



ADVANCED ANALYTICAL
CONSULTING GROUP

Target Date Funds: Historical Volatility/Return Profiles

Michael J. Brien, PhD

Deloitte Financial Advisory Services LLP

Philip J. Cross, PhD

Deloitte Financial Advisory Services LLP

Constantijn W.A. Panis, PhD

Advanced Analytical Consulting Group Inc

October 23, 2009

A study by Deloitte Financial Advisory Services LLP in conjunction with Advanced Analytical Consulting Group Inc. for the U.S. Department of Labor, Employee Benefits Security Administration.

Table of Contents

Objectives and Key Findings

Data and Methodology

Primary Findings

2010 Funds: A First Look

2010 Funds: A Closer Look

Equity Exposure

The background of the slide is a solid blue color. Overlaid on this background are several dark blue puzzle pieces of various shapes and sizes, scattered across the right and bottom-right portions of the slide. The puzzle pieces are interlocking, with some showing their tabs and others showing their sockets.

Objectives and Key Findings

Objectives

- Provide update on initial Task Order work
 - Findings subject to change based on further work and additional data
- Review Life Cycle/Target Date Funds
 - Provide in-depth look at the universe of life cycle funds
- Evaluate Volatility and Return of Target Date Funds
 - Present volatility/return profiles within and across funds
 - Understand the impact of recent economic crisis
- Explore recent returns and volatility in 2010 funds

Key Findings

- Rates of returns and volatility on target-2010 funds varied substantially in 2008
 - Spread in returns can be traced to substantial variation in equity exposure
 - Some fund families maintain equity exposure of more than 60 percent, even for their 2010 fund
- Returns generally increase with equity exposure, except in 2008
- Overall objective of funds, as stated in fund prospectuses, is generally not informative of whether a fund is aggressive or conservative
- Funds that performed particularly poorly in 2008 were heavily exposed to equities
 - Performance may rebound when the returns on equity improve.
- Best performing 2010 funds in '08 were not “typical” TDFs
 - “American Century Target Maturity 2010 Inv” invests only in Treasuries
 - “DWS Target 2010” does not have 2020, 2030, 2040, 2050 sibling funds

The background of the slide is a light blue color with several dark blue puzzle pieces scattered across it. The puzzle pieces are of various shapes and sizes, some overlapping each other. The text 'Data and Methodology' is written in a white, serif font, centered horizontally and positioned in the upper half of the slide.

Data and Methodology

Data*

- Volatility and Returns

- Computed from daily fund prices
- Source: Bloomberg, Yahoo Finance and the Thrift Savings Plan website

- Asset Composition

- Source: MarketWatch and the Thrift Savings Plan website
- Asset Composition

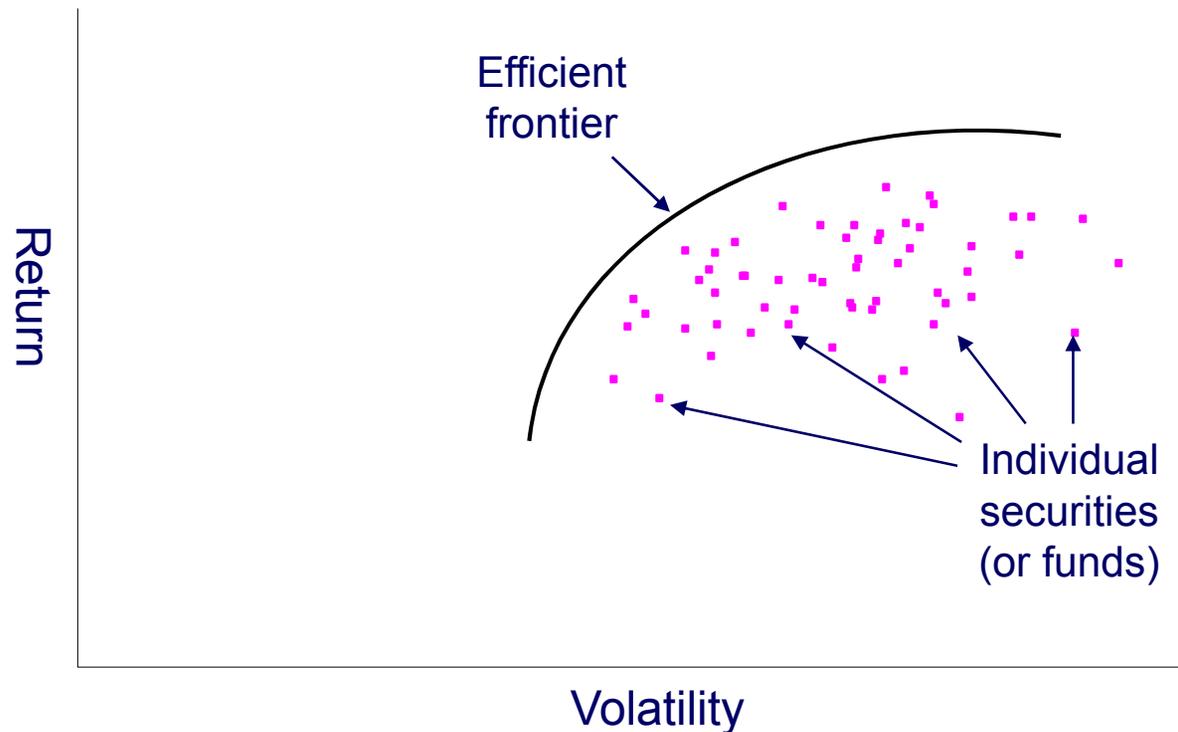
- Funds in the Sample

- 1,645 currently active funds defined by Morningstar as Life Cycle Funds
- Funds asset sizes range from less than \$1 mil to \$16.8 bil; mean size is \$493 mil, median size is \$25 mil
- Fraction of each fund in stocks ranges from 0% to 97% (median 68%) and net fraction in cash ranges from -107% to 38% (median 5%)

*Deloitte FAS assumes that such information and data are reliable. We have observed, however, in a small number of cases differences between these data and data reported by other commonly used sources.

Efficient Frontier

- Optimal allocations should be along the mean-variance frontier, which contains diversified portfolios of risky assets



Mean-Variance Efficient Frontier

Methodology

- Returns are historical annualized daily returns over N years, from day t=1 until day t=T;

$$return = \sqrt[N]{\frac{price(T)}{price(1)}} - 1$$

- Volatility is the historical annualized standard deviation in the daily percentage change in returns;

