goods and services in check. Exceptionally good productivity performance, on top of well behaved wage inflation, over the past several quarters meant that the level of unit labor costs actually declined about 2% over the past four quarters. This has helped to restore margins and keep prices in check. The GDP price index rose at only a 1.1% rate in the third quarter and only 0.8% over the last four quarters. However, this reflects sharply divergent behavior of goods prices versus services prices.

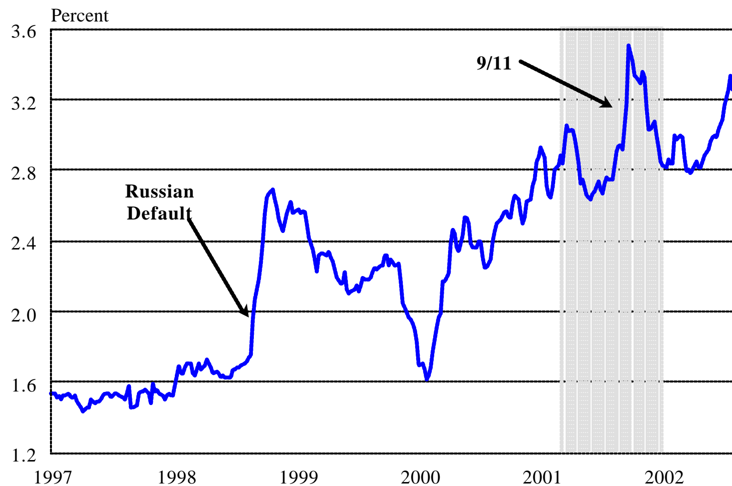
The recent benign behavior of inflation means the Fed can remain focused on insuring that the economic recovery underway since last fall will continue and transition, for a period, to growth rates strong enough to reduce the unemployment rate back toward 5%. With the significant challenges facing the economy in the post-bubble environment now compounded by heightened uncertainty associated with possible military action in Iraq and the potential for additional domestic terrorism, and with recent evidence accumulating that the economy lost considerable momentum in late summer and early fall, the Fed moved aggressively and lowered the target fed funds rate 50 basis points at its November 6th policy meeting. MA expects that this will be the last easing in this rate cycle and that interest rate hikes will accompany an improving economy next summer. The current level of bond yields already reflects some probability of an eventual rise in short-term interest rates. The wide spread of bond yields over 3-month treasury bills for example, suggests that investors expect significantly higher short-term interest rates over the next several years. Despite some anticipation of rising short-term yields, when investors see actual rate hikes long-term yields typically show a sympathetic increase. Hence, in this forecast we project that long-term yields will rise

next year as the Fed begins to nudge short-term yields back towards a more neutral stance.



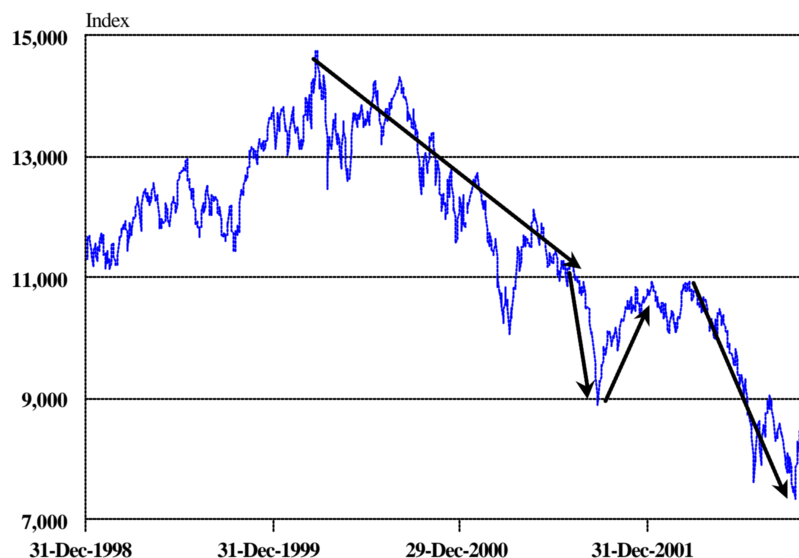
Equity Values Remain Key to the Outlook

Key to the forecast that the economy will re-accelerate from growth below-trend in the fourth quarter of this year and first quarter of next year to growth above trend for several quarters subsequently is the expectation that equity prices will rise significantly, if unevenly, through 2004. Underpinning this expectation is the judgment that equities are undervalued relative to levels that can be supported by economic fundamentals. The correction of this undervaluation accounts for the lion's share of the gains in equities we expect.

