

2/12/02

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Alaska Permanent Fund Corporation

P.O. Box 25500 Juneau, AK 99802-5500

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MEMORANDUM

DATE: February 19, 2002

TO: Representative Eldon Mulder
Co-Chairman
House Finance Committee

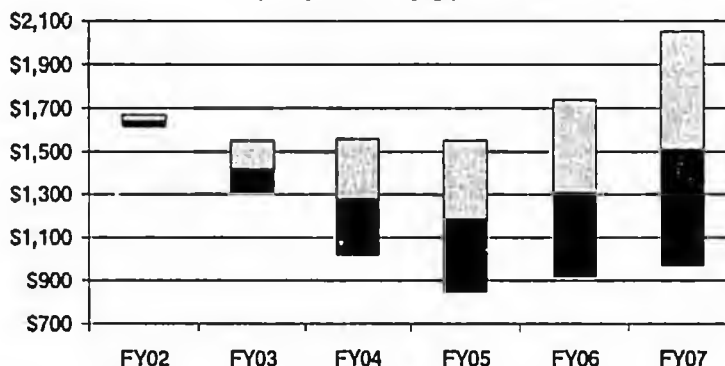
THRU: Robert D. Storen *RDS*
Executive Director

FROM: *CP* Chris Phillips
Director of Finance

SUBJECT: Presentation, House Finance, February 12, 2002

I would like to make one correction to a slide in the presentation to House Finance on February 12, 2002. The correction is on page 10 of the presentation reproduced correctly below. The graphical presentation of the slide below contained an error, however the figures represented were correct.

**Range of per capita dividend
FY02 – FY07**



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$1,670	\$1,550	\$1,560	\$1,550	\$1,740	\$2,050
Median	\$1,640	\$1,420	\$1,280	\$1,190	\$1,310	\$1,510
Bottom quartile	\$1,610	\$1,300	\$1,020	\$ 850	\$ 920	\$ 970

February 19, 2002
Representative Mulder

The data used in the February 12th presentation was based on the Alaska Permanent Fund financial results as of 12/31/01. We have recently produced the January 31, 2002 financial statements. The downturn in the financial markets continues. At the end of January, our statutory net income projection of approximately \$700 for the year is currently below the bottom quartile of \$800 million as presented to you in House Finance on 2/12/02 (page 8). Because of the five year averaging of the annual realized earnings, the projected distributed income continues to be approximately \$1 billion (page 9). Projected earnings reserve at the end of FY02 continues to be within the top and bottom quartile as presented to you in House Finance on 2/12/02 (page 7).

A complete set of financial statements for the Alaska Permanent Fund as of January 31, 2002 is attached for your review.

ALASKA PERMANENT FUND

Balance Sheets/Statements of Net Assets

Unaudited (Millions of Dollars)	January 31, 2002	June 30, 2001
Assets		
Cash and temporary investments	\$ 636.4	544.0
Receivables, prepaid expenses and other assets	312.4	365.2
Investments —		
Marketable debt securities	8,691.5	10,005.7
Preferred and common stock	12,823.7	12,617.7
Real estate	2,437.9	2,504.5
Alaska certificates of deposit	29.4	147.4
Total investments	<u>23,982.5</u>	<u>25,275.3</u>
TOTAL ASSETS	<u>\$ 24,931.3</u>	<u>26,184.5</u>
Liabilities		
Accounts payable	\$ 346.1	253.2
Income distributable to the State of Alaska	1.7	1,116.4
TOTAL LIABILITIES	<u>347.8</u>	<u>1,369.6</u>
Fund Balances/Net Assets		
Reserved/Restricted:		
Principal	21,171.3	21,047.6
Unreserved/Unrestricted:		
Unrealized earnings reserve	880.1	1,383.6
Remaining earnings reserve	2,532.1	2,383.7
Total earnings reserve	<u>3,412.2</u>	<u>3,767.3</u>
TOTAL FUND BALANCES/NET ASSETS	<u>24,583.5</u>	<u>24,814.9</u>
TOTAL LIABILITIES & FUND BALANCES/ NET ASSETS	<u>\$ 24,931.3</u>	<u>26,184.5</u>

ALASKA PERMANENT FUND

Statements of Revenues, Expenses and Changes in Fund Balances/Statements of Activities

Unaudited (Millions of Dollars)	Month ended January 31, 2002	Seven months ended January 31, 2002	Fiscal year-end projected/actual June 30, 2002 2001	
Revenues				
Interest	\$ 44.8	348.5	587.9	710.3
Dividends	9.4	84.3	147.4	155.6
Real estate and other income	32.2	138.8	211.9	225.2
Total interest, dividends, real estate & other	86.4	571.6	947.2	1,091.1
Net increase (decrease) in the fair value of investments —				
Marketable debt securities	24.8	206.5	206.5	359.6
Preferred and common stock	(315.4)	(1,068.9)	(633.8)	(2,486.9)
Real estate	(47.0)	(39.1)	(33.6)	119.9
Foreign exchange contracts	10.6	(0.1)	(0.1)	37.2
Currency	(0.8)	(1.7)	(1.7)	(5.3)
Total net decrease	(327.8)	(903.3)	(462.7)	(1,975.5)
TOTAL REVENUES	(241.4)	(331.7)	484.5	(884.4)
Expenditures/Expenses				
Operating expenses	(3.5)	(23.4)	(40.1)	(39.5)
EXCESS OF REVENUE OVER EXPENDITURES/EXPENSES	\$ (244.9)	(355.1)	444.4	(923.9)
Other Financing Sources/Uses				
Contributions	14.8	123.7	223.0	339.3
Distributions	—	—	(972.0)	(1,116.4)
EXCESS OF REVENUES & TRANSFERS IN OVER EXPENDITURES/EXPENSES & TRANSERS OUT	(230.1)	(231.4)	(304.6)	(1,701.0)
Fund Balances/Net Assets				
Beginning of period	24,813.6	24,814.9	24,814.9	26,515.9
End of period	\$ 24,583.5	24,583.5	24,510.3	24,814.9

Statutory Income Calculation

Excess of revenues over expenditures/expenses	(244.9)	(355.1)	444.4	(923.9)
Settlement earnings and unrealized losses	254.5	493.3	251.3	2,123.0
STATUTORY NET INCOME	\$ 9.6	138.2	695.7	1,199.1



ALASKA PERMANENT FUND

FINANCIAL PROJECTIONS 2002 - 2012, 2021

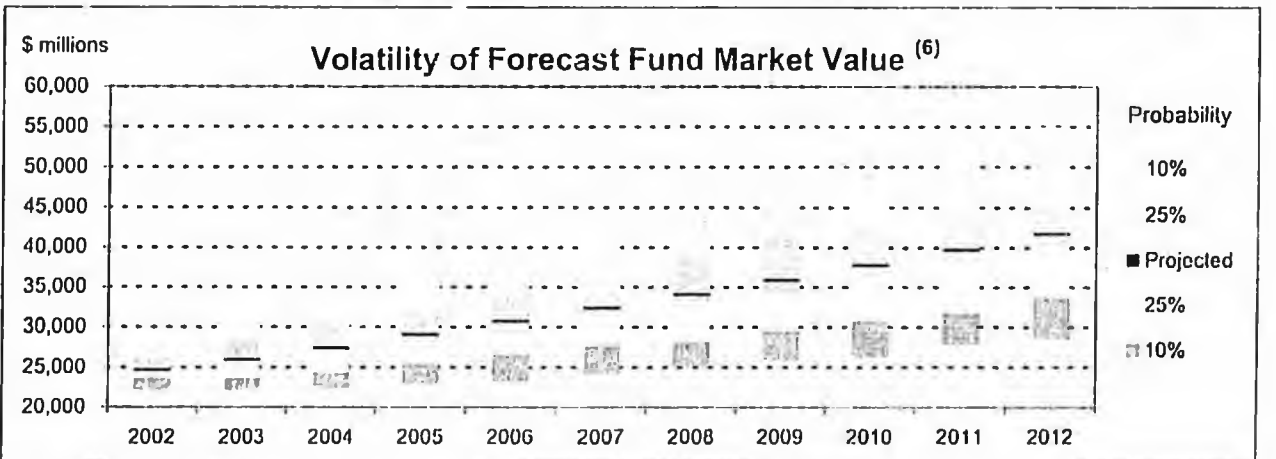
as of January 31, 2002
(in millions)

PRINCIPAL					
FY	FY Begin Balance	Dedicated			FY End Balance
		Appro-riations	State Revenues	Inflation-Proofing	
77-96	0	5,870	5,711	4,624	16,205
97	16,205	829 ⁽²⁾	308	486	17,828
98	17,828	35 ⁽³⁾	230	423	18,516
99	18,516	41	155	288	19,001
00	19,001	281 ⁽²⁾	310	423	20,015
01	20,015	7	339	686	21,047
02	21,047	0	223	602	21,872
03	21,872	17	216	652	22,757
04	22,757	18	240	679	23,695
05	23,695	20	218	706	24,638
06	24,638	21	195	733	25,587
07	25,587	22	187	761	26,557
08	26,557	24	181	789	27,552
09	27,552	25	174	819	28,569
10	28,569	27	164	848	29,609
11	29,609	29	125	878	30,641
12	30,641	31	125	908	31,705
...
21	41,362	55	125	1,225	42,767
Cumulative Totals					
Projected for 2002-2021		3,358	18,759		

INCOME										TOTAL FUND ⁽⁵⁾
Net Income ⁽¹⁾	Statutory Net Income	Distributions of Statutory Income			Earnings Reserve				FY	
		Dividends	Inflation-Proofing	General Fund	Realized Net Change	FY End Balance	Unrealized Net Change	FY End Balance		
14,134	14,054	5,993	4,624	223	104	104	2,084	2,084	77-96	18,393
3,149	2,036	747	486	1	3	107	1,085	3,169	97	21,104
3,435	2,595	893	423	1	1,282	1,389	802	3,971	98	23,876
2,148	2,544	1,045	288	3	1,201	2,590	(430)	3,541	99	25,132
2,249	2,222	1,172	423	3	382	2,972	(12)	3,529	00	26,516
(924)	1,199	1,113	686	4	(508)	2,384	(2,146)	1,383	01	24,814
444	696	972	602		(878)	1,506	(252)	1,131	02	24,509
1,914	1,572	864	652		56	1,561	325	1,456	03	25,775
2,015	1,655	771	679		205	1,766	342	1,798	04	27,259
2,131	1,750	722	706		322	2,088	361	2,159	05	28,886
2,259	1,856	790	733		332	2,421	383	2,542	06	30,550
2,390	1,964	924	761		279	2,699	404	2,946	07	32,203
2,521	2,071	976	789		305	3,005	426	3,373	08	33,929
2,657	2,183	1,031	819		333	3,338	449	3,822	09	35,729
2,799	2,299	1,089	848		362	3,700	473	4,294	10	37,603
2,946	2,420	1,148	878		394	4,094	497	4,792	11	39,526
3,098	2,545	1,209	908		427	4,521	523	5,314	12	41,540
...
4,827	3,962	1,891	1,225		845	10,285	811	11,371	21	64,424
60,248	51,765	25,704	18,759							

Assumptions			
	Total Return - Inflation = Total Real Return		
FY 2002	1.95%	2.83%	-0.88%
FY 2003-2021 ⁽⁴⁾	7.95%	2.95%	5.00%

⁽¹⁾ Net income is statutory net income plus the net change in unrealized gains and settlement earnings.
⁽²⁾ Earnings reserve appropriated to principal.
⁽³⁾ Settlement earnings transferred to principal per AS 37.13.145(d).
⁽⁴⁾ Based on 2002 Callan capital market assumptions.
⁽⁵⁾ Total Fund equals Principal plus Earnings Reserve.
⁽⁶⁾ The MOMA volatility graph shows the range of possible outcomes with the extremes of the bars indicating the less likely probability.