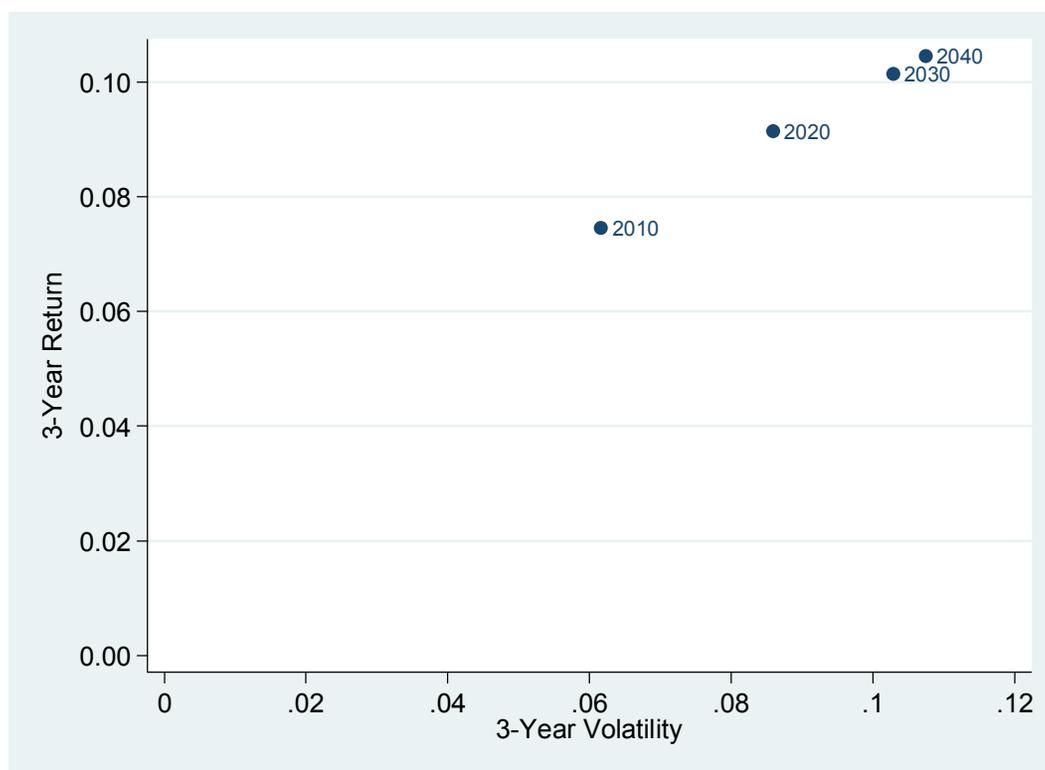
$$volatility = StdDev_{i=1, \dots, T} \left[\frac{price(i) - price(i-1)}{price(i-1)} \right] \times \sqrt{T / N}$$

Primary Findings

The background of the slide features a pattern of interlocking puzzle pieces. The pieces are rendered in two shades of blue: a medium blue and a darker, navy blue. The pieces are scattered across the slide, with some overlapping, creating a sense of a larger, partially assembled picture.

Volatility/Return within a Family of Funds

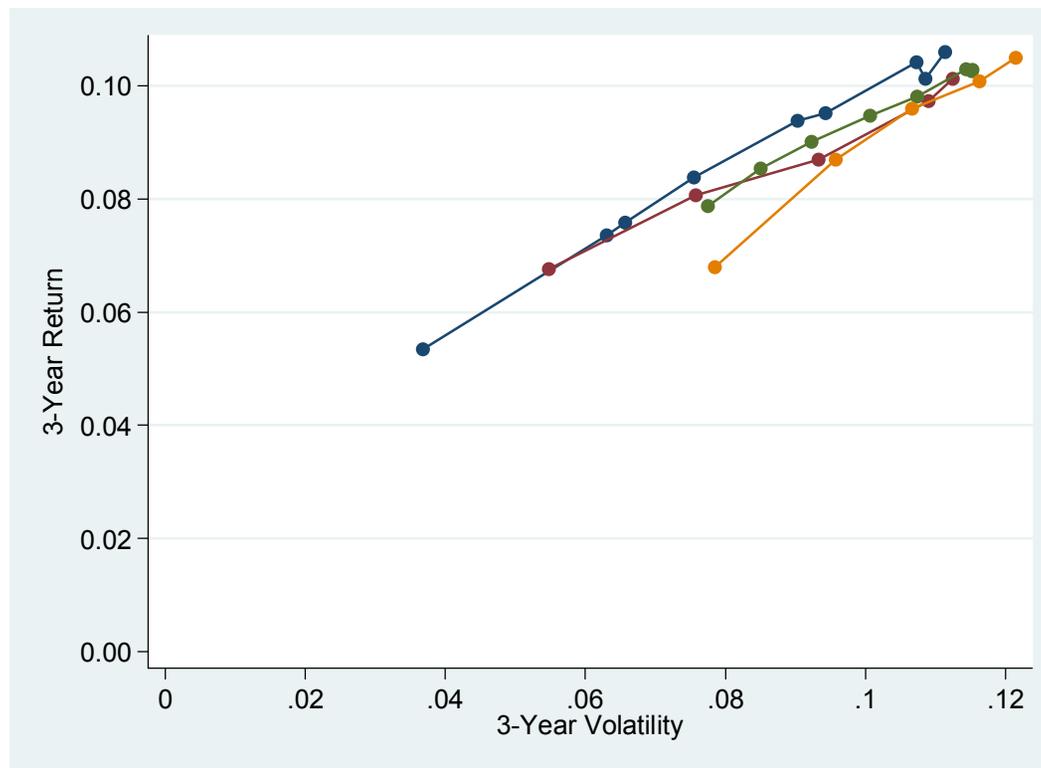
- Before 2008, return and volatility within a family increased with the target date
 - Appear to be along an Efficient Frontier



Volatility and return in 2005-2007 for a single family, single class of funds

Volatility/Return Across Funds

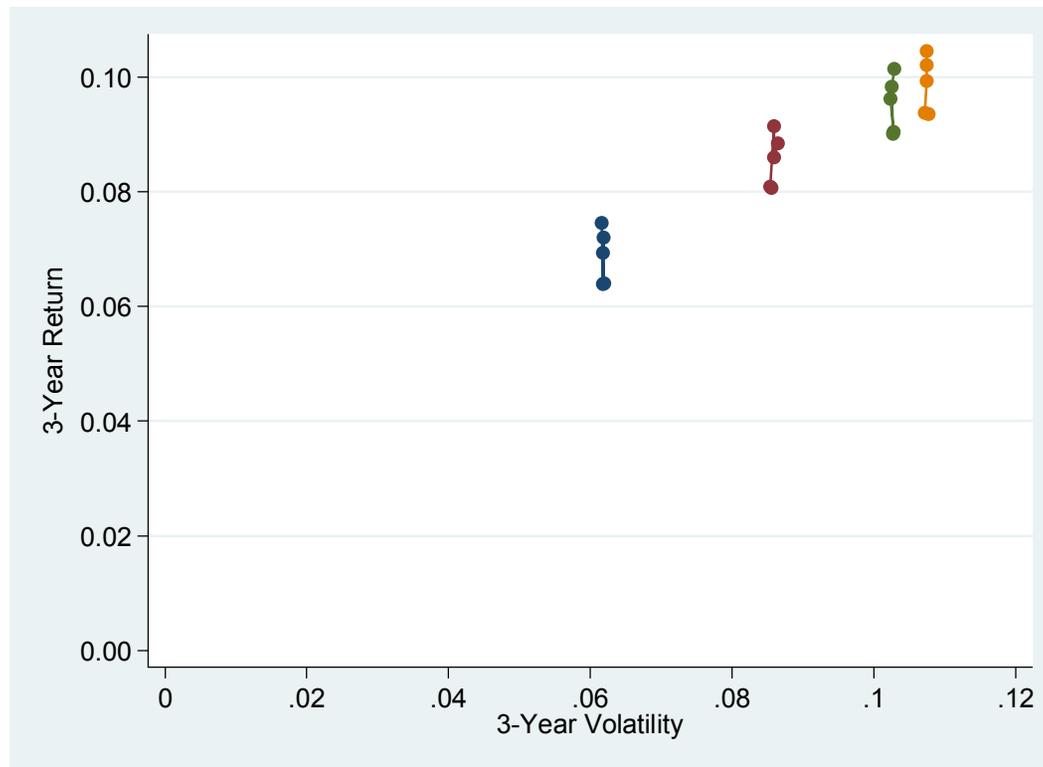
- While fund managers differed in target investments and returns, the patterns were largely similar