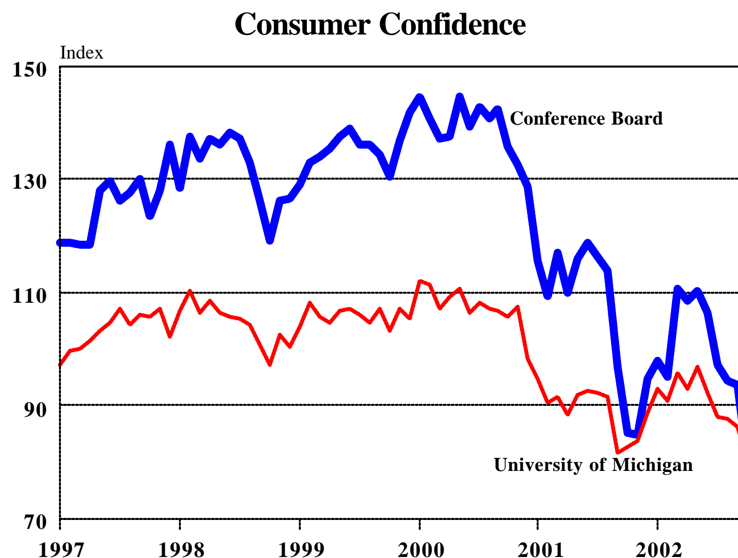


One plausible explanation for why equities would be undervalued at this point in time is that the risk associated with holding corporate equities or bonds has risen dramatically due to increased uncertainty from a variety of sources. Corporate accounting scandals, the appearance, if not fact, of spurious appraisals from stock analysts whose motives may have been skewed by incentives to win investment banking business, insider trading, fears of additional terrorist attacks in the U.S. which may target corporate assets, uncertainty over the economic effects of U.S. military action in Iraq, and uncertainty regarding the sustainability of the current tentative expansion all contribute to investor concerns that corporate equities and bonds are riskier than just a short while ago. One piece of evidence of this generalized uneasiness about holding corporate stock or debt is the sharp rise in corporate bond spreads over Treasury notes that occurred this year. The nearby chart shows the difference of the Baa bond yield and the 10-year Treasury note yield. Note that in the immediate aftermath of 9/11 this spread widened sharply, but by early this year had returned to below levels immediately prior to 9/11. However, this spread began to widen sharply again as corporate accounting scandals broke in the spring and summer, as prospects of military action in Iraq increased, and as signs appeared that the economy was losing momentum.

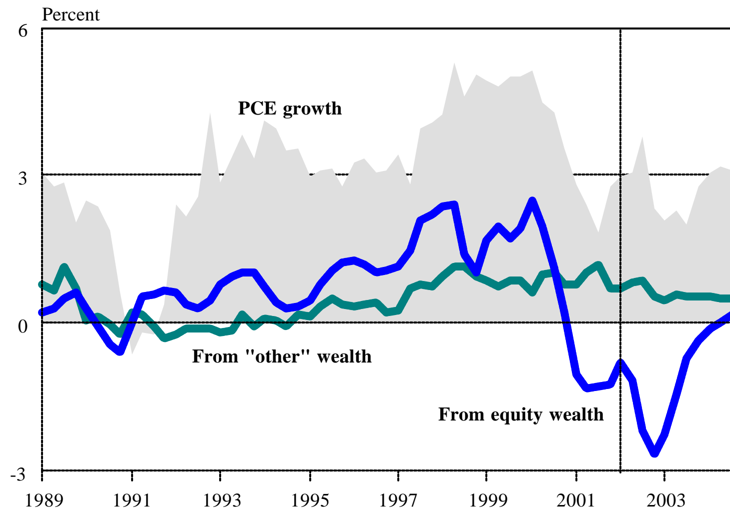
The same forces behind the rising risk spreads seen in corporate bond yields were also reflected in a rising equity risk premium and contributed to the deepening equity-market meltdown over the summer. The chart below shows the three phases of this meltdown using the Wilshire 5000 equity price index: 1) the original bursting of the tech bubble and its spillover to the broader market, 2) the shock of 9/11 and subsequent recovery, and 3) the third leg down in the stock market associated with recent corporate scandals, heightened concerns over war in Iraq, and signs of economic weakening.