Alaska Permanent Fund

Financial outlook for Fund
growth and income

Chris Phillips, Director of Finance
Alaska Permanent Fund Corporation

House Finance
February 12, 2002

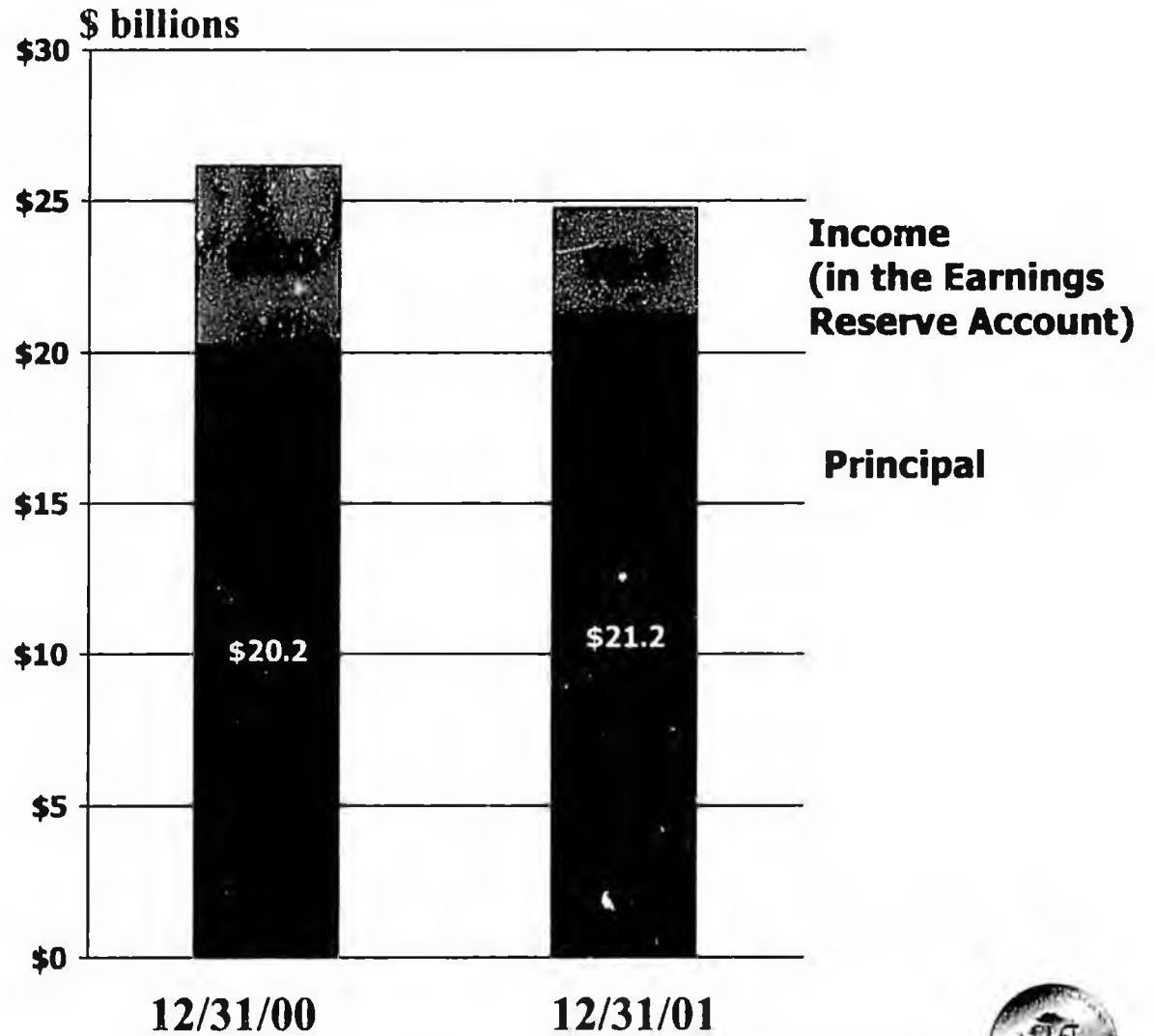
Alaska Permanent Fund



Permanent Fund market value

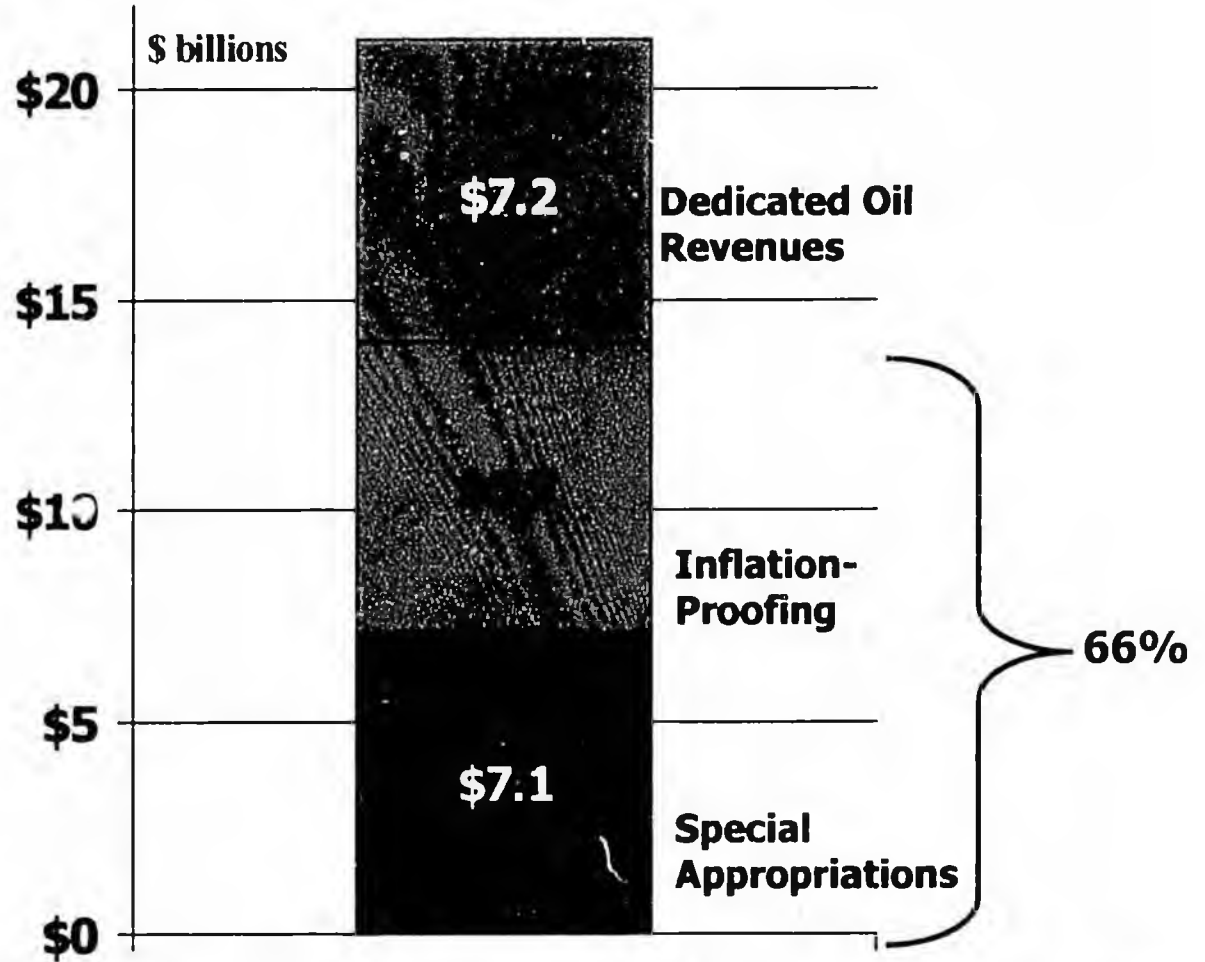
The market value of the Permanent Fund is currently \$24.8 billion

It consists of two parts: principal and income



Permanent Fund principal

- **The Alaska Permanent Fund principal is protected by the Alaska Constitution**
- **The principal is not available for appropriation.**

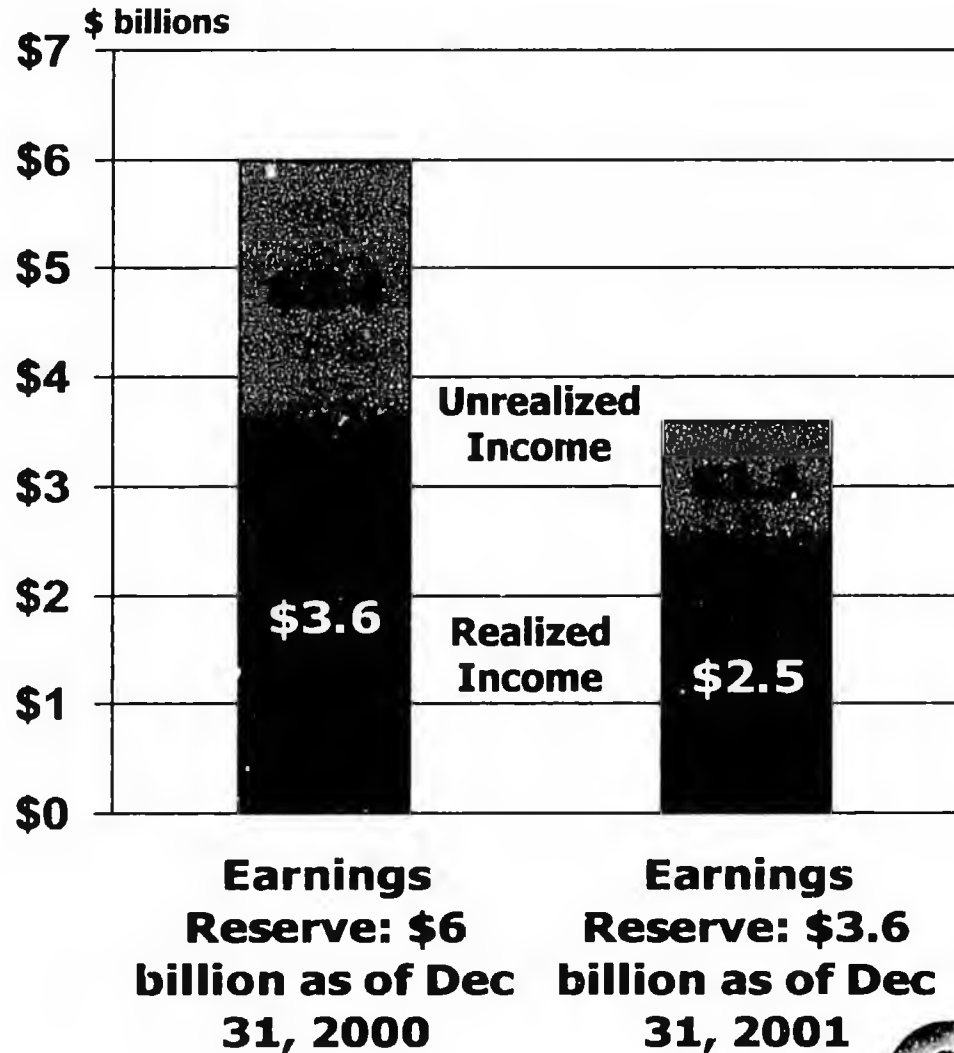


\$21.2 billion as of Dec. 31, 2001



Permanent Fund earnings reserve

- **As provided by law, all income from the Permanent Fund's investments is deposited into the Earnings Reserve Account in the Permanent Fund**
- **It is retained there until appropriated by the legislature**