Volatility and return in 2005-2007 for various fund families (investor class)

Investor Classes Differ Mostly in Returns

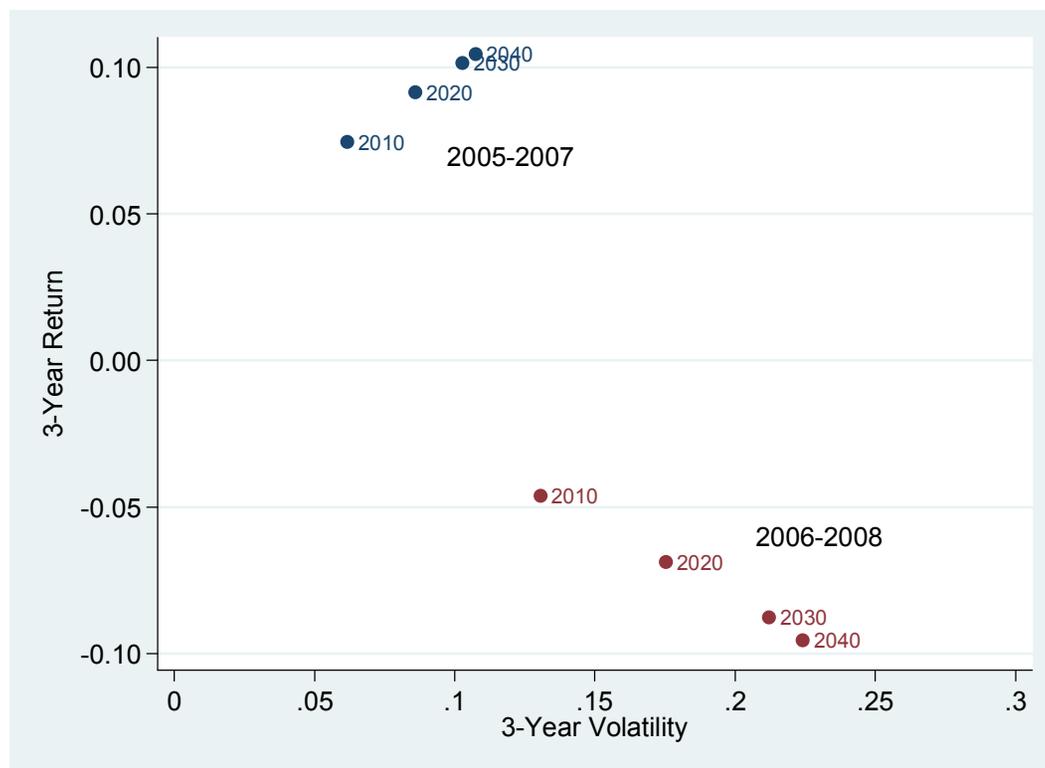
- Within fund families, investor classes vary in fees and thus returns, not in volatility



Volatility and return in 2005-2007 for various investor classes (single fund family)

Crash Reduced Returns, Upped Volatility

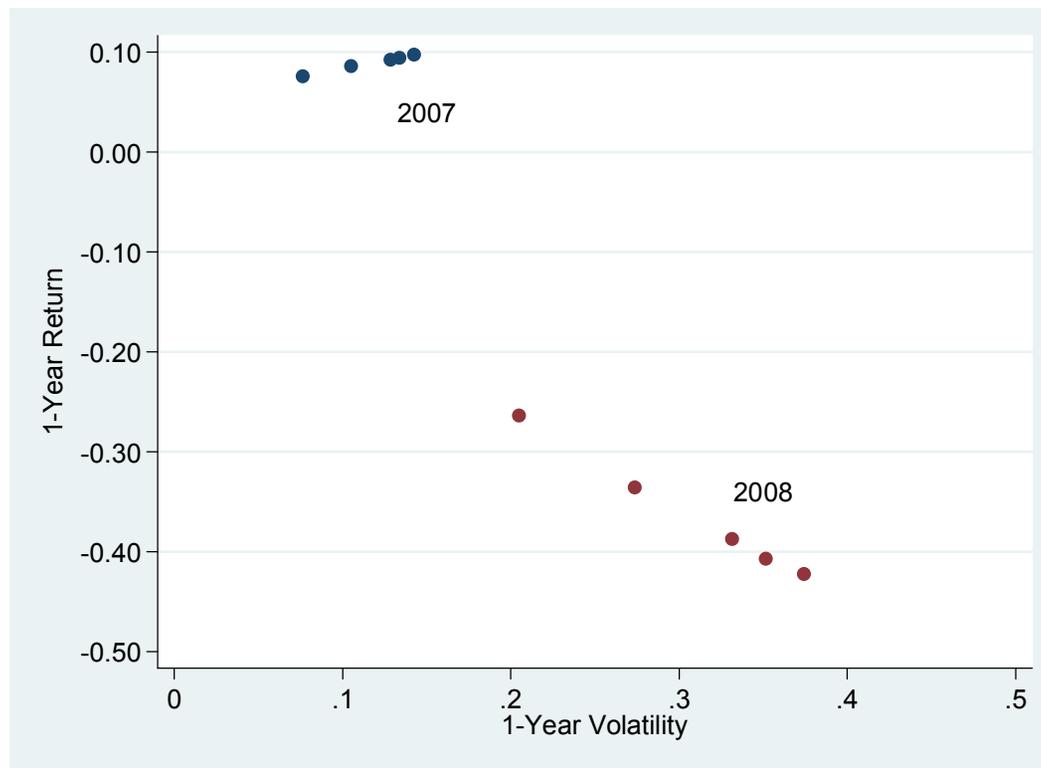
- The market crash that started in 2008 increased volatility and lowered returns



Volatility and return in 2005-07 vs. 2006-08 (single fund family, single investor class)

1-Year Differences Were Even Larger

- 1-year volatility generally higher than 3-year volatility; 1-year returns lower than 3-year returns



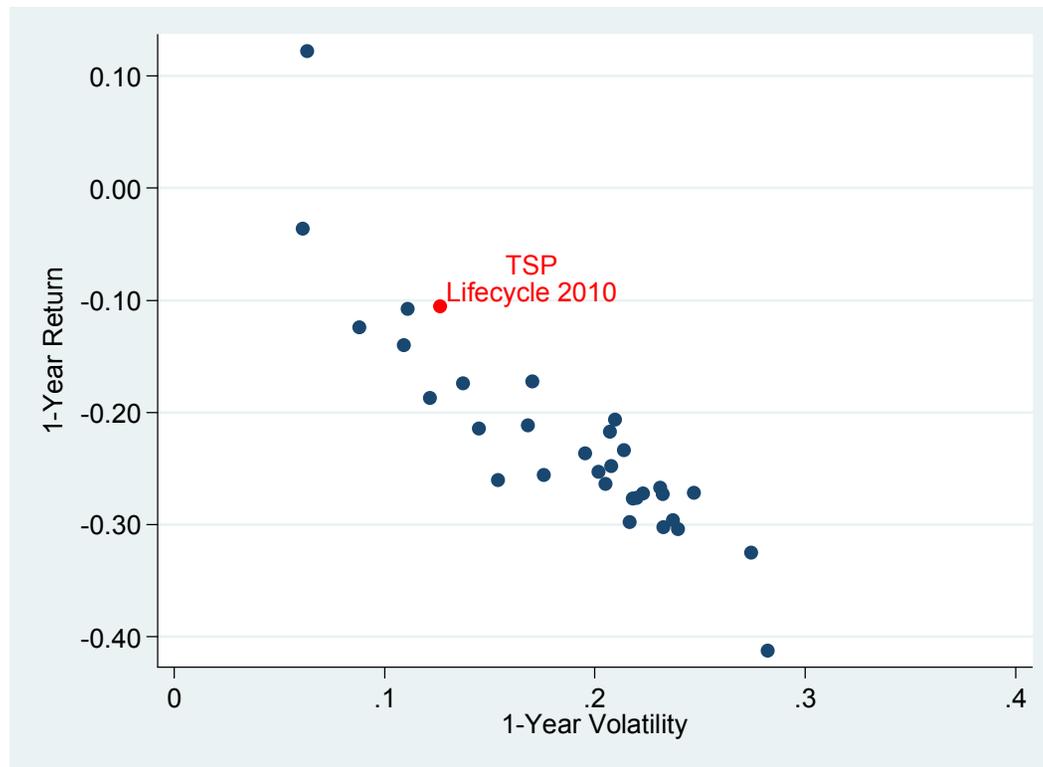
Volatility and return in 2007 vs. 2008 (single fund family, single investor class)

