

# Porter, White & Company

## Comparison of Fixed Income Fund Performance

White Paper, September 2009, Number IM 15.2

During the calendar year 2008, the PW&Co Fixed Income Composite,<sup>1</sup> which is primarily composed of short-term fixed income funds from Dimensional Fund Advisors (DFA), outperformed the Vanguard Benchmark fund<sup>2</sup> on an absolute and risk-adjusted return basis after underperforming in 2007 on an absolute return basis but outperforming on a risk-adjusted return basis.<sup>3</sup> Risk in fixed income funds can be measured by duration as well as the volatility of their returns. PW&Co's investment philosophy is to use fixed income as a risk reducer in the context of the overall portfolio, so such a comparison of funds should also include analysis of the relationship between fixed income assets and other assets comprising the portfolio, principally equities. In this paper, we describe the variable maturity strategy used by the DFA funds, look at the fixed income market during 2008, and then consider various risk and return comparisons.

*The discussion herein should be understood in light of the Important Notice at the end.*

### I. Variable Maturity Strategy

DFA's fixed income funds employ a "variable maturity strategy," which entails buying bonds of a certain maturity and pre-determining when to sell that bond, if not to be held to maturity. Research covering the period since 1953 concludes that the current yield curve is the best (albeit imperfect) estimate of future yield curves (Fama, 1984). DFA uses the current yield curve to calculate expected returns and determine the optimal maturity and holding period for a portfolio.

The shape of the yield curve determines the choice of maturity. Maturities are extended when there is an anticipated reward for doing so (i.e., when the yield curve is steep, as in Figure 1). When the yield curve is flat or inverted (see Figure 2), the fund purchases short term securities.

Figure 1: Steep Yield Curve

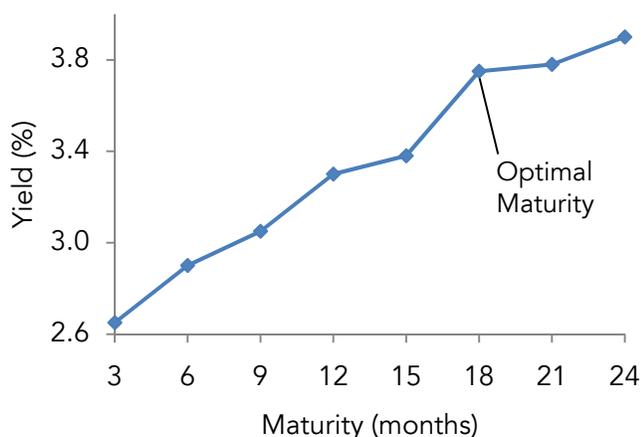
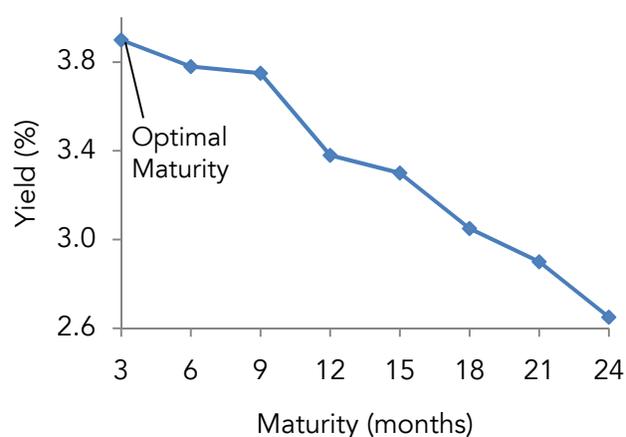


Figure 2: Inverted Yield Curve



DFA uses the current yield curve as an estimate of future yield curves to construct a matrix of expected returns. For the example shown in Table 1, the highest expected annualized return, 5.73%, is for a strategy of buying securities with 18-month maturities and selling them in 3 months when their maturities are 15 months.