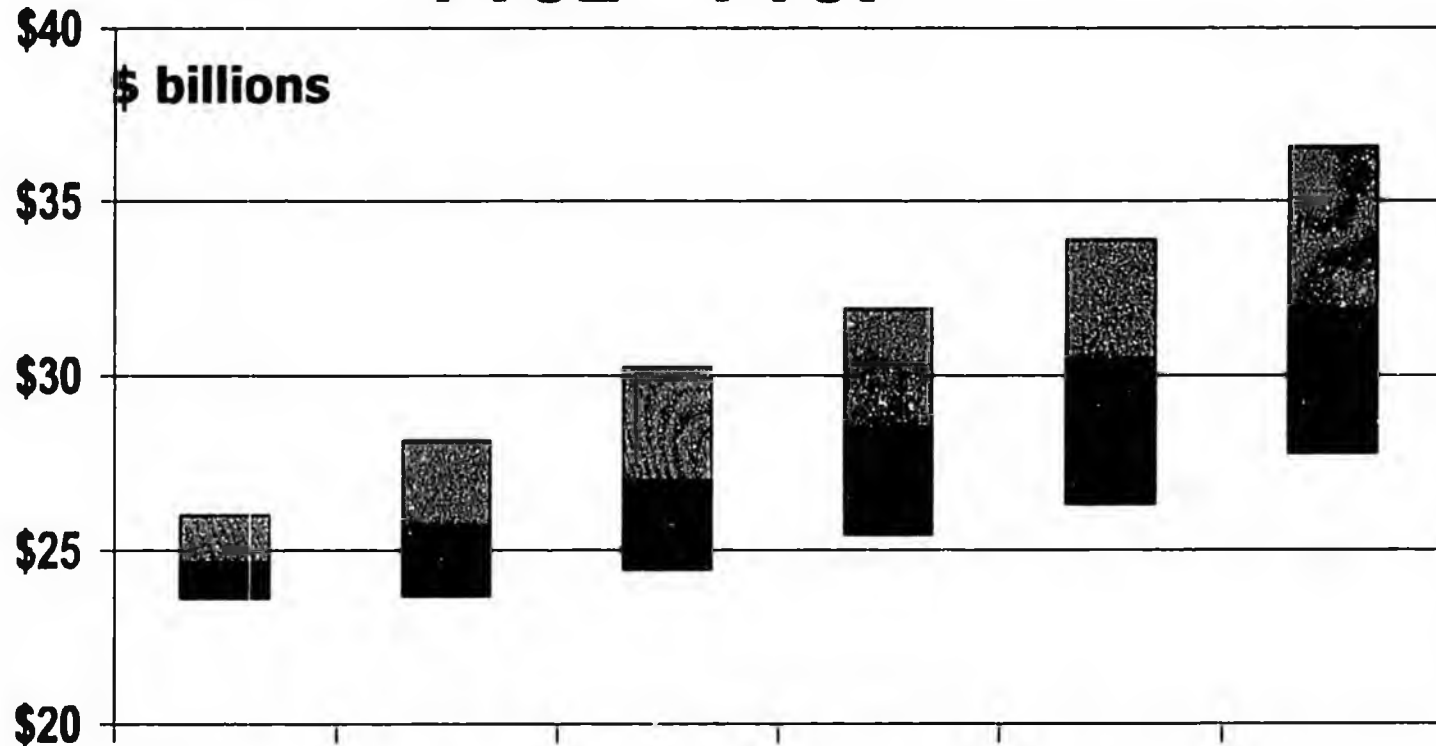


Earnings Reserve: \$6 billion as of Dec 31, 2000

Earnings Reserve: \$3.6 billion as of Dec 31, 2001



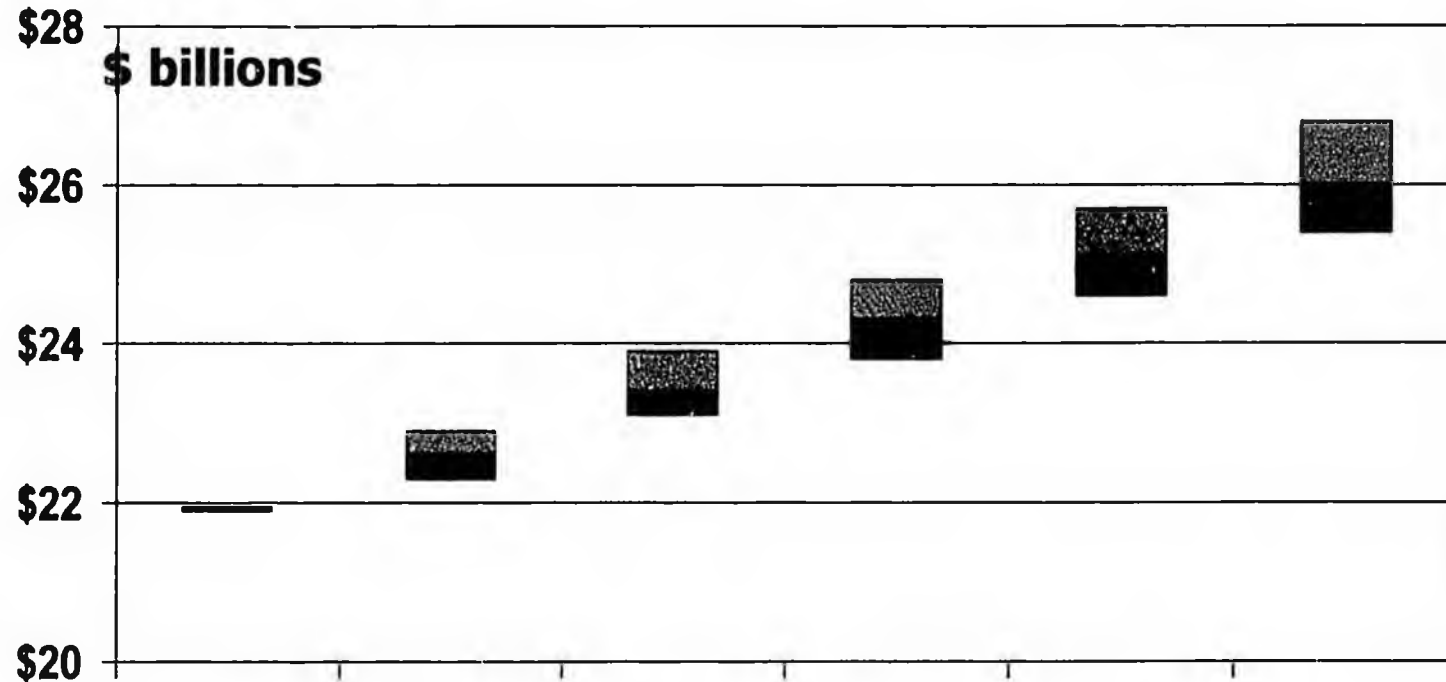
Range of market value FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$26.0	\$28.1	\$30.2	\$31.9	\$33.9	\$36.6
Median	\$24.6	\$25.7	\$26.9	\$28.4	\$30.4	\$31.9
Bottom quartile	\$23.6	\$23.7	\$24.4	\$25.4	\$26.3	\$27.7



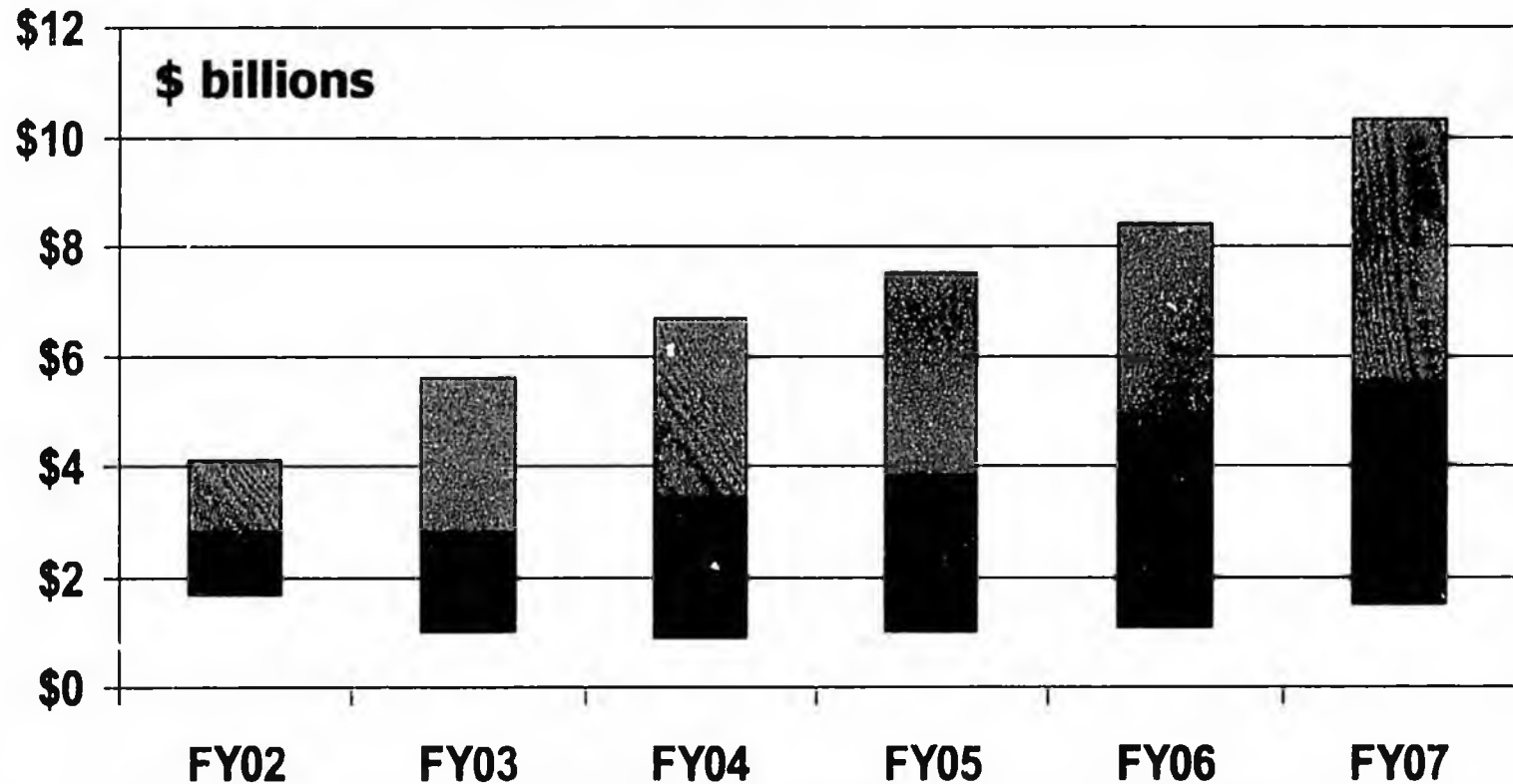
Range of principal balance FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$21.9	\$22.9	\$23.9	\$24.8	\$25.8	\$26.8
Median	\$21.9	\$22.6	\$23.4	\$24.3	\$25.2	\$26.0
Bottom quartile	\$21.9	\$22.3	\$23.1	\$23.8	\$24.6	\$25.3



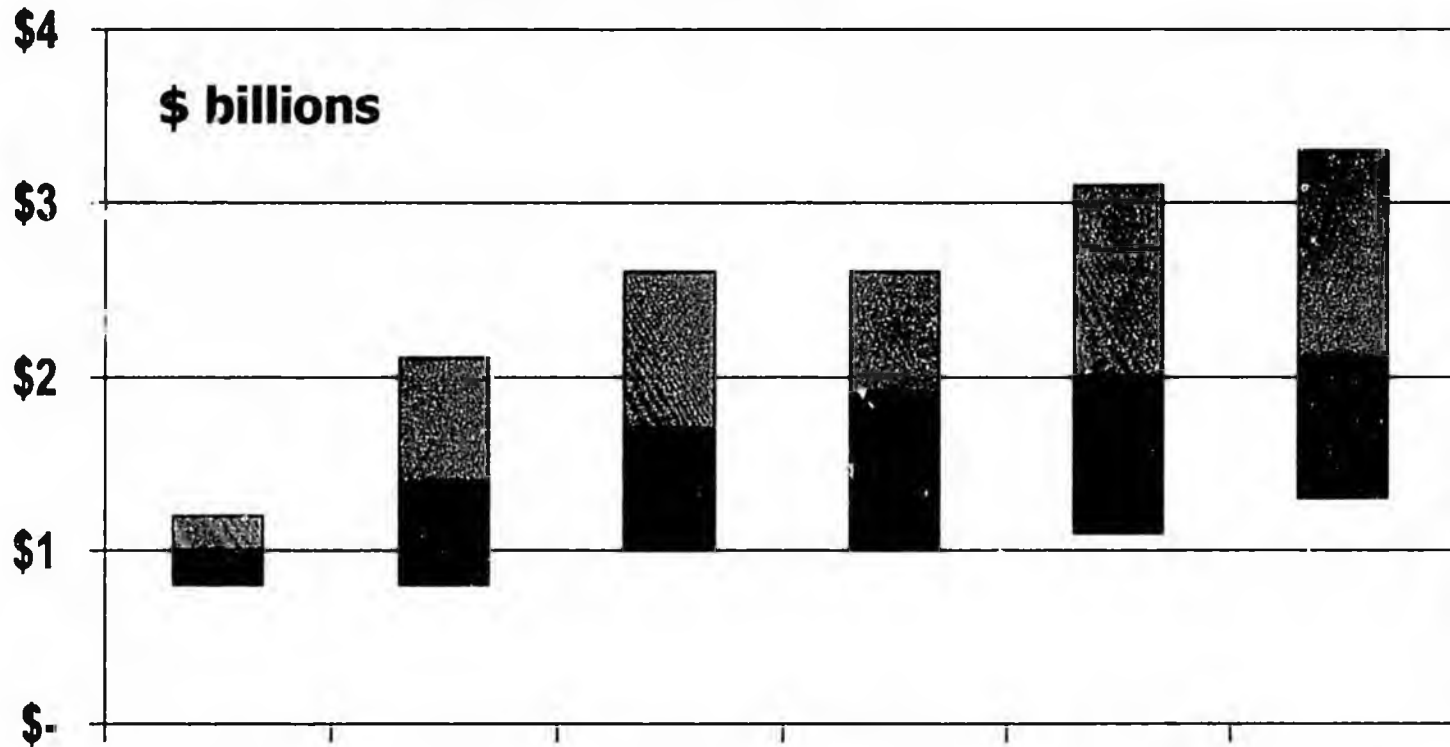
Range of total earnings reserve FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$4.1	\$5.6	\$6.7	\$7.5	\$8.4	\$10.3
Median	\$2.8	\$2.8	\$3.4	\$3.8	\$4.9	\$5.5
Bottom quartile	\$1.7	\$1.0	\$0.9	\$1.1	\$1.1	\$1.5



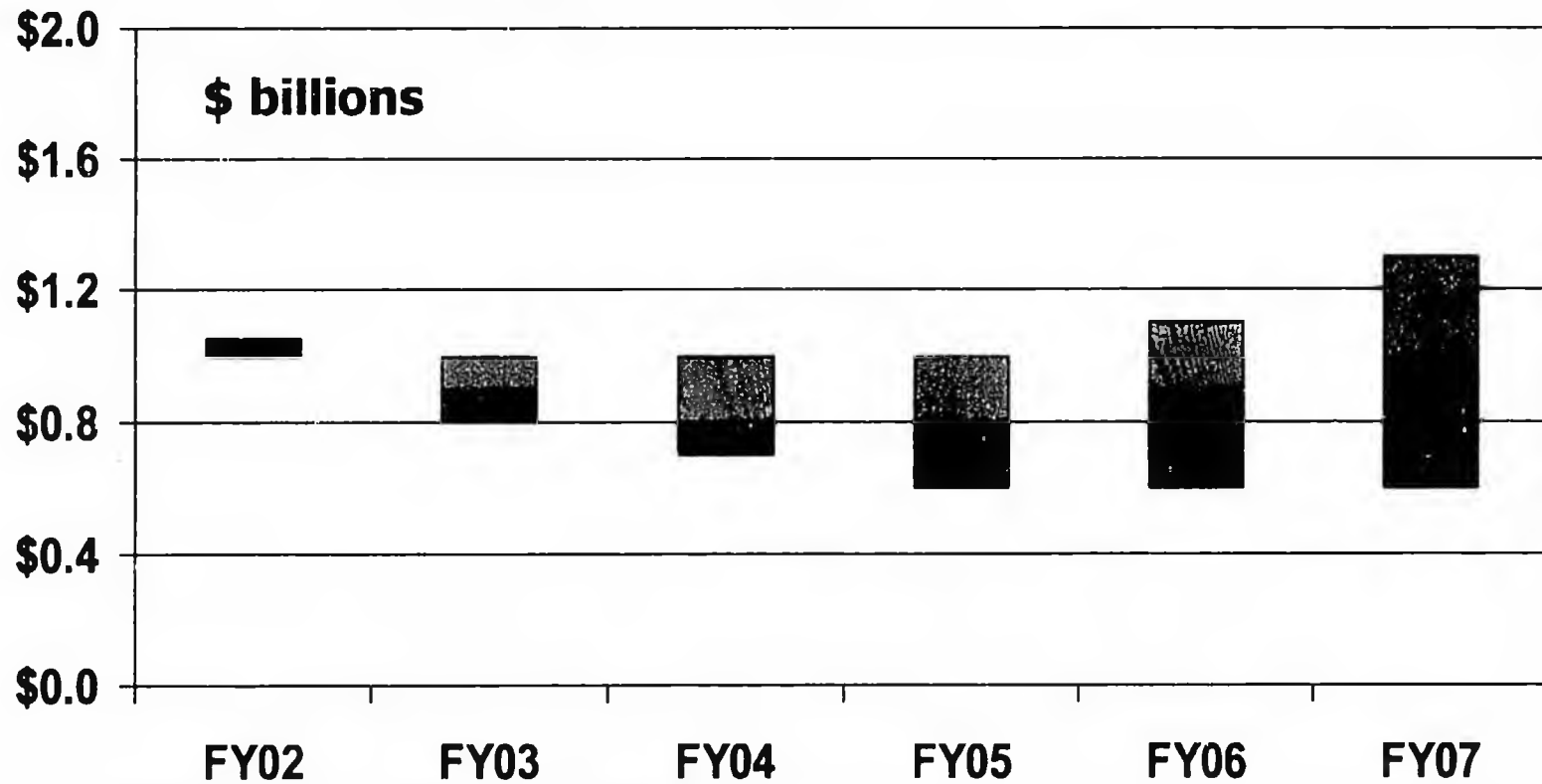
Range of annual statutory net income FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$1.2	\$2.1	\$2.6	\$2.6	\$3.1	\$3.3
Median	\$1.0	\$1.4	\$1.7	\$1.9	\$2.0	\$2.1
Bottom quartile	\$ 0.8	\$0.8	\$1.0	\$1.0	\$1.1	\$1.3