The background of the slide is a solid blue color with several dark blue puzzle pieces scattered across it. The puzzle pieces are of various shapes and sizes, some overlapping each other. The text is centered in the upper half of the slide.

2010 Funds: *A First Look*

2010 Funds Varied in Volatility and Returns

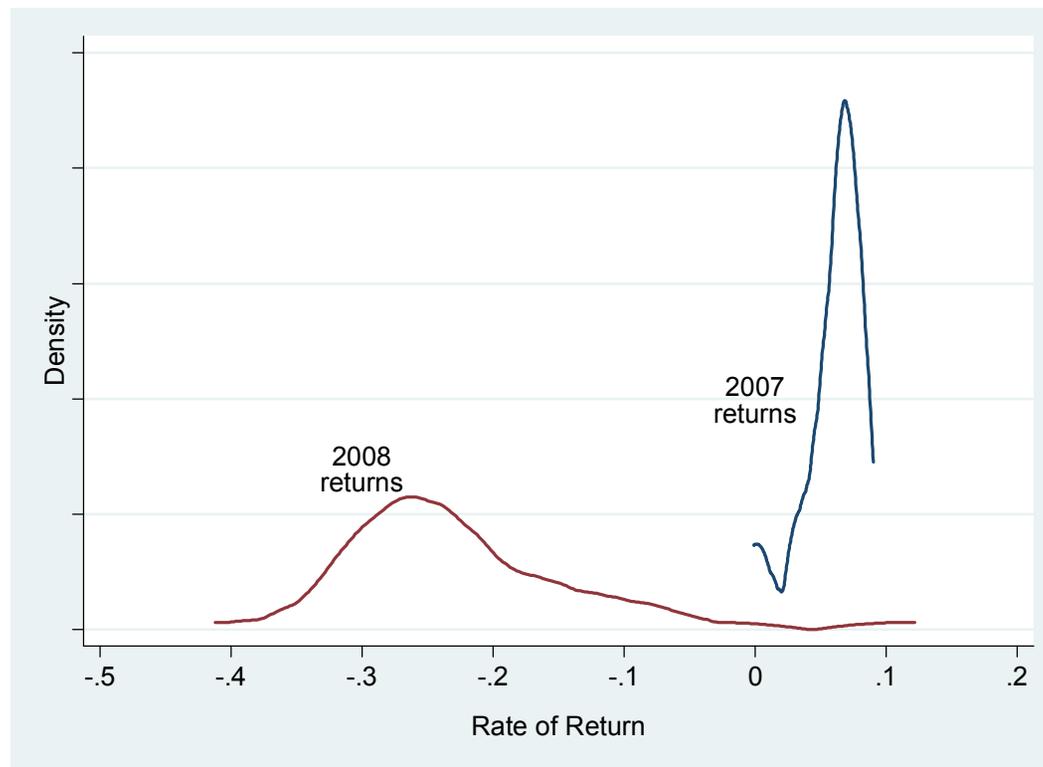
- Target date funds, even with the same target year, are heterogeneous in volatility/return profiles



Volatility and return in 2008 for funds with target date 2010 (many fund families, single investor class)

Returns Dropped, Differences Widened

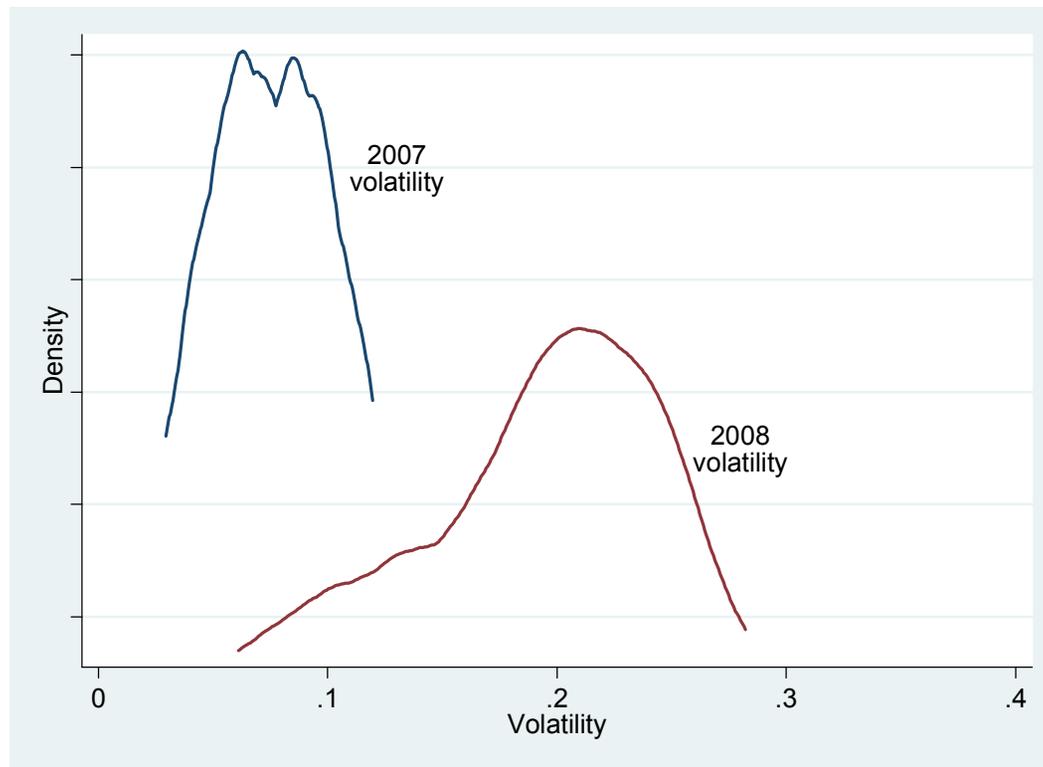
- As may have been expected, funds with target date 2010 had lower average returns in 2008 than in 2007, and fund return differences widened



Distribution of rates of return in 2007 vs 2008 among funds with target date 2010 (many fund families, single class)