The Wilshire index fell roughly 38% from its average in the first quarter of 2000 to the third quarter of 2002. This corresponded to a decline in the equity wealth of households of nearly $8.7 trillion. A decline of this magnitude would be expected to put the damper of consumer perceptions of their own economic well-being and it did. Combined with the sharp slowing in job growth after the first quarter of 2000 and outright employment declines roughly a year later, the stock market meltdown contributed to a dramatic weakening in measures of consumer confidence. The chart below shows both major measures, Consumer Sentiment from the University of Michigan, and Consumer Confidence from the Conference Board. Note how the three periods of plunging confidence, the second and third interrupted by the recovery after 9/11, mirrors the path of stock prices.



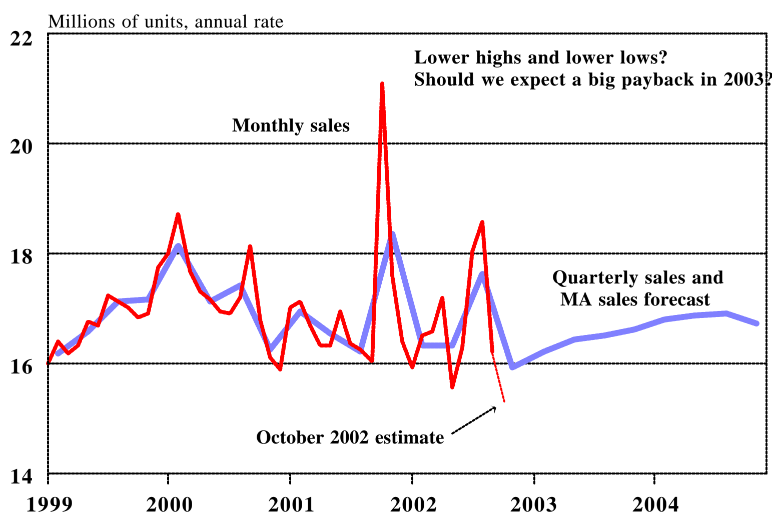
MA's modeling of consumer confidence, consumer spending and household wealth suggests that this apparent close relationship is no accident. The recent declines in confidence are largely explained by the economic circumstances in which the household sector finds itself. Those circumstances are best described in the aggregate by the recent behavior of stock prices, real incomes of consumers and job prospects as reflected by the unemployment rate. Moreover, these are an important subset of the economic forces that determine consumer spending (demographics being a key here also). The two most important determinants of the level of consumer spending are real disposable (after-tax) income and real net worth of the household sector.



Income growth has been solid over the last couple of years aided by the strong growth of productivity — the key driver of real wages earned by labor — and by the tax cuts implemented in 2001 and 2002, despite declines in overall employment. This has maintained consumer spending in the face of significant drag from the decline in equities. The chart above shows the 4-quarter growth of consumer spending and the contribution to that growth from changes in the equity wealth of households and their other non-equity wealth. (These estimates are derived from MA's modeling of consumer spending.) The sharp slowing in the growth of consumer spending starting in 2000 is easily understood in the context of the negative wealth effects from the equity-market meltdown. A key element of the MA forecast for 2003 and 2004 is that the drag from negative equity wealth effects dissipates, and this, in turn, depends crucially on a continuation of the rally in stock prices that began just a few weeks ago. This allows the growth of consumer spending to remain in the range of 2½% - 3% over the next two years.