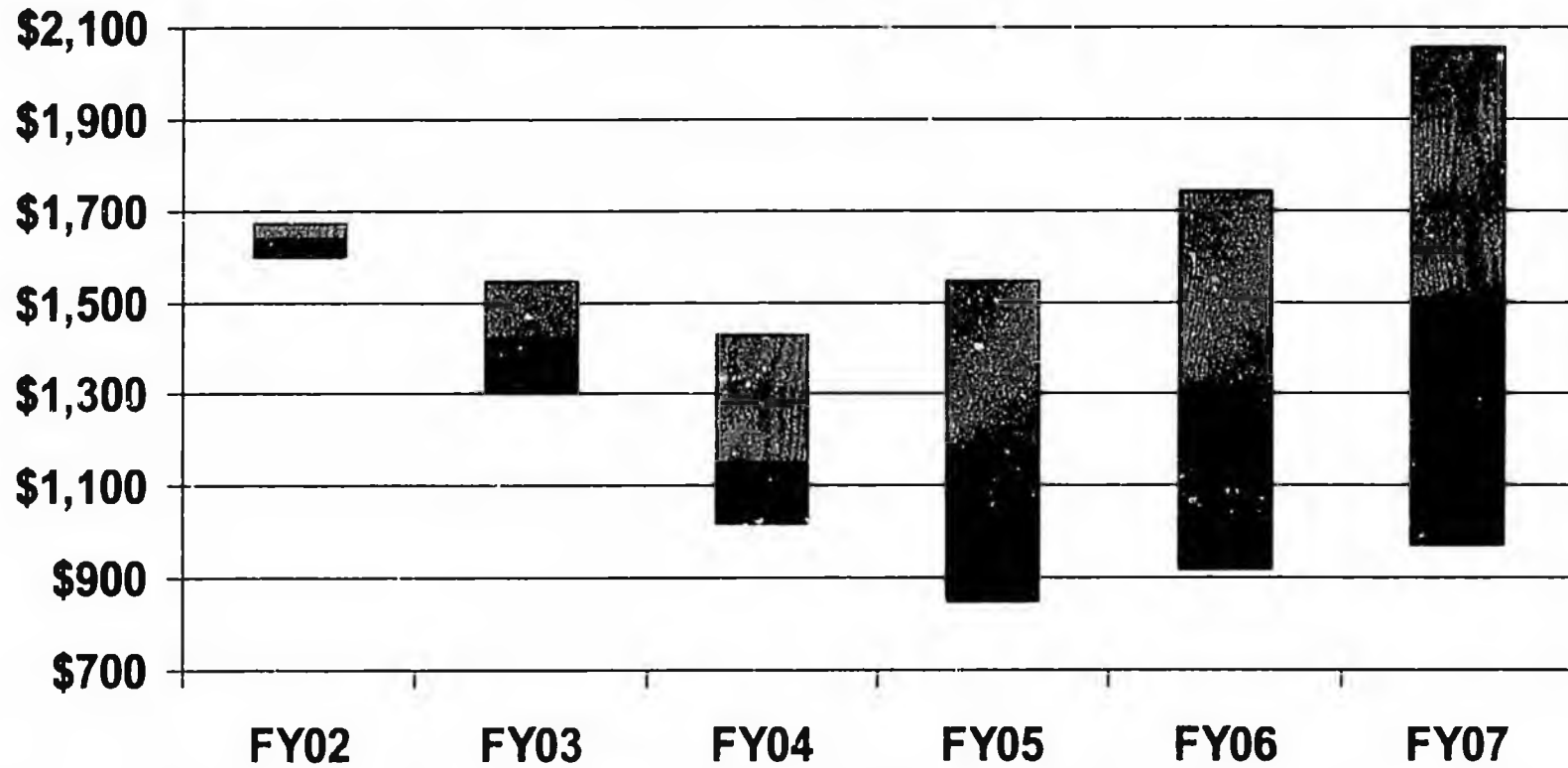
Range of distributed income FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$1.0	\$1.0	\$1.0	\$1.0	\$1.1	\$1.3
Median	\$1.0	\$0.9	\$0.8	\$0.8	\$0.9	\$1.0
Bottom quartile	\$1.0	\$0.8	\$0.7	\$0.6	\$0.6	\$0.6



Range of per capita dividend FY02 – FY07



	FY02	FY03	FY04	FY05	FY06	FY07
Top quartile	\$1,670	\$1,550	\$1,560	\$1,550	\$1,740	\$2,050
Median	\$1,640	\$1,420	\$1,280	\$1,190	\$1,310	\$1,510
Bottom quartile	\$1,610	\$1,300	\$1,020	\$ 850	\$ 920	\$ 970



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Top stories

February 08, 2002

■ Committee, Board to meet

JANUARY 31 - The Board of Trustees' Corporate Governance Committee will meet in Juneau at 10:00 a.m. on February 11th to consider proxy voting policy and receive an informational presentation on class action litigation. That meeting will be followed at 1:00 p.m. by a regular Board of Trustees meeting, which is scheduled to conclude at 3:00 p.m. on February 13. This meeting begins the Board's annual review of asset allocation policy. The meetings will be held at the APFC's Hugh Malone Boardroom in Juneau and the public is invited to attend. [View Committee Agenda](#) [View Board Agenda](#)

■ Summer internships offered

JANUARY 29 - The Alaska Permanent Fund Corporation (APFC) invites students to take advantage of internship opportunities that both the APFC and its partnering firms are offering to qualified Alaska students for the summer of 2002. All application information can be found at the [APFC website](#).

Daily unaudited position as of February 07, 2002

U.S. Fixed Income	35%	\$8,506,800,000
Non-U.S. Fixed Income	3%	\$608,500,000
U.S. Equities	36%	\$8,662,500,000
Non-U.S. Equities	16%	\$3,850,600,000
Real Estate	11%	\$2,666,800,000
Alaska CDs	0%	\$29,600,000
TOTAL	100%	\$24,324,800,000

Quarterly report



An Alaskan's Guide to the Permanent Fund



HOME PAGE

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Alaskans Speak Out

APFC



2002 Capital Market Outlook
Alaska Permanent Fund
2/12/02

Michael J. O'Leary CFA
Executive Vice President
Callan Associates Inc.



2002 Capital Market Outlook

Summary of Today's Presentation

- What will be the economic environment over the next five years
- We entered recession in Q2 - the worst may already be past.
- The revenge of fundamentals - prices have fallen but earnings are falling, too. How far away is the earnings bottom?
- What are the risks to the economy? To the capital markets?
- The projections - how they differ from 2001?

The New World in the New Millennium

The Party's Over

2000-2001 have been a remarkable (and painful) run for the U.S.

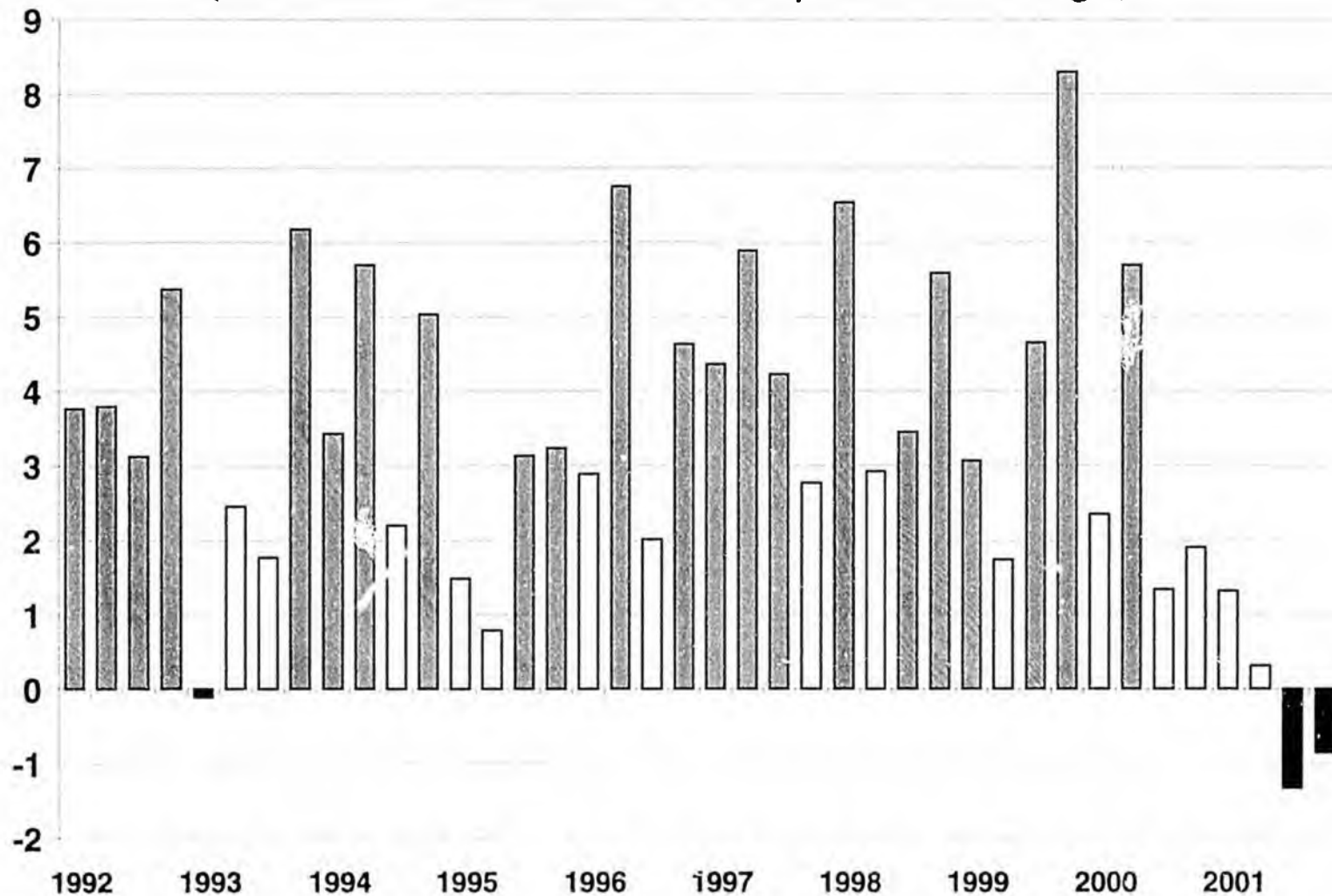
- Technology and dot-com bubble burst.
- Terrorist attacks, ensuing war, and broken confidence. The longest expansion in history ended in March 2001.
- Stock market fell for two consecutive years, the first such decline since 1973-74. S&P 500 is down 21.7% since March 2000; NASDAQ is off 57.2%.
- The Fed cut interest rates 11 times (4.75%), the steepest cut in history. Interest rates are near a 40-year low.
- Much-touted federal surplus sighted in fiscal 2000, only to disappear again in the current fiscal year.

The Current Economic Environment

- U.S. economy officially peaked in March 2001, thus entering recession in the second quarter of the year.
- Christmas may have been merrier than expected, and data suggest a fourth quarter growth rate near zero. The recession may already be technically over.
- However:
 - ✓ Corporations are still retrenching.
 - ✓ Investors are bewildered - high cash levels, where to invest?
 - ✓ The stock market still looks overvalued by many standards.
 - ✓ Layoffs are high and rising.
 - ✓ The savings rate is still very low (1%).
 - ✓ Consumer debt is very high (104% of disposable income).
 - ✓ The trade gap is hitting records.
 - ✓ Low interest rates can't eliminate excess capacity.