Volatility Rose In Many Funds

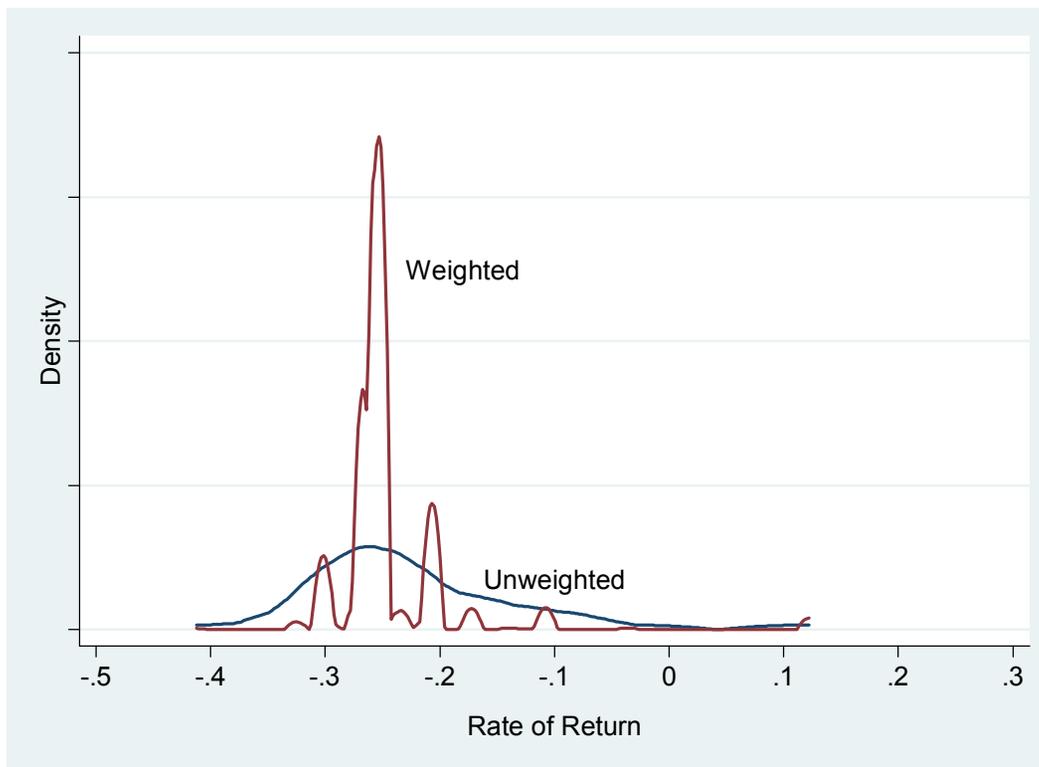
- Funds with target date 2010 varied in 2007 volatility; appeared more volatile in last 12 months



Distribution of volatility in 2007 vs 2008 among funds with target date 2010 (many fund families, single class)

Heterogeneity in Small and Large Funds

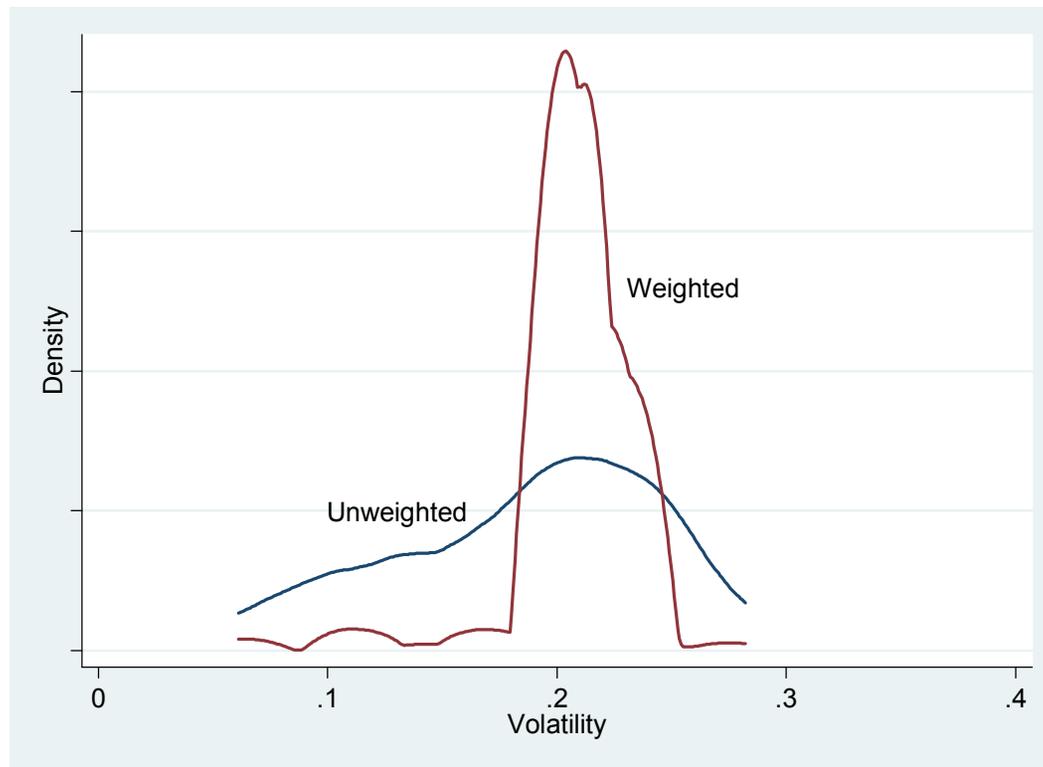
- Small 2010 funds are more heterogeneous in rates of return than large funds



Distribution of rates of return in 2008 among funds with target date 2010, weighted/unweighted by asset size (many fund families, single class)

Heterogeneity in Small and Large Funds

- Small 2010 funds are more heterogeneous in volatility than large funds



Distribution of volatility in 2008 among funds with target date 2010, weighted/unweighted by asset size (many fund families, single class)



2010 Funds: *A Closer Look*

Objectives

- Investigate variability in the 2008 performance of 2010 funds
 - Compare '08 performance of 2010 fund with other TDFs in the fund family
 - Compare fund families' performance in '08 with that in '06, '07 and '09
- Link between fund performance and fund philosophy
 - Examine the glide paths (asset composition over different target dates) of fund families

Methodology

- Illustrative sample selection
 - A case study of 2010 funds that performed well, intermediately, and poorly in '08, and other members of their families
 - Within-family investor classes with relatively low expense ratios

- Time-period selection
 - One-year results for '06, '07, '08 and partial year '09 (through 10/9/09)
 - Funds established during a year are excluded from the results for that year

Funds* in the Case Study

Alliance Bernstein 2010 Retirement Strategy I

Seek the highest total return over time consistent with its asset mix (which emphasizes capital preservation and income for periods nearer to and after retirement).

American Century Target Maturity 2010 Inv**

Seek the highest return consistent with investment in U.S. Treasury securities.

DWS Target 2010***

Provide a guaranteed return of investment to investors who reinvest all dividends and hold their shares to the Maturity Date and to provide long-term growth of capital.

Fidelity Advisor Freedom 2010 I

Seek high total return with a secondary objective of principal preservation.

Oppenheimer Transition 2010 Y

Seek total return until the target retirement date and then seeks income and secondary capital growth.

Vanguard Target Retirement 2010

Seek high total return with a secondary objective of principal preservation as the fund approaches its target date and beyond.