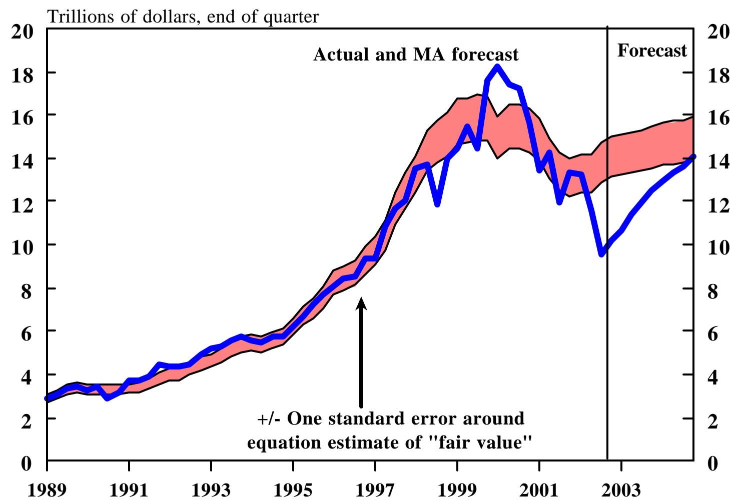
It is worth noting that zero-percent financing from Detroit has dramatically boosted consumer purchases of cars and light trucks and generally supported the overall level of consumer spending over the past year. To the extent these incentives are perceived by potential car buyers as only temporary we would expect them to rob sales from the future rather than create new sales. As has been the case previously with such incentives, when they end there is a payback — a period of well below-trend sales — so that no net new sales are created. In the current episode however, the paybacks have been small to nonexistent. Light vehicle sales have dipped hardly at all below trend. One explanation may be that generous sales incentives have not been entirely withdrawn between rounds of the most generous zero-percent financing promotions. This amounts to a more or less permanent price reduction that would be expected to have much more staying power. However, a pull-ahead of sales does appear to be part of the success of the incentives offered after 9/11. The chart at right shows monthly

sales of light vehicles along with the quarter average of sales and MA's quarterly forecast. Each successive round of zero-percent financing appears to be less successful than the previous round, and sales fall to lower levels after the most generous incentives are withdrawn. By one method of estimation, roughly ¾ of a million light vehicle sales have been borrowed from the future. If the underlying trend of sales were 16.5 million for next year, then actual sales may turn out to be closer to 15.7 million. Fortunately, if negative wealth effects dissipate as expected, the trend of light vehicle sales will be rising, so the temporary dip below trend will result in sales levels that remain above 16 million units.



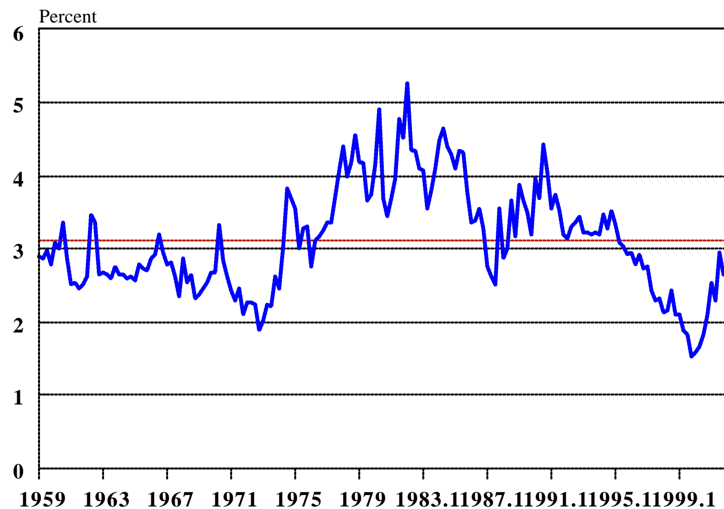
The importance of changes in stock prices and equity wealth in the household sector to the outlook requires that we be quite explicit about what we are assuming with respect to stocks and why. Of particular interest has been the notion that equity values may, as of the end of the third quarter (and still), be undervalued. MA has developed a model of equity valuation that attempts to relate a broad measure of equity capitalization to the aggregate level of dividends paid, a discount rate, and the expected growth of dividends, i.e. a dividend-discount model applied at the level of the entire economy. A key innovation in MA's implementation of this model is that the proxy for the expected growth of dividends is the growth of the corporate capital stock. This makes intuitive sense because the corporate capital stock is the source of capital income, of which dividends are a major component. The chart below shows the actual and predicted level of this broad measure of stock market capitalization (equities owned directly and indirectly by the household sector) and a range of "fair valuation." This range is simply plus and minus one standard error of the predicted value from MA's model of equity market capitalization, roughly a band 14% wide.