Table 1: Finding the Optimal Maturity and Holding Period

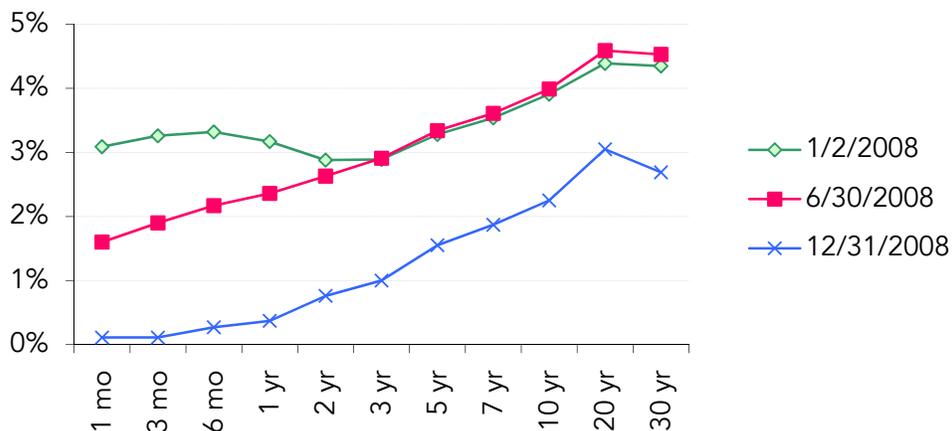
Maturity at Time of Sale (Months)	21	4.65								
	18	4.32	3.98							
	15	4.79	4.85	5.73						
	12	4.50	4.45	4.68	3.64					
	9	4.39	4.32	4.44	3.80	3.95				
	6	4.22	4.13	4.17	3.65	3.65	3.35			
	3	4.07	3.98	3.98	3.54	3.51	3.29	3.22		
	0	3.90	3.79	3.76	3.37	3.30	3.08	2.94	2.66	
			24	21	18	15	12	9	6	3
			Maturity at Time of Purchase (Months)							

Each DFA fund has its own limits regarding the maximum maturities of permitted investments.

## II. Market Overview

During 2008, the fixed income markets experienced a declining yield curve with the short end showing the largest decline in rate throughout the year. The long end of the yield curve shifted lower during the second half of the year as the financial crisis worsened. Real GDP growth turned negative by the end of the third quarter and continued to decline in the fourth quarter as unemployment rose.

Figure 3: Treasury Yield Curve



Since the curve was hump-shaped from 1 month out to 2 years in early 2008, the overall decline in rates was most prominent in the 3 to 6 month part of the curve, as shown in Figure 3. A decline in rates increased fixed income returns over the time period.

### III. Returns Summary

The PW&Co Fixed Income Composite benefitted from having a shorter duration compared to the Benchmark during 2008 because short-term rates declined more than long-term rates. Primarily for that reason, the relative outperformance of the PW&Co Composite, which invests primarily in the DFA variable maturity bond funds, occurred because the variable maturity funds had a short duration and benefited from the large drop in rates.

**Table 2: Fixed Income Return and Volatility Summary**

	1 Year	3 Years	5 Years	10 Years	Volatility
PW&Co Fixed Income Composite	<b>6.7</b>	5.5	3.9	4.6	<b>2.2</b>
Benchmark	5.0	5.5	<b>4.7</b>	<b>5.8</b>	5.7

Note: Volatility is measured as the standard deviation of monthly returns over 10 years ending December 31, 2008. PW&Co Composite Fixed Income includes all fixed income investments under management, net of fees and expenses. Benchmark is 100% Vanguard Intermediate-Term Bond Index. See "Important Disclosure Note" and "Sources & Descriptions of Data."

The PW&Co Fixed Income Composite has only outperformed the Benchmark in three of the last 10 years. This result is to be expected from funds with a shorter duration because longer duration bonds have greater volatility and greater volatility should be rewarded with higher returns.