Thrift Savings Plan L 2010 Fund

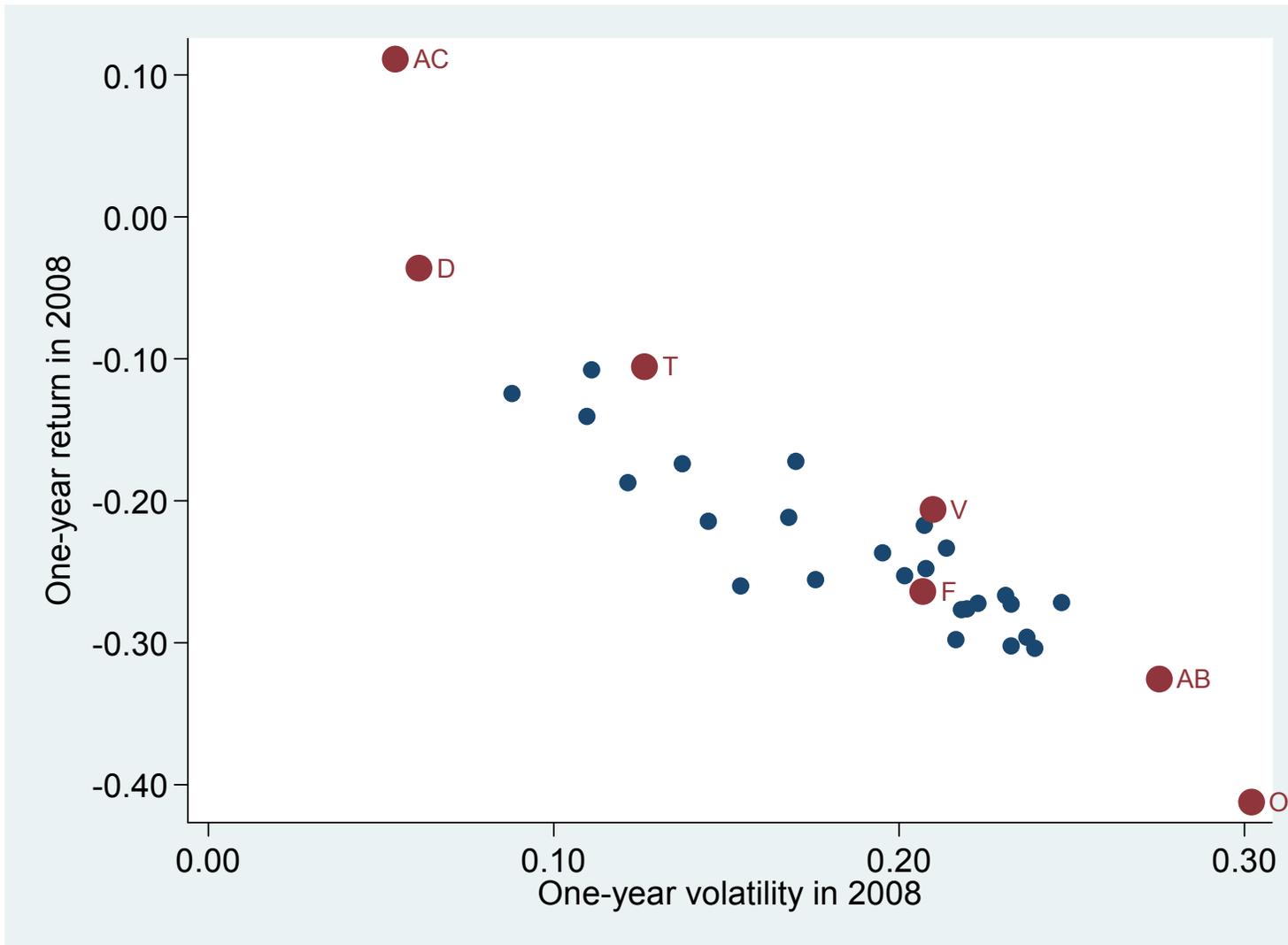
Provide the highest possible rate of return for the amount of risk taken.

*Where applicable the case study includes some or all of 2000 (a.k.a. "Income" or "Retirement"), 2010, 2020, 2030, 2040 & 2050 Target Date Funds. Off-decade funds are excluded. Fund descriptions are based on their prospectuses.

**For this family only a 2010 and 2020 fund are available.

***Other target dates are from the DWS LifeCompass fund family.

Variability in Performance of 2010 Funds in '08



Graph depicts a universe of 32 Target Date Funds

Better in '08: American Century and DWS

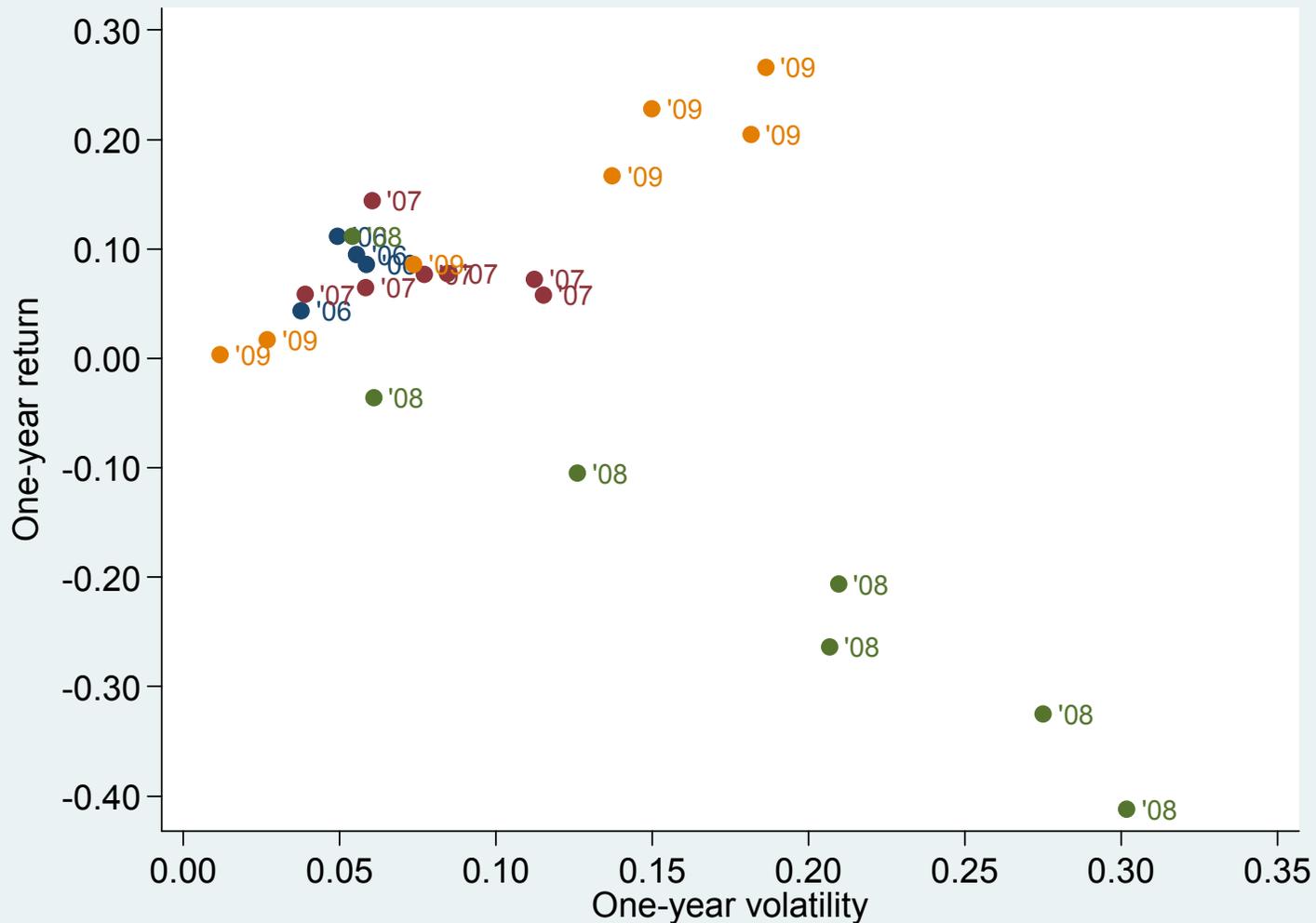
Intermediate in '08: Thrift Savings Plan, Vanguard and Fidelity