Household Holdings of Corporate Equities



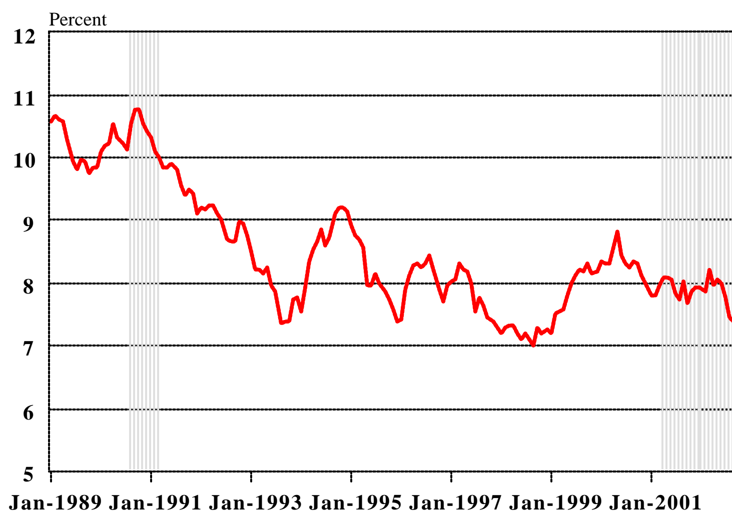
This is not meant to be a model to forecast stock prices. Rather it is used to broadly calibrate a level of stock-market capitalization that is consistent with economic fundamentals. The current implication of the model is that stocks are undervalued relative to economic fundamentals, which are derived from a whole host of assumptions we must make in constructing the entire forecast. One additional fact to consider on this issue is the dividend yield for non-financial corporate business. This is simply the ratio of total dividends paid by this sector to the total market capitalization of the sector as recorded in the Flow of Funds accounts assembled by the Federal Reserve. The chart below shows the dividend yield back to 1959 and the average of roughly 3.1% over the period. With the yield now near 3.8%, it is possible that this broad segment could benefit from a decline in the dividend yield back toward its historical average.

Dividend Yield for Nonfinancial Corporate Business



Is Capital Spending Ready to Step up?

A recurring theme in the outlook over the last year has been the need for consumer spending to continue to carry the expansion until capital spending could "kick in" and fuel the next phase of growth. This is a fairly typical pattern, except that in a more typical recession — in contrast to the mild slowdown the U.S. experienced in 2001 — consumer spending would have weakened more sharply and rebounded more sharply in the early recovery period. Previously we noted that the yield spread of a Baa bond over the 10-year Treasury note was at a historic high. Nevertheless, the absolute level of Baa yields are near historic lows.



This suggests that for most larger companies, but certainly not all, the current cost of financing is probably not a significant factor restraining capital spending. Indeed, while overall net debt issuance for the non-financial corporate sector has sharply slowed this year, bond issuance has remained strong. Corporations, much as they may dislike borrowing when spreads over Treasuries are this wide, are taking advantage of the low level of long-term yields to restructure their balance sheets and lengthen the maturity structure of their debt. This is part of the process of building a foundation for the next upturn in capital spending.

Another factor that may have been restraining capital spending was the emergence of so-called "capital overhangs" in some sectors. The cheap cost of equity capital available to some firms, notably many in high-tech industries, during the stock market boom of the late 1990s encouraged over investment. When reality set in to the equity market, the cost of capital soared, investment plunged, and the beginnings of the 2001 recession were in motion. MA's analysis of the growth of the productive capital stock of computers, software, and other equipment over the past couple of decades suggests that computers and software did experience excessive growth in the capital stock resulting in a capital overhang. However, these overhangs by now appear to have dissipated for several reasons. First, the economy has continued to grow (except for

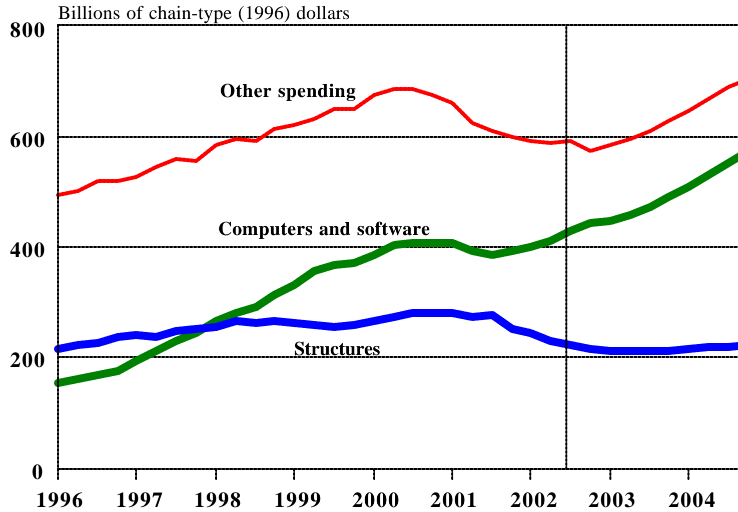
the shallow recession in 2001) and the level of nonfarm output is well above what it was when the estimated overhangs were at their peak in early 2001. Second, weakening in investment spending since mid 2000 has slowed the gross accumulation of capital, while rapid economic depreciation rates for high-tech capital has meant the net accumulation has slowed even more appreciably. Third, the prices of computers and software (in real quality adjusted terms) have continued to fall sharply, raising the profit-maximizing ratio of capital to output and providing added incentive to raise capital spending.