**Table 3: Annual Returns**

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
PW&Co Fixed Income Composite	<b>3.8</b>	6.6	5.9	7.6	2.8	1.6	1.2	<b>5.2</b>	4.7	<b>6.7</b>
Benchmark	(3.0)	<b>12.8</b>	<b>9.3</b>	<b>10.9</b>	<b>5.6</b>	<b>5.2</b>	<b>1.8</b>	3.9	<b>7.6</b>	5.0

### IV. Risk-Adjusted Comparison

Because the PW&Co Fixed Income Composite has historically been invested largely at the short end of the curve, the volatility has been lower than the Benchmark. The risk-adjusted returns were correspondingly much higher, as shown in Table 4 below.

**Table 4: Fixed Income Risk Adjusted Return Summary**

	1 Year			2 Years		
	Return	Volatility	R/V	Return	Volatility	R/V
PW&Co Fixed Income Composite	<b>6.7</b>	<b>4.2</b>	<b>1.6</b>	5.7	<b>2.9</b>	<b>2.0</b>
Benchmark	5.0	10.5	0.5	<b>6.3</b>	7.7	0.8

Note: Volatility is measured as standard deviation of monthly returns for period ending December 31, 2008. R/V is a measure of risk adjusted return. Benchmark is 100% Vanguard Intermediate Term Bond Index (VBIIX).

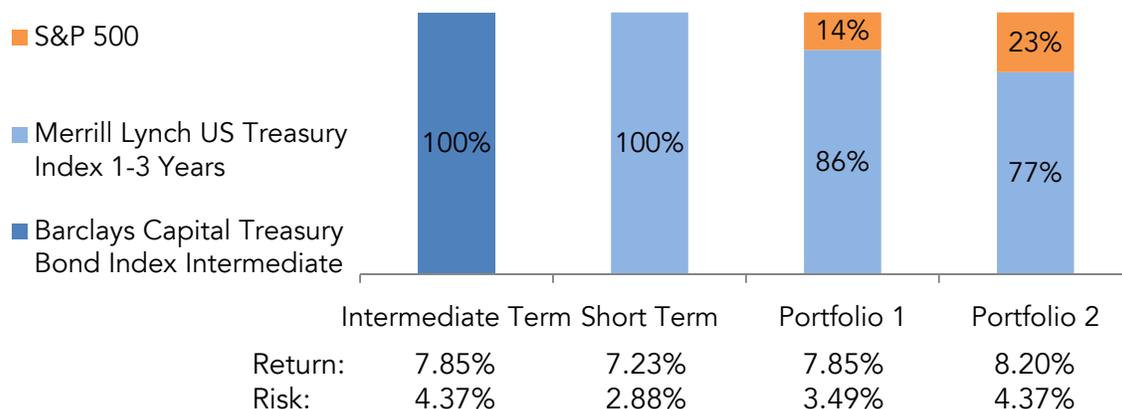
In general, volatility is preferred as long as it is associated with large positive returns (“positive skewness”). However, it is used as a proxy for risk because volatility generally goes in both directions over the long term. Since historically the treasury yield curve is upward sloping, it was

not surprising to see some of the out-performance of the benchmark unwind during 2008 as the yield curve returned to a more typical upward sloping pattern.

Historical risk and return properties with short and intermediate term fixed income in combination with equity is considered in Figure 4. Since the Intermediate Term return is higher than Short Term return, we must add some equity component to put things on a comparable basis. Portfolio 1 adds enough equity to Short Term to make its return equal to the Intermediate Term. Even with this additional equity component, the risk (as measured by the standard deviation of returns of the Short Term) is lower (2.88%) than the Intermediate Term (4.37%). Portfolio 3 adds even more equity to bring the portfolio risk to the same level, generating an even higher return (8.20% vs. 7.85%).

**Figure 4: Portfolio Allocations and Historical Performance**

*(Annualized monthly returns, from July 1977 to June 2009)*



Note: See "Important Disclosure Note" and "Sources & Descriptions of Data."