GDP Growth Heads Into Recession

(Real GDP Growth - annual percent change)



Many Overseas Economies Are in or Near Recession

North America



Canada

Mexico

Asia



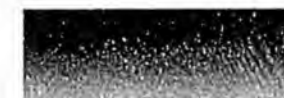
Taiwan

Hong
Kong

Singapore

Malaysia

Latin America



Argentina

Peru

Western Europe

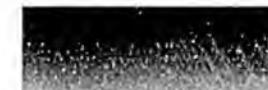


Italy

Belgium

Austria

Emerging Europe



Turkey

Poland

U.S. Recession Will Be Relatively Mild

The Worst May Have Already Passed

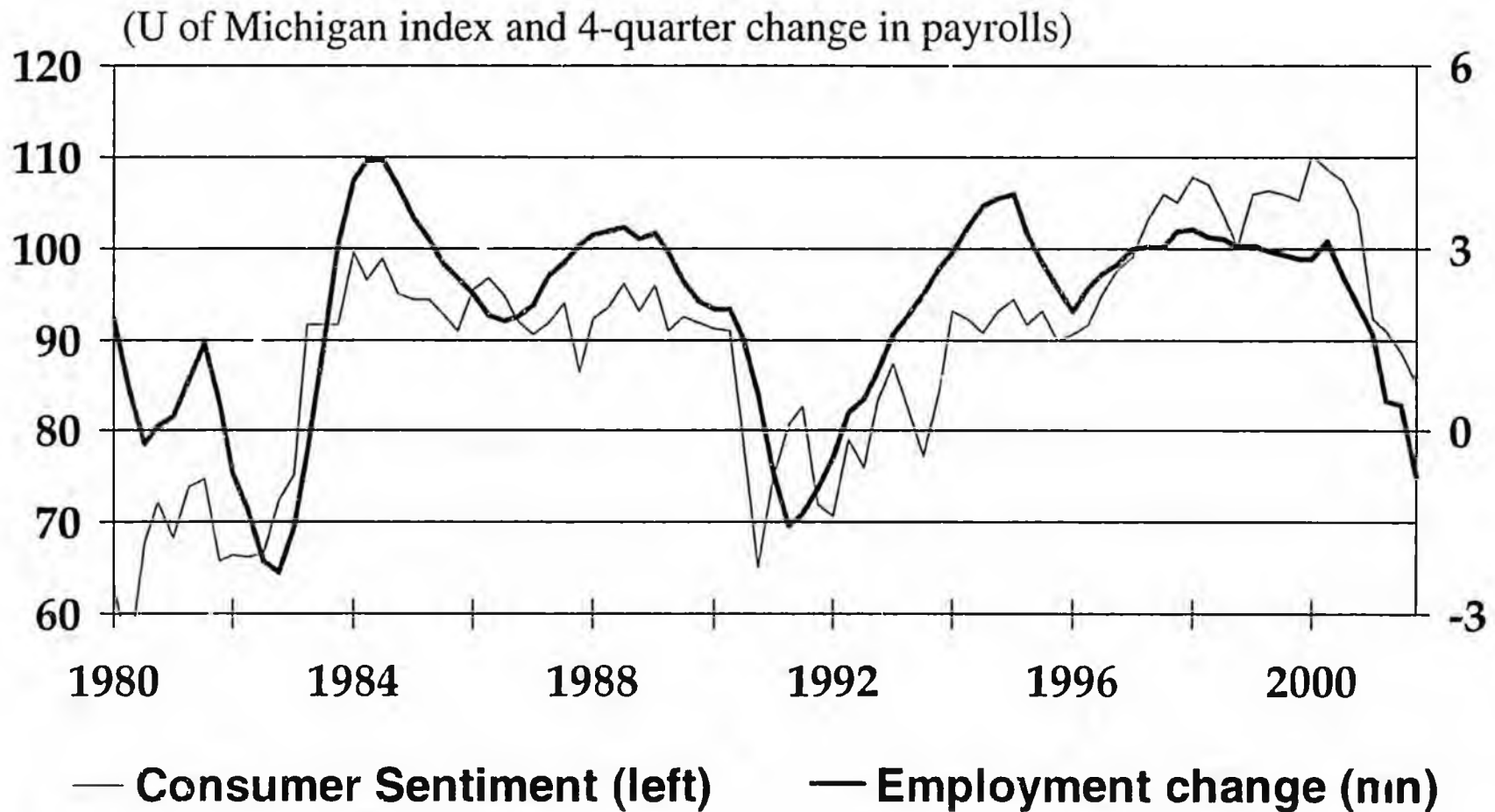
(Source: DRI-WEFA)

Recession	Duration, Months	Real GDP % Decline	Unemployment Rate Peak
2001 - 2002	10	-1.0%	6.3%
1990 - 1991	8	-1.5%	7.8%
1981 - 1982	16	-2.9%	10.8%
1980	6	-2.2%	7.8%
1973 - 1975	16	-3.4%	9.0%
1969 - 1970	11	-0.6%	6.1%
1960 - 1961	10	-1.6%	7.1%

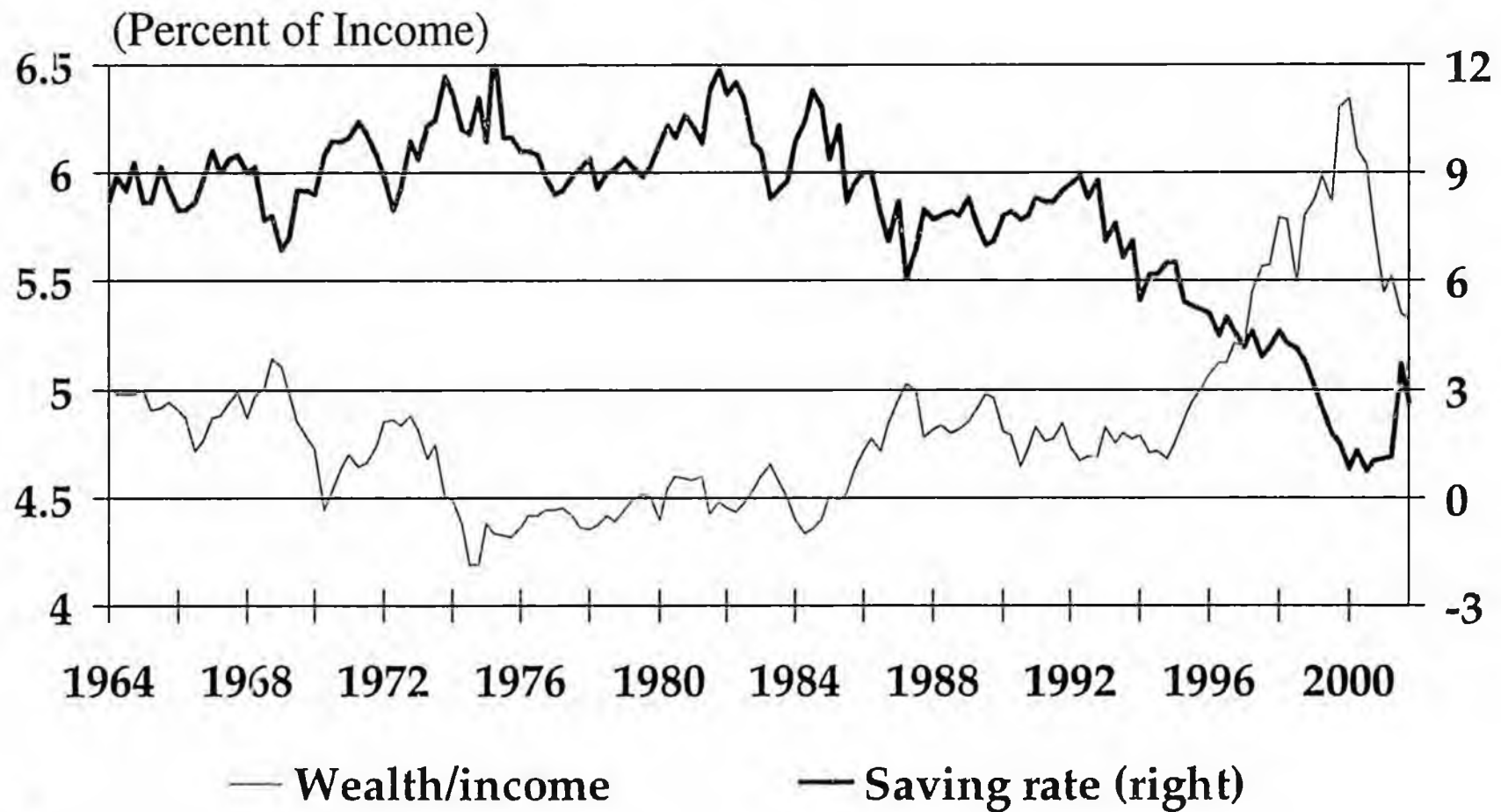
Despite the Gulf War Analogies, This Downturn Differs From 1990-91

- Negative Differences:
 - ✓ The terrorist attacks.
 - ✓ More synchronized global cycle.
 - ✓ High tech investment crash.
- Positive Differences:
 - ✓ Sharp decline in energy costs.
 - ✓ Stronger banking system.
 - ✓ More balanced real estate markets.
 - ✓ Stronger fiscal and monetary policy response - Mr. Greenspan learned his lessons.