MA expects total nonresidential investment to fall at a 6% rate in the fourth quarter, following a small rise in the third quarter. The third-quarter gain was almost entirely accounted for by a sharp 19.2% rate of increase in computer and software investment that has subsequently slowed somewhat. We expect a fourth-quarter rise of about 11%. Business investment in other equipment, which eked out a 1.4% gain in the third quarter is expected to back-track, falling at roughly an 11% rate. Business investment in nonresidential structures is expected to remain essentially “dead in the water” neither rising nor falling much over the next several quarters. The chart at right shows the recent historical and forecasted levels of the three major components of nonresidential business fixed investment that we track. Because of the significant declines in capital spending over the last couple of years, achieving double-digit growth is less grandiose than it may at first appear. MA expects computer and software investment to rise12.3% this year, 10.8% next year and nearly 17% in 2004. Other equipment is projected to fall 4.4% this year, and then rise 9.5% and 12.1% in 2003 and 2004, respectively. Investment in nonresidential structures, which fell sharply over the first three quarters of this year and which is expected to fall 14.4% for the year, is projected to decline only 1.4% next year and rise 4.2% in 2004.

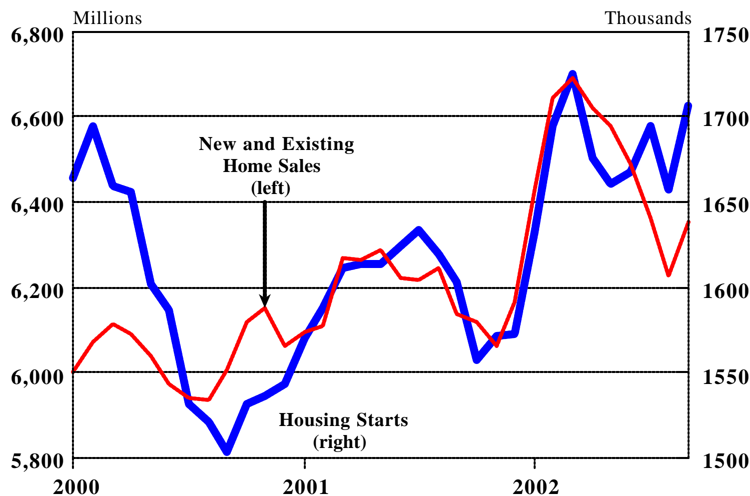
Housing Hangs In

The historically low level of mortgage rates —rates on 30-year conventional mortgages bouncing around near 6% —and continued strong growth of real incomes, despite the otherwise unspectacular economic performance in this recovery, has kept housing markets humming. Mortgage refinancing activity has continued to lower monthly payments for significant numbers of households, freeing up income for other spending. However, the total effect is not as large as some would suggest because that mortgage interest paid is also someone else’s income. The net gain in spending is limited to the difference between the added spending generated by those whose mortgage payment go down and the reduction in spending by those whose interest receipts go down. Another aspect of the period of low mortgage rates that has been supportive of spending is the ability of some households who refinance to remove some additional equity from their homes, especially in areas where home prices have risen sharply over the last several years. While the ability to liquefy net worth using home equity lines of credit or mortgage refinancing reduces the cost of converting overall gains in wealth into increases in consumer spending, the effect is unlikely to be as large as some have argued. The main positive effect of low mortgage rates on the economy has been twofold. First, low rates have supported the gains in the value of owner-occupied real

estate, and through the usual wealth effect, helped to partly offset declines in equity wealth.



Second, low mortgage rates have promoted strong sales of new and existing homes and housing starts.