## V. Conclusion

The PW&Co Fixed Income Composite outperformed the Benchmark on an absolute and risk-adjusted basis over the calendar year 2008. Although the Benchmark has outperformed the PW&Co Fixed Income Composite over longer periods of time, the PW&Co Fixed Income Composite is superior to the Benchmark on a risk-adjusted basis. By adding equity to a predominantly low-risk fixed income portfolio, we end up with higher returns than an intermediate-term bond fund with the same risk level. An issue for future consideration is the optimal fixed income allocation for a predominantly equity portfolio.

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 Tim J. Heaven Jr.  
 September 1, 2009

## Important Notice

This paper is intended to provide information to investors. Whether to invest in fixed income investments is a decision to be made on the basis of current market conditions and the circumstances of each investor. In addition, investors should be aware of the investment principles listed below.

- i. Past performance is not a guarantee of future results. Values change frequently and past performance may not be repeated. There is always the risk that an investor may lose money. Even a long-term investment approach cannot guarantee a profit. Economic, political, and issuer-specific events will cause the value of securities, and the portfolios that own them, to rise or fall.
- ii. Different types of investments involve varying degrees of risk, and there can be no assurance that any specific investment will either be suitable or profitable for a client's investment portfolio. In this document, risk is equated to standard deviation, which may be an incomplete measure of risk.
- iii. Fixed income securities are subject to interest rate risk because the prices of fixed income securities tend to move in the opposite direction of interest rates. In general, fixed income securities with longer maturities are more sensitive to these price changes and may experience greater fluctuation in returns.
- iv. The returns and other characteristics of the allocation mixes contained in this presentation are based on models and back-tested simulations to demonstrate broad economic principles. They were achieved with the benefit of hindsight and do not represent actual investment performance.
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- vii. Sample fixed income portfolio returns and sample model portfolios are not intended to illustrate the returns of clients of Porter, White & Company. Sample and model results do not reflect actual trading and do not illustrate the impact that material economic and market factors may have had on the returns if an adviser implemented these strategies with client funds. Furthermore, advisory fees would reduce these returns.
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- x. Economic factors, market conditions, and investment strategies will affect the performance of any portfolio and there are no assurances that it will match or outperform any particular benchmark.

## VI. Appendix

### A. Bibliography

Fama, E. F. (December 1984). The Information in the Term Structure. *Journal of Financial Economics* 13, no. 4, 509-28.

### B. Sources & Descriptions of Data

#### PW&Co Composite Fixed Income

Includes all fixed income investments for all clients since inception date of December 31, 1997, net of all advisory fees, mutual funds fees and other related expenses.

#### PW&Co Composite Equity

Includes all equity investments for all clients since inception date of December 31, 1997, net of all advisory fees, mutual funds fees and other related expenses.

#### Vanguard Intermediate-Term Bond Index Fund

Vanguard Intermediate-Term Bond Index Fund net of all fund fees.

#### Barclays Capital Treasury Bond Index Intermediate

November 2008 - present: Barclays Capital Treasury Bond Index Intermediate Total returns in USD  
January 1973 - October 2008: Lehman Brothers Intermediate Treasury Bond Index  
Maturity range 1-10 years  
Source: Barclays Capital

#### Merrill Lynch US Treasury Index 1-3 Years

Total returns in USD, July 1977 - Present: Merrill Lynch US Treasury Index 1-3 Years  
Source: Merrill Lynch G1O2 Index

#### S&P 500

Total returns net of all fees in US\$. Data provided by Standard & Poor's Index Services Group

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<sup>1</sup> The PW&Co Fixed Income Composite is the aggregate of fixed income investments in all investment accounts managed by PW&Co.

<sup>2</sup> The Vanguard Benchmark fund is the Vanguard Intermediate Term Bond Index Fund (VBIIX). This fund employs a passive management, or indexing, approach and is designed to track the performance of the Barclays Capital U.S. 5-10 Year Government/Credit Bond Index. The index includes medium and larger issues of U.S. government, investment grade corporate, and investment grade international dollar denominated bonds that have maturities between 5 and 10 years. The duration was 7.7 as of December 31, 2008. The expense ratio was 0.22% as of April 24, 2009.

<sup>3</sup> Results are reported net of all fees and expenses.