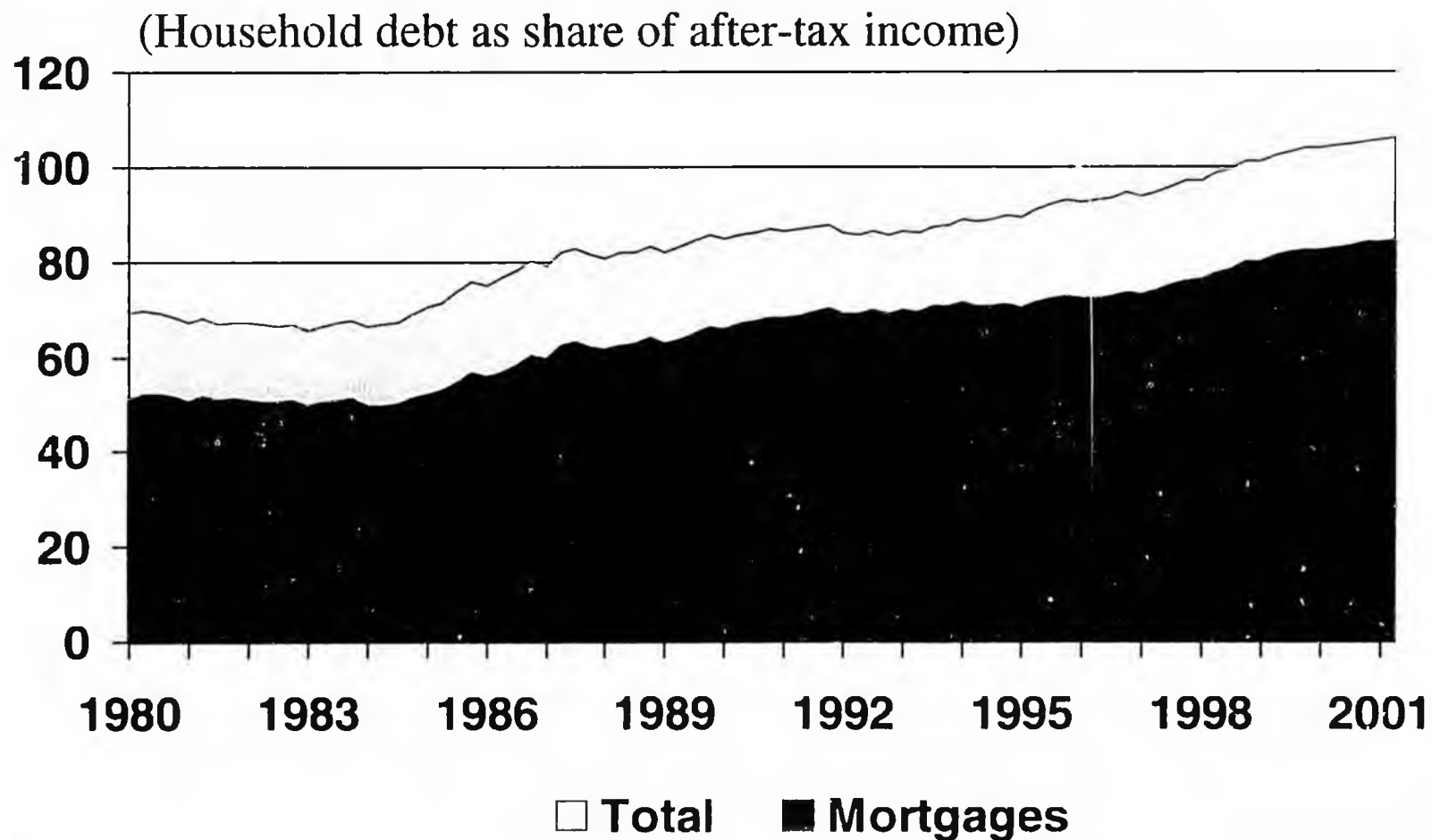
Confidence Follows Jobs



Saving Plunged as Wealth Hit a Record High

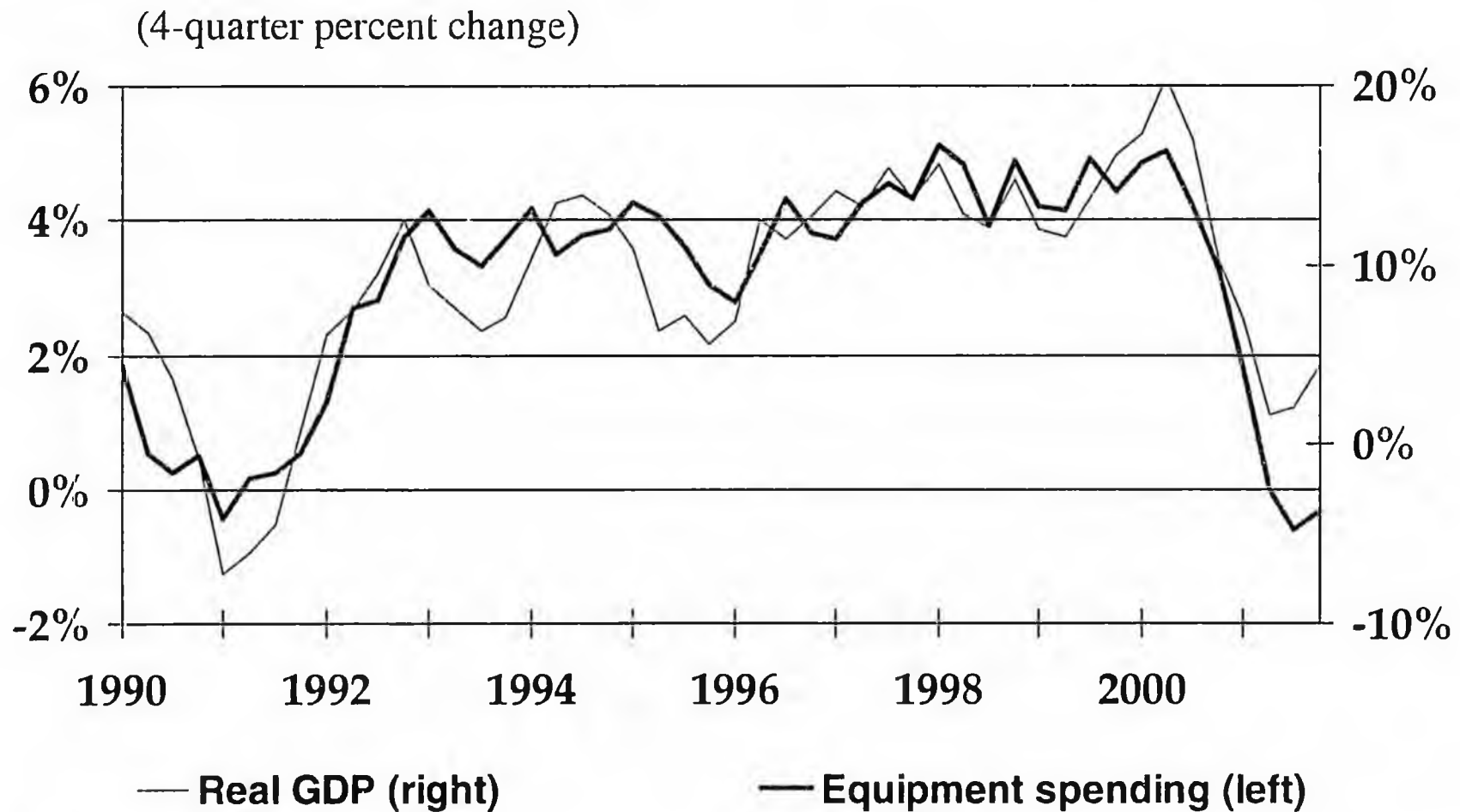


Debt is Hitting New Records, Dominated by Mortgages



Capital Investment Follows GDP

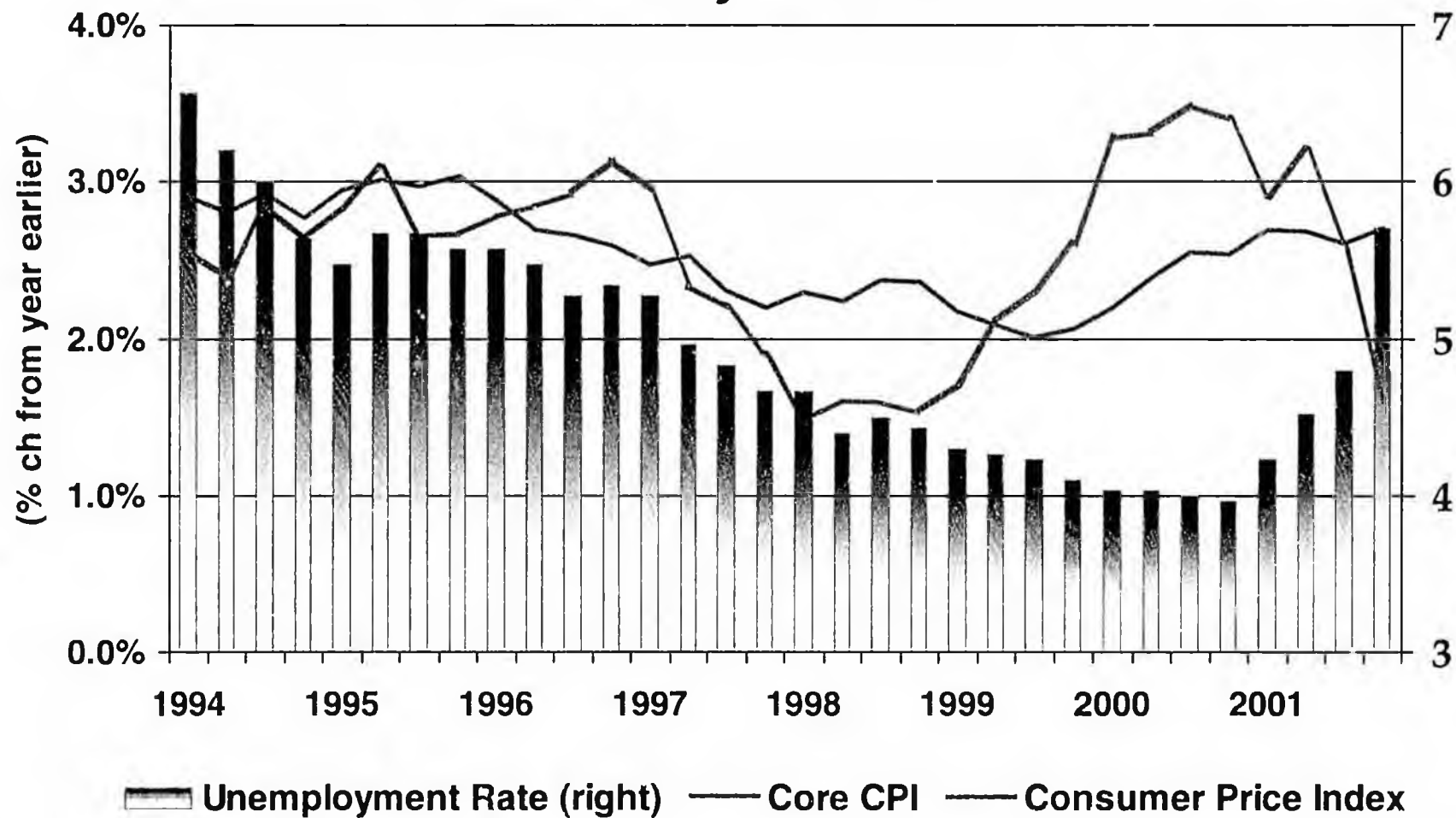
Corporations Are More Cautious Than Consumers



Corporations Are Still More Cautious Than Consumers

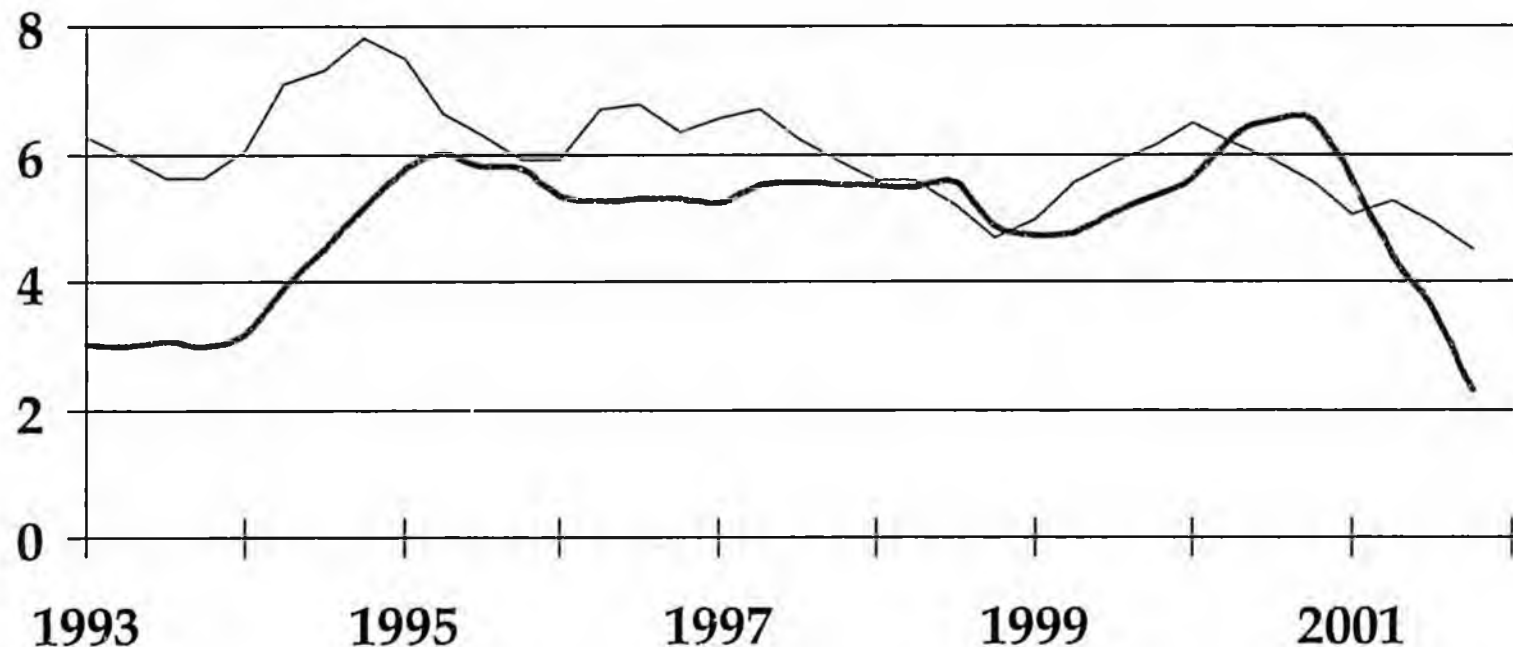
- Capital spending has been slashed.
- Inventories have been run off dramatically.
- Payrolls have been shaved.
- However, capital spending is not likely to recover until orders start showing up on the books. Thus far, only defense orders are climbing.
- Recovery will not be smooth - some industries are plagued by overcapacity.
- Employment lags the economy - layoffs are likely to continue in 2002. Companies will not be rehiring until they are sure that the orders will continue.

Inflation Will Decelerate as the Economy Softens



The Fed Has Loosened Quickly *4.75% in 11 Rate Cuts - Are They Done?*

(Percent)



— Federal Funds Rate — 10-Year Treasury Bond Yield

Capital Markets Confront the Law of Gravity

	<u>1999 Returns</u>	<u>2000 Returns</u>	<u>2001 Returns</u>
Callan Broad	22.74	-9.79	-11.96
S&P Super Composite 1500	20.27	-6.98	-10.64
S&P 500	21.04	-9.10	-11.88
Callan Small	33.87	0.23	-2.45
S&P 600 Small Cap	12.40	11.80	6.54
Russell 2000	21.26	-3.02	2.49
EAFE	26.96	-14.17	-21.44
NASDAQ	86.10	-39.18	-20.80
LB Agg	-0.82	11.63	8.43
SB Non-US	-5.07	-2.63	-3.54

U.S. Economic Forecast: Consensus on Recovery in 2002

- The recession will be relatively mild, with growth returning in the second half of the year.
 - The Fed switched quickly from recession avoidance to seeding recovery, but don't expect more rate cuts.
 - Consumers have proven resilient, and the recovery depends on the consumer (although there is little pent-up demand).
 - Inflation will remain benign.
 - The rest of the world will suffer from a U.S. slowdown.
 - Fiscal policy will be very expansionary, even without a specific stimulus package.
 - Exports and investment will lag.
- Our Capital Market projections incorporate our economic expectations.

Capital Market Projection Process

- Evaluate the current environment and economic outlook for the U.S. and other major industrial countries.
- Examine the relationships between the economy and asset class performance patterns.
- Examine recent and long-run trends in asset class performance, and create risk, return and correlation projections.
- Test the projections for reasonable results.

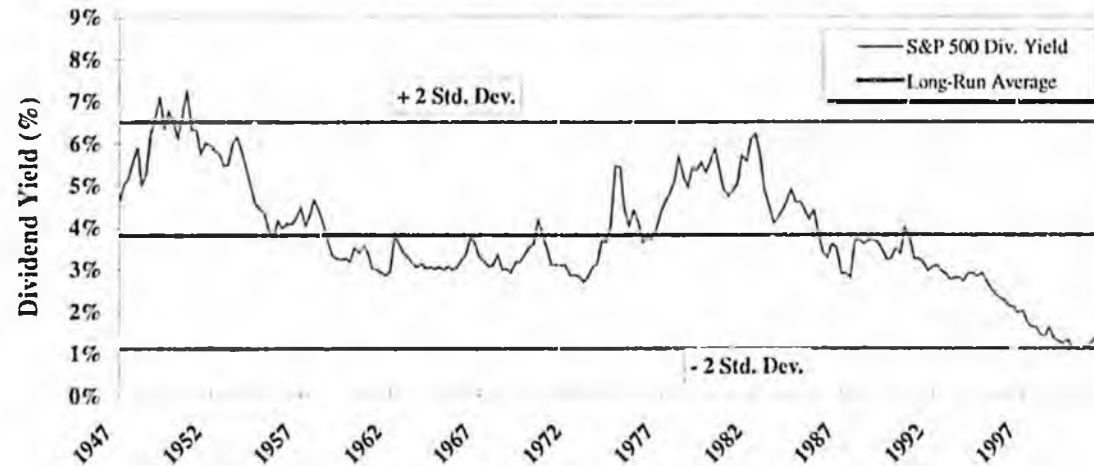
Stock Fundamentals Matter More Than Ever

(...although we were starting to wonder)

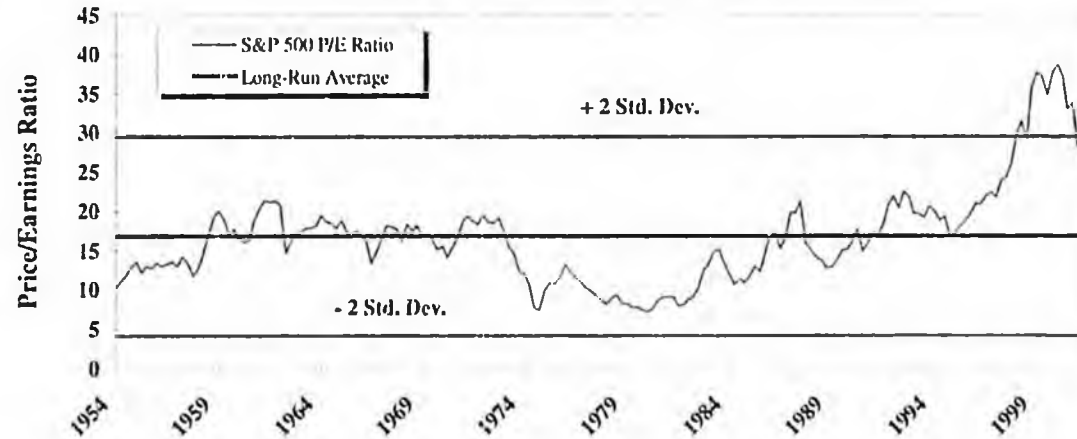
- P/E ratios hit astounding heights, and were inconsistent with long-term interest rates
 - prices may be falling, but earnings are plummeting. When do we get to “reasonable” prices?
 - price depreciation during 2000 began with weakening earnings (or even weakening expectations). Fear overtook in 2001.
 - it is still difficult to make many quantitative models justify expected real returns in the near future.
- We retain our bias towards long-run averages.