Housing construction has made a modest positive contribution to the level of economic activity, but it has not been a major factor in the 3% GDP growth we seen over the past year. On the other hand, had mortgage rates not remained this low, a sharp decline in housing activity could have been a significant negative for the economy.

Housing starts have averaged 1.7 million (annual rate) over the first three quarters of this year, but surged to a pace of 1.843 million in September, the highest since 1986.

This surge is expected to be reversed and starts are projected to average 1.616 million in the fourth quarter. Despite the rise in mortgage rates next year (see chart on page 3), housing starts are expected to average 1.66 million next year, boosted by stronger growth of employment and incomes.

Some, but Not Much, Help from Abroad

Forecasts of foreign GDP growth recently have been marked down so we now assume slower growth of trade-weighted foreign GDP, especially in 2003. We expect growth of 3% this year, 3.2% next year and 3.6% in 2004. With less zip to foreign demand, there is less underlying momentum for growth of exports next year. However, our forecast of U.S. growth over the next few quarters is also weaker than recent forecasts, implying less underlying momentum for imports. We now expect exports to grow at only a 3.4% rate in the fourth quarter, ratcheting up to 6.3% growth over 2003 and 8.3% growth over 2004. Imports are expected to grow at a slightly faster 4.2% rate in the fourth quarter, followed by growth next year of 4.9%, and in 2004 of 5.4%. Because the level of imports is much higher than that of exports, net exports continues to decline in our forecast into early 2004, before foreign recoveries and a declining dollar help push growth of exports well above that of imports. The level of net exports is expected to decline approximately $7 billion in the fourth quarter, to -$499 billion, then fall further but unevenly to about -$513 billion in early 2004 before rising to -$501 billion in Q4-04.

Recent data on European economies is not encouraging. Both business and consumer confidence have declined in the eurozone. A purchasing managers index for the eurozone, while up slightly in October, is still below the level of 50 that separates signs of contraction from expansion. The outlook for Germany is of particular concern, and fiscal and monetary policy are unlikely to provide much of a respite. Germany's budget deficit threatens to exceed limits agreed to as part of the negotiations for the euro, so fiscal policy is unlikely to help a recovery. Meanwhile, the European Central Bank has been hesitant to cut interest rates in part because of concerns that eurozone inflation will exceed its guidelines. However, some analysts have argued that the Fed's aggressive action on rates may make it easier for the European Central Bank to trim rates.

It's not easy to find strong grounds for optimism about a recovery in Japan. True, GDP rose 0.6% in the second quarter (quarterly rate), but signs are that growth slowed in the third quarter. Japan's index of leading indicators fell sharply from July to August, and the quarterly *Tankan* index from the Bank of Japan, while up slightly in recent quarters, is still in a deep trough. In October the Nikkei 225 stock index fell to a 19-year low. Apparently investors are cautious about government plans to expedite the write-downs of bad loans, which burden the banking sector, in light of indications that at least some of the proposed measures are vigorously opposed by some government officials and members of the ruling Liberal Democratic Party. Most analysts continue to expect only quite modest growth in Japan, near 1% this year and only 1% - 1½% over the next two years.

The growth outlook in other regions is mixed, with continued recoveries expected in much of non-Japan Asia, fueled in part by growing demand from China and intra-Asian trade. Over the four quarters through Q3-02, GDP rose 8.1% in China, according to its government. In Latin America, Mexican GDP growth is forecast to slip from 3.7% this year (estimated) to 3.4% next year, but then improve to 5.6% over 2004. Mexican authorities have tightened monetary policy in recent months, in response to a decline in the peso. To our north, the Canadian economy continues to outperform the U.S. Canada suffered only a single quarterly decline in GDP in 2001, compared to three quarterly declines in the U.S.) and job growth there has surprised even the most optimistic analysts. Equally surprising is the fact that the job gains are quite geographically and industrially diffuse. In Brazil, the victory of an opposition candidate ("Lula") in a recent presidential election has been reflected in a volatile exchange rate, rising interest rates, and until mid-October, declining stock prices. However, hope that the incoming president may adopt policies that are less anti-investor than originally feared contributed to modest rebounds in both stock prices and the foreign-exchange value of the Brazilian currency, the *real,* in late October. But the recovery in Brazil is expected to be modest: GDP growth is forecast at 3.3% next year and 3.0% in 2004, following estimated growth for 2002 of 1.3%.

Will the Fed's Rate Cut Help?