Worse in '08: Alliance Bernstein and Oppenheimer

Summary of the Seven Highlighted 2010 TDFs

		Alliance Bernstein 2010 Retirement Str I	American Century Target Mat 2010 Inv	DWS Target 2010	Fidelity Advisor Freedom 2010 I	Oppenheimer Transition 2010 Y	Vanguard Target Retirement 2010	Thrift Savings Plan L 2010 Fund
2009	Return	0.265	0.003	0.017	0.228	0.204	0.166	0.085
	Volatility	0.186	0.012	0.027	0.150	0.182	0.137	0.074
2008	Return	-0.326	0.111	-0.036	-0.264	-0.412	-0.206	-0.105
	Volatility	0.275	0.054	0.061	0.207	0.302	0.210	0.126
2007	Return	0.058	0.144	0.058	0.076	0.072	0.077	0.064
	Volatility	0.115	0.061	0.039	0.077	0.113	0.085	0.059
2006	Return		0.085	0.043	0.095			0.111
	Volatility		0.059	0.038	0.056			0.049
Asset composition (%)								
	Equities	62.43	0.00	9.15	49.23	63.65	53.65	30.00
	Bonds	30.91	100.00	90.84	31.26	39.33	43.74	70.00
	Cash	-0.03	0.00	0.01	14.25	3.34	0.64	0.00
	Other	6.25	0.00	0.00	5.26	-6.24	2.03	0.00

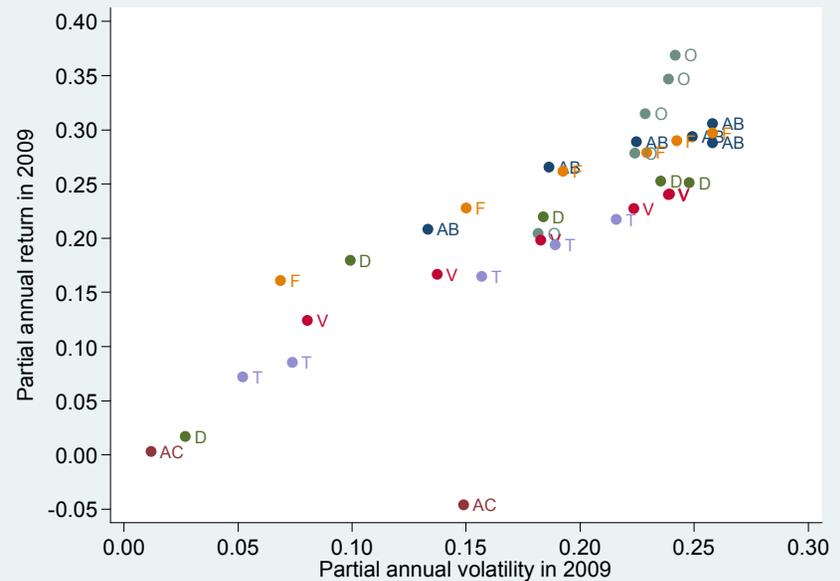
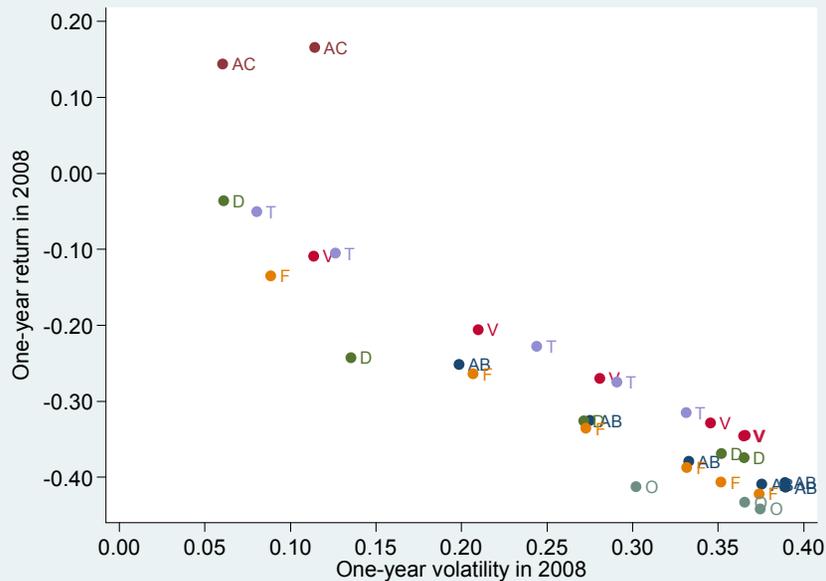
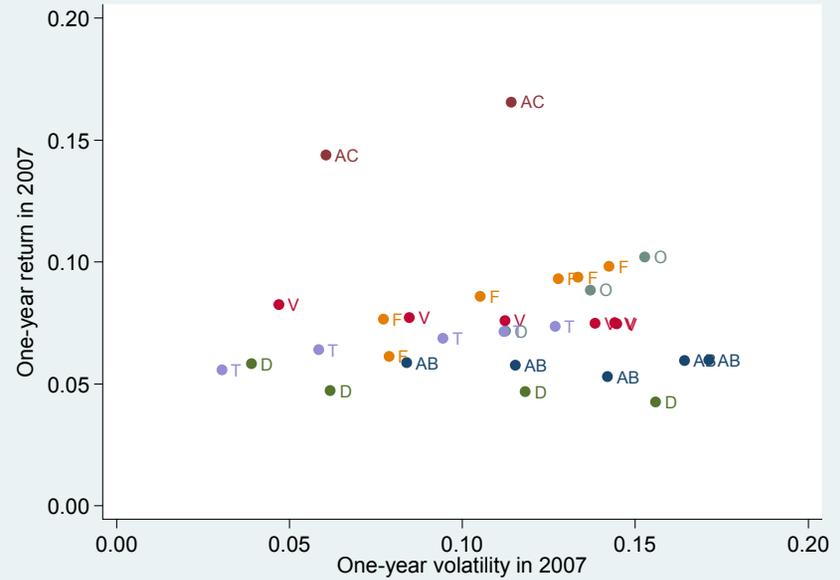
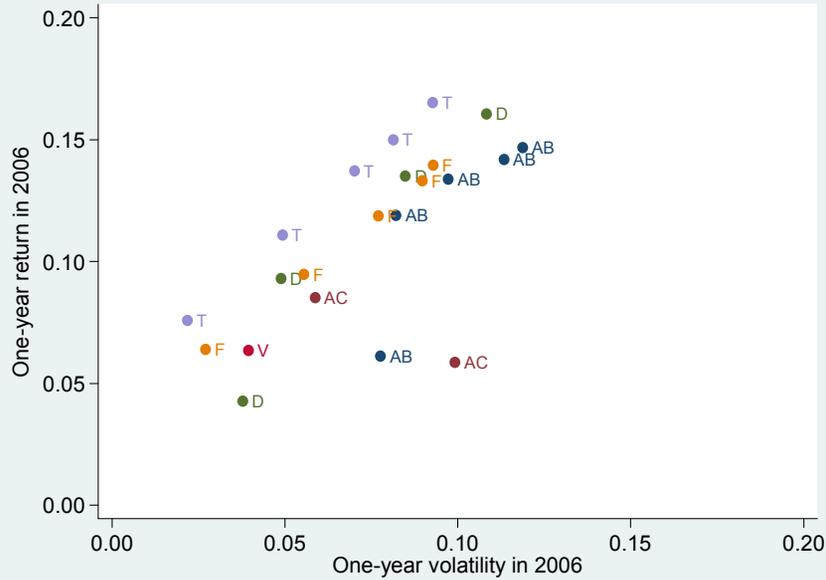
Volatility/Return Profile: 2010 Funds in '06, '07, '08 & '09