The Last Few Years Were More Than a Little Unusual

Dividend Yield of S&P 500 (1947 - 12/31/2001)



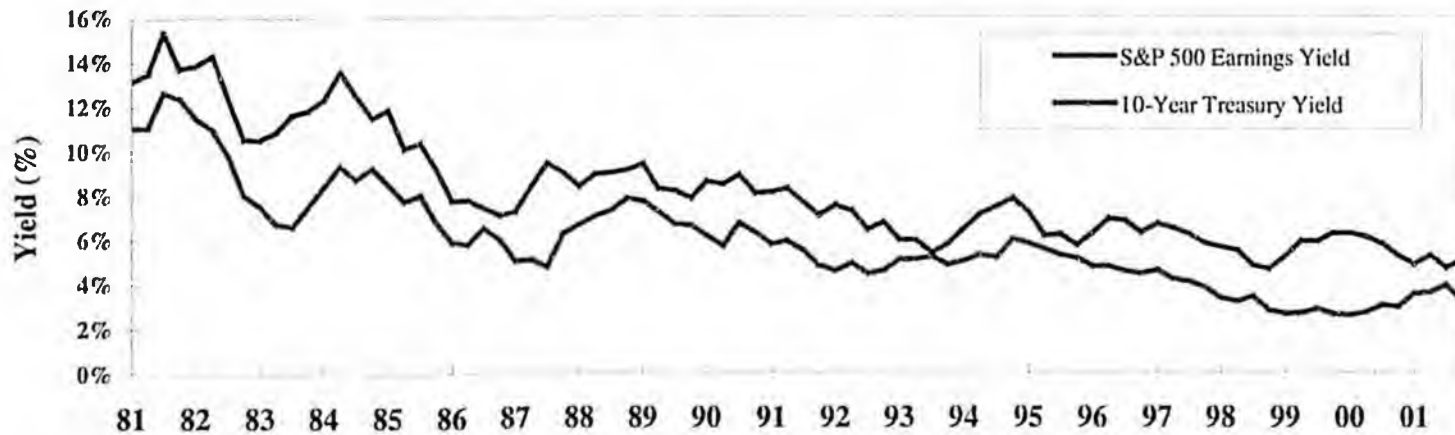
Price to Earnings Ratio for S&P 500 (1954 - 12/31/2001)



Equity Valuations Now in Line?

The Ever-Popular Greenspan Model

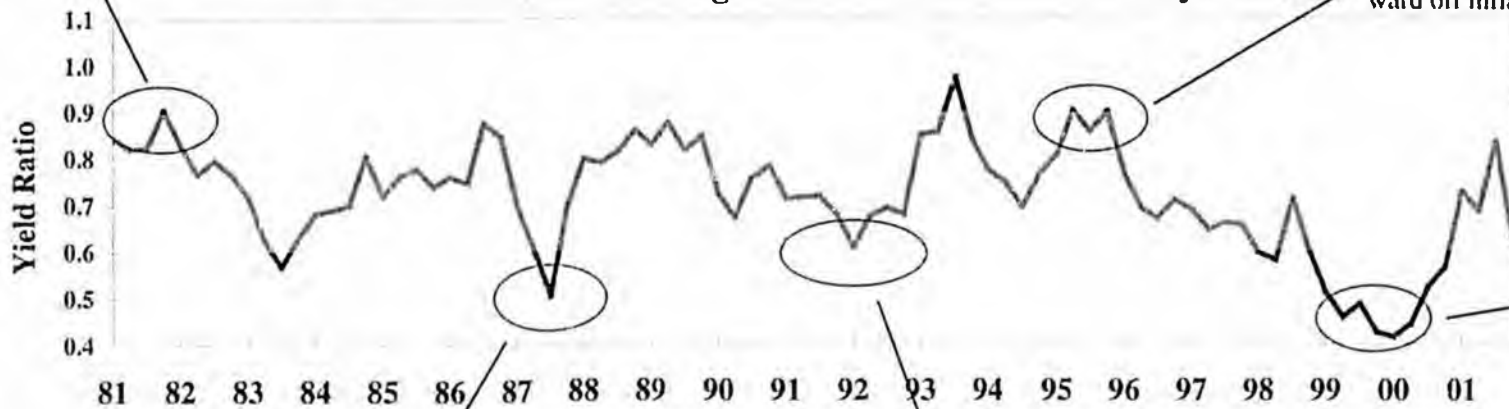
S&P 500 Earnings Yield vs. 10-Year Treasury Yield



Peak of interest rates and inflation

Ratio of S&P 500 Earnings Yield and 10-Year Treasury Yield

Fed raises interest rates to ward off inflation



Yield Ratio

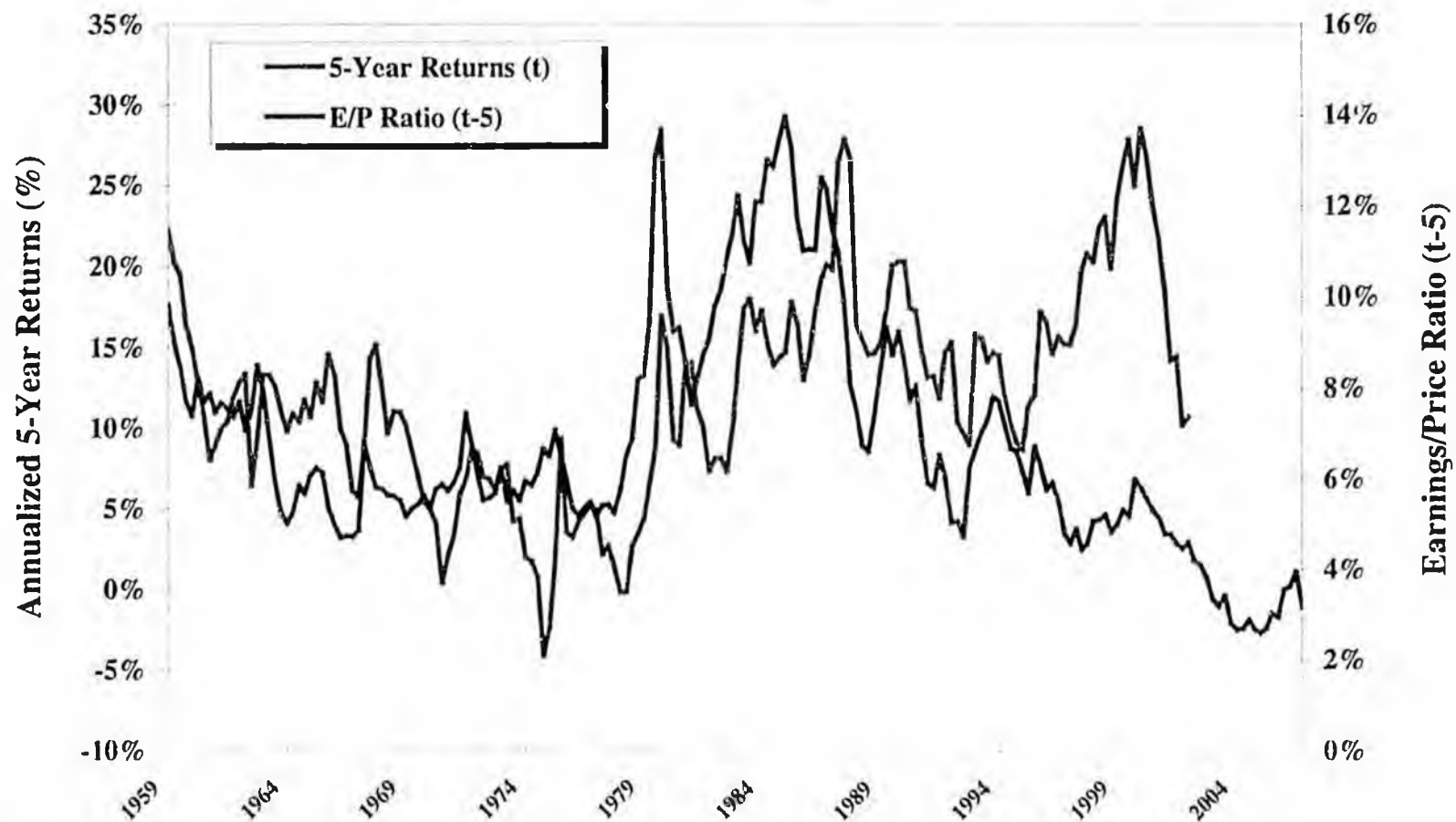
Rising rates, falling earnings

1987 Market Crash

Fed tardy in raising interest rates

Are Equity Prices Becoming Re-connected to Their Underlying Value?

S&P 500 5-Year Returns vs. Lagged Earnings/Price (1954 - 2001)



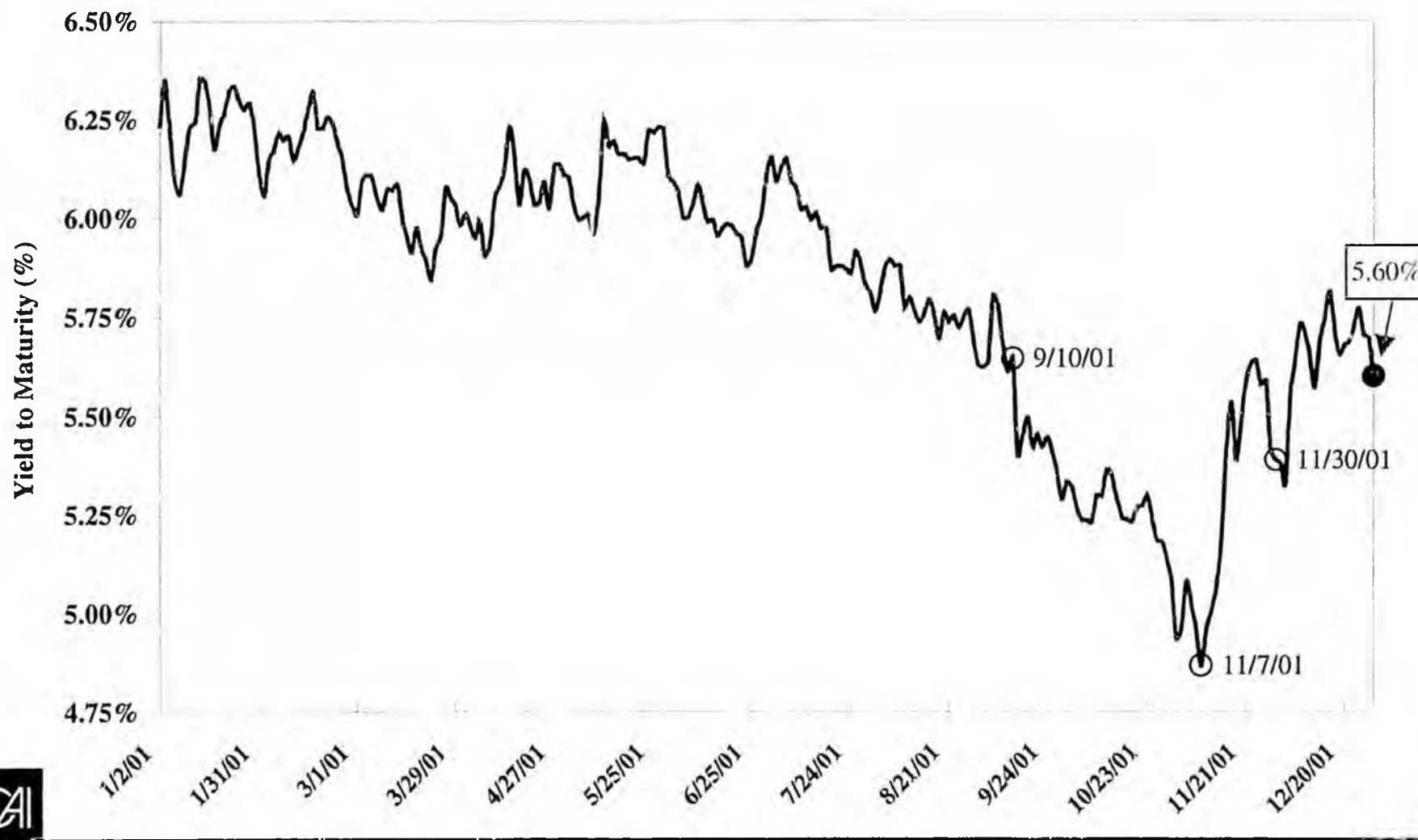
Why Bother With Bonds?

Because of Years Like 2000 & 2001

- Plan sponsors are finally enjoying the diversification benefit of bonds.
- Bond yields trended down during the first three quarters as the recession emerged, then plummeted in the flight to quality following September 11. Yields moved back up at the end of the year as the stock market recovered.
- The yield curve steepened dramatically during 2001. The 475 basis points in interest rate reductions by the Fed had only a modest effect on longer-term rates. Money-market rates are now below inflation, implying negative real yield. The elimination of the 30-year Treasury bond had a greater impact on the long term rates than the rate cuts.
- Our forecast implies a slight rise in return over the current yield over the next five years.