In the lead section of this report we discussed the motivation for the Fed's aggressive 50 basis-point rate cut on November 6. A question we heard ahead of and after the cut is "If the problem with economy now is not the level of rates but the level of uncertainty, why would another rate cut boost growth?" The answer is pretty straightforward. Whatever the source of drag on demand in the economy, there are any number of spending decisions that depend on the price of credit, which are currently right on the margin of being economically feasible, and which will be decided in the affirmative if the price of credit falls. Unless it were the case that businesses and consumers had become totally insensitive to changes in (relative) prices and stopped responding to economic incentives, further cuts in rates must have a positive effect on spending. We concede that to the extent that non-economic factors have created an attitude among some of "no way at any price" there may be some reduction in the effectiveness of further rate declines. However, based on the response of consumers to zero-percent financing, and based on the spurt of activity in the housing market as mortgage rates fell, we doubt this is a very widely held view.

	2002.2	2002.3	2002.4	2003.1	2003.2	2003.3	2003.4	2004.1	2004.2	2001	2002	2003
Real GDP & Components			% change annual rate							q4/q4		
GDP	1.3	3.1	0.9	2.0	3.7	3.8	3.8	4.2	4.3	0.1	2.6	3.3
Personal Consumption Expenditures	1.8	4.2	0.2	2.1	2.7	3.1	3.2	3.2	3.1	2.8	2.3	2.8
Business Fixed Investment	-2.4	0.6	-6.0	3.5	6.6	8.9	9.6	11.7	12.9	-9.3	-3.5	7.1
Real Activity			quarterly averages, unless noted							annual avg.		
Private Housing Starts (thous units)	1667	1707	1616	1652	1648	1670	1668	1682	1690	1603	1679	1660
Light Vehicle Sales (mil units)	16.3	17.6	15.9	16.2	16.4	16.5	16.6	16.8	16.9	17.0	16.6	16.4
Industrial Production (% ch, a.r.)	4.2	3.6	2.0	3.1	3.2	4.5	4.4	4.9	5.3	-5.9	3.1	3.8
Manuf. Capacity Util. (%)	74.0	74.4	74.3	74.8	75.2	75.7	76.3	76.8	77.5	75.1	74.0	75.5
Unemployment Rate (%)	5.9	5.7	5.9	6.0	5.8	5.7	5.6	5.5	5.4	4.8	5.8	5.8
Prices, Productivity, & Costs			% change annual rate, unless noted							q4/q4		
CPI (all urban)	3.4	1.9	2.9	2.4	0.5	1.6	2.0	1.9	2.4	1.9	2.4	1.6
PPI (finished goods)	1.2	-0.8	0.4	-0.6	-2.8	-0.7	0.5	-0.7	0.3	-1.0	0.2	-0.9
Compensation Per Hour	3.7	4.5	3.6	3.8	4.0	3.9	3.6	3.6	3.7	1.4	3.8	3.8
Output Per Hour	1.5	4.5	0.0	0.9	1.8	2.3	2.5	2.8	2.6	1.9	3.6	1.9
Price of Imported Oil ($/barrel)	23.8	26.1	26.0	26.0	20.0	20.0	20.0	18.0	18.0	22.0	23.8	21.5
Selected Interest Rates			quarterly average (%)							annual avg		
Federal Funds Rate	1.75	1.74	1.45	1.25	1.26	1.67	2.23	2.71	3.16	3.89	1.67	1.60
30-Year Treasury Bond Yield	5.75	5.24	4.66	4.57	4.67	4.89	5.09	5.30	5.51	5.49	5.31	4.81
Aaa Corporate Bond Yield	6.71	6.35	6.31	6.20	6.20	6.29	6.38	6.43	6.53	7.08	6.50	6.27
Incomes & Related Measures			% change annual rate, unless noted							q4/q4		
Corporate Profits	-6.2	8.0	-0.5	9.4	7.0	7.3	7.4	14.8	16.4	8.2	-1.5	7.8
HH Net Worth, Equities (qrtrly rate)	-12.8	-17.2	6.9	4.5	6.4	5.0	4.3	4.1	2.9	-14.8	-23.1	21.8
Federal Surplus (FY, Uni, bils $)	62	-169	-258	-299	60	-223	-257	-255	113	127	-159	-180

Source: Macroeconomic Advisers. LLC

Prepared by Macroeconomic Advisers for Ohio PERS
November 6, 2002