Profiles negatively correlated in '08 and positively correlated in '09 (YTD)

'06 and '07 profiles have modest positive correlations, and much more narrow ranges of volatility and return

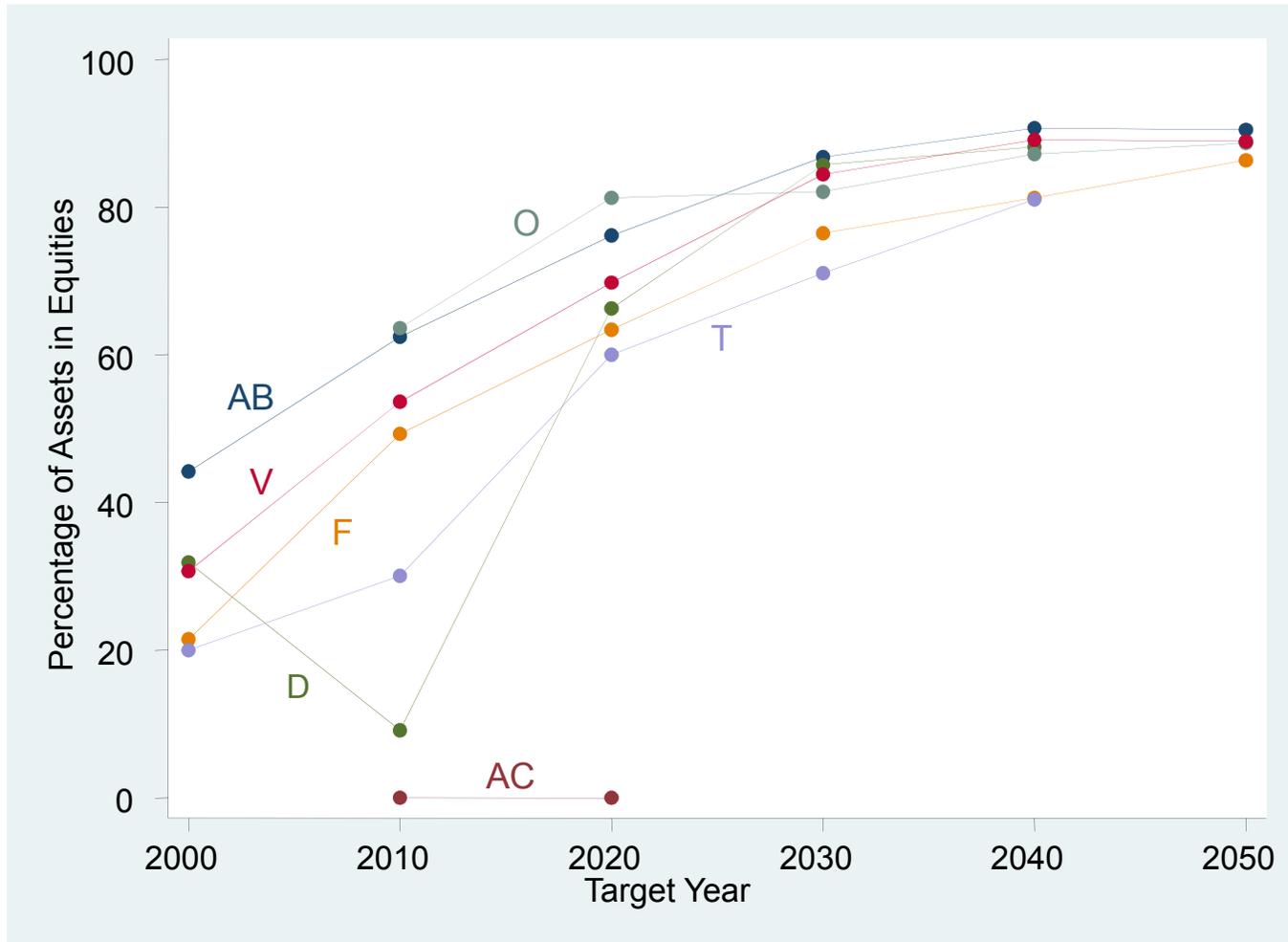
Volatility/Return Profiles in 2006, '07, '08 & '09



Equity Exposure

The background of the slide features a pattern of interlocking puzzle pieces. The pieces are rendered in two shades of blue: a medium blue and a darker, navy blue. The pieces are scattered across the frame, with some overlapping others, creating a sense of depth and complexity. The overall aesthetic is clean and professional.

2000-2050 Glide Paths for the Fund Families



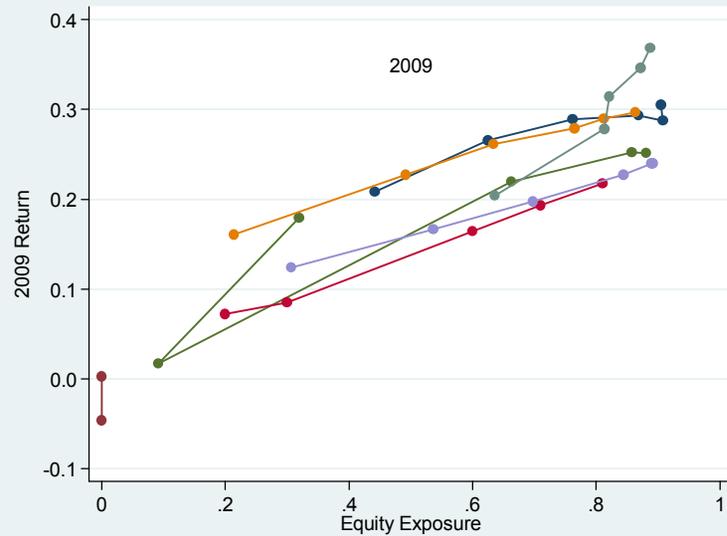
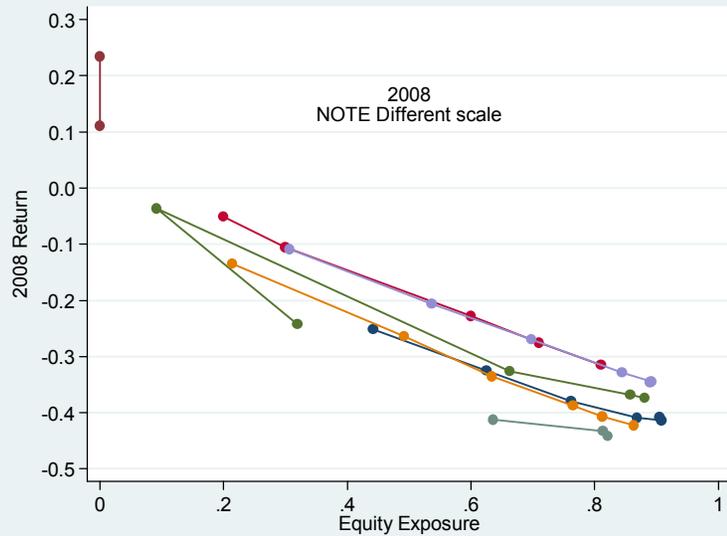