Impact of September 11 Was Substantial But Largely Temporary

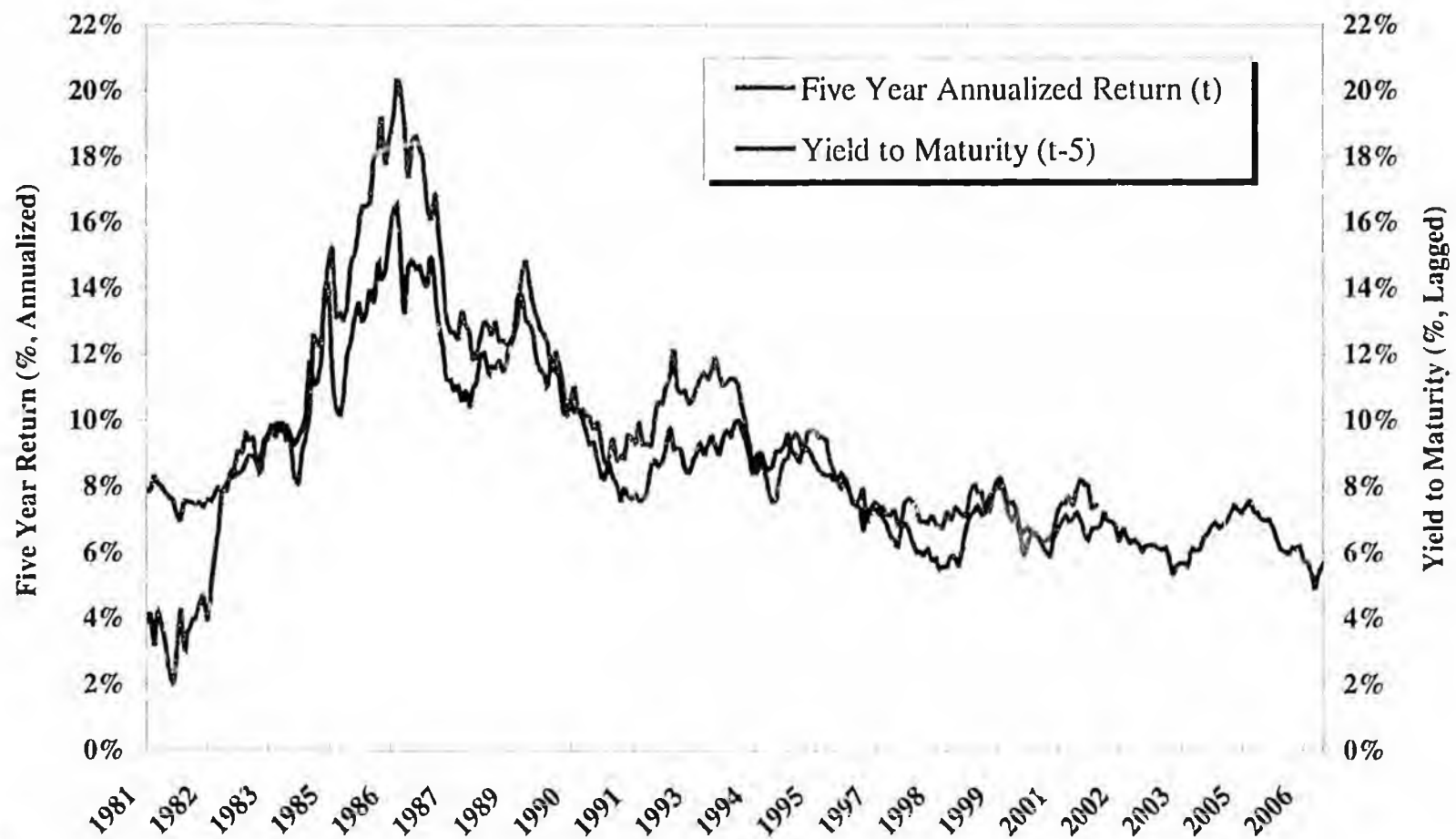
Lehman Aggregate Index - 2001 Daily Yield to Maturity (Yield to Worst)



Domestic Fixed Income

Current Yield Is A Strong Predictor of Returns

Lehman Aggregate Index 5 Year Returns vs. Jagged Yield to Maturity



2002 Capital Market Projections

2002 Capital Market Projections

Asset Class	Index	Projected Annual Return	Projected Standard Deviation (Risk)	2001 Projections	
Equities					
Broad Domestic Equity	CAI Broad	9.30%	17.20	9.20	16.30
Large Cap	S&P 500	9.00%	16.00	8.90	15.00
Small Cap	CAI Small	10.60%	25.00	10.40	25.00
International Equity	EAFE	9.90%	21.50	9.80	21.50
Emerging Markets Equity	MSCI EMF	10.40%	35.00	10.30	35.00
Global Broad Equity	90% EAFE/10% EMF	9.95%	21.15		
Fixed Income					
Domestic Fixed	LB Agg	5.75%	5.00	6.45	5.30
Defensive	LB Gov't 1-3	4.60%	2.60	5.30	3.30
High Yield	FB High Yield	7.50%	12.65	7.50	11.40
Non US\$ Fixed	SB Non US	5.60%	9.60	6.25	9.80
Other					
Real Estate	CRES	8.00%	16.50	8.30	16.50
Alternative Investments	VECO 100	12.25%	35.00	12.00	36.00
Cash Equivalents	T-bill	3.50%	0.70	5.00	0.70
Inflation	CPI-U	2.90%	1.00	3.25	1.90

2002 Capital Market Projections

- Largest changes are to returns for cash and bonds.
- Inflation has risen over the past two years, but the threat of further price acceleration is fading.
- Bond returns are lower, reflecting lower yields to maturity compared to a year ago.
- Equity return expectations remain essentially unchanged - below the long-run averages.
- We remain convinced that international belongs in a diversified portfolio, despite the second-worst absolute performance in 20 years.
- Real estate returns are reduced slightly.
- Private equity returns are increased slightly.

Optimizations - Where The Rubber Meets the Road

- The 2002 efficient frontier is “steeper” and shifted to the right compared to last year’s frontier.
- Compared to last year, portfolios with the same targeted level of return have a higher level of risk.
- Portfolios with the same targeted percentage of equities face lower returns but higher expected risk.
- Small cap stocks account for a similar percentage of domestic equity (approximately 20%) across mixes reflecting a long-run neutral bias toward market capitalization.
- International equities account for a similar percentage of the total equity allocation (approximately 30%) across all mixes.
- Allocations to domestic fixed income are lower across almost all mixes.

2002 vs. 2001 Comparison

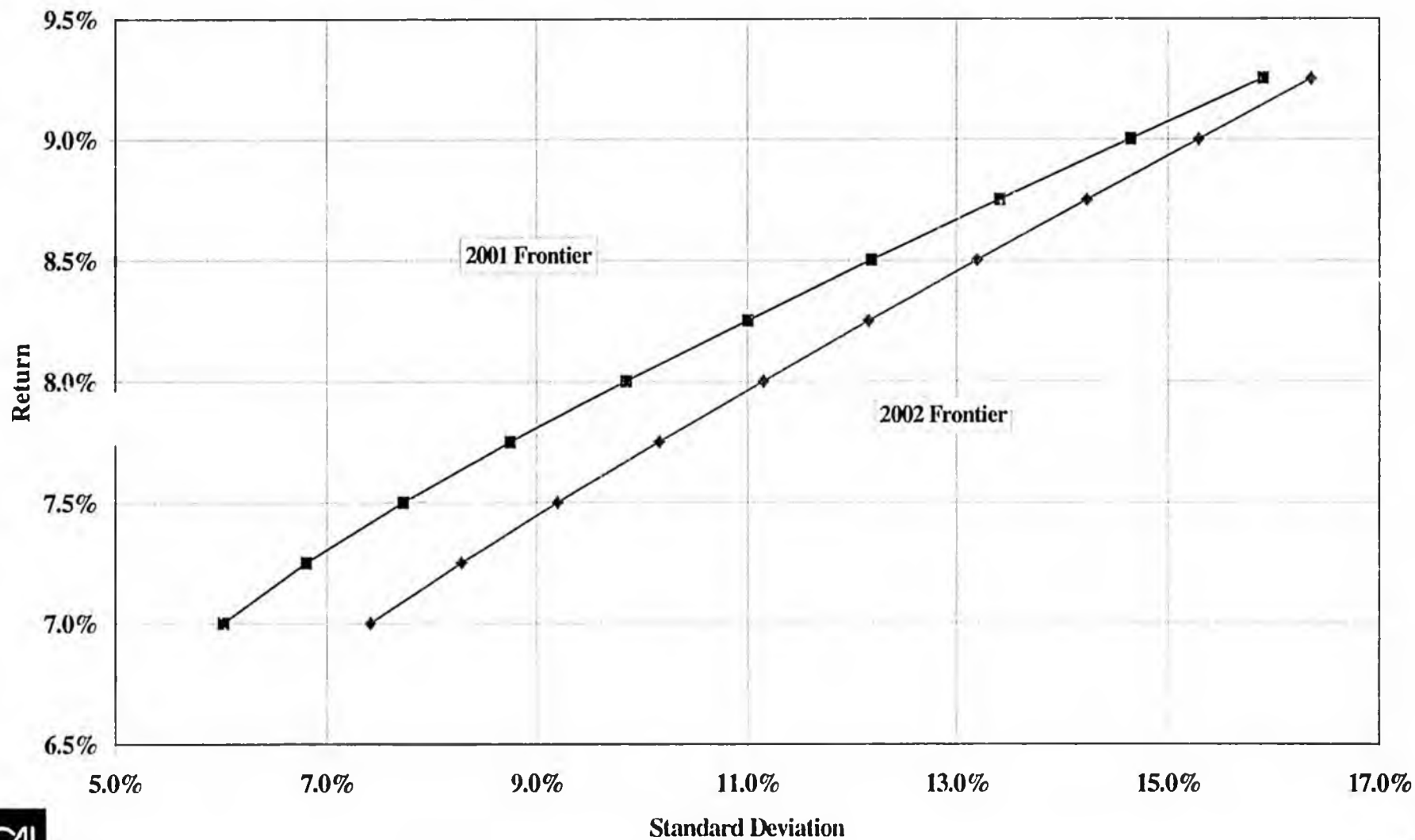
2002 <i>Asset Classes</i>	Limits		Asset Mix Alternatives									
	Min	Max	1	2	3	4	5	6	7	8	9	10
Large Dom Eq	0%	100%	18%	21%	25%	28%	31%	35%	38%	41%	45%	48%
Small Dom Eq	0%	100%	4%	5%	6%	7%	8%	8%	9%	10%	11%	12%
International Eq	0%	100%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%
Dom Fixed	0%	100%	57%	51%	45%	38%	32%	26%	19%	13%	6%	0%
International Fixed	0%	100%	6%	6%	5%	5%	4%	4%	3%	3%	2%	2%
Real Estate	0%	100%	6%	6%	7%	8%	8%	9%	10%	10%	11%	12%
Cash	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Totals			100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Projected Return			7.00%	7.25%	7.50%	7.75%	8.00%	8.25%	8.50%	8.75%	9.00%	9.25%
Projected Risk			7.41%	8.28%	9.20%	10.16%	11.15%	12.16%	13.19%	14.24%	15.29%	16.35%

2001 <i>Asset Classes</i>	Limits		Asset Mix Alternatives									
	Min	Max	1	2	3	4	5	6	7	8	9	10
Large Dom Eq	0%	100%	12%	16%	20%	23%	28%	32%	36%	40%	44%	48%
Small Dom Eq	0%	100%	3%	3%	4%	6%	7%	8%	9%	10%	11%	13%
International Eq	0%	100%	5%	7%	10%	12%	14%	17%	20%	22%	25%	27%
Dom Fixed	0%	100%	65%	64%	56%	48%	40%	32%	24%	16%	8%	0%
International Fixed	0%	100%	6%	6%	5%	5%	4%	3%	2%	2%	1%	0%
Real Estate	0%	100%	4%	4%	5%	6%	7%	8%	9%	10%	11%	12%
Cash	0%	100%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Totals			100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Projected Return			7.00%	7.25%	7.50%	7.75%	8.00%	8.25%	8.50%	8.75%	9.00%	9.25%
Projected Risk			6.03%	6.81%	7.72%	8.75%	9.85%	11.00%	12.19%	13.41%	14.65%	15.90%

2002-2001 <i>Asset Classes</i>	Limits		Asset Mix Alternatives									
	Min	Max	1	2	3	4	5	6	7	8	9	10
Large Dom Eq	0%	100%	6%	5%	5%	5%	3%	3%	2%	1%	1%	0%
Small Dom Eq	0%	100%	1%	2%	2%	1%	1%	0%	0%	0%	0%	-1%
International Eq	0%	100%	3%	3%	2%	2%	2%	1%	0%	0%	-1%	-1%

Comparison

Efficient Frontier (Alternative Investments Excluded)



Unconstrained Efficient Frontier

Optimal Portfolios

Portfolio Component	Target Mx	Limits		Asset Mix Alternatives						
		Mn	Mix	1	2	3	4	5	6	7
Broad	37%	0%	100%	30%	34%	38%	42%	46%	50%	54%
Int'l Eq	16%	0%	100%	13%	15%	17%	19%	21%	23%	25%
LB Agg	35%	0%	100%	45%	39%	33%	27%	20%	14%	8%
NUS Bond	2%	0%	100%	5%	5%	5%	4%	4%	3%	3%
Real Est	10%	0%	100%	6%	7%	8%	9%	9%	10%	11%
T-Bills	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Totals	100%			100%	100%	100%	100%	100%	100%	100%
Median	7.95%			7.50%	7.74%	7.97%	8.21%	8.45%	8.69%	8.92%
Std Dev	10.99%			9.22%	10.14%	11.08%	12.04%	13.01%	14.00%	15.00%

Efficient Frontier with equities constrained to 60%

Optimal Portfolios

Portfolio Component	Target Mx	Limits		Asset Mix Alternatives						
		Mn	Mx	1	2	3	4	5	6	7
Broad	37%	0%	100%	30%	34%	38%	41%	39%	35%	33%
Int'l Eq	16%	0%	100%	13%	15%	17%	18%	21%	25%	27%
LB Agg	35%	0%	100%	45%	39%	33%	28%	21%	14%	5%
NUS Bond	2%	0%	100%	5%	5%	5%	4%	2%	0%	0%
Real Est	10%	0%	100%	6%	7%	8%	8%	17%	26%	35%
T-Bills	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%
Totals	100%			100%	100%	100%	100%	100%	100%	100%
Median	7.95%			7.50%	7.72%	7.94%	8.17%	8.39%	8.61%	8.83%
Std Dev	10.99%			9.22%	10.08%	10.96%	11.86%	12.81%	13.87%	15.00%

The 60% equity constraint results in huge real estate allocations beyond mix 4 because that is the only choice available to the optimizer that would increase expected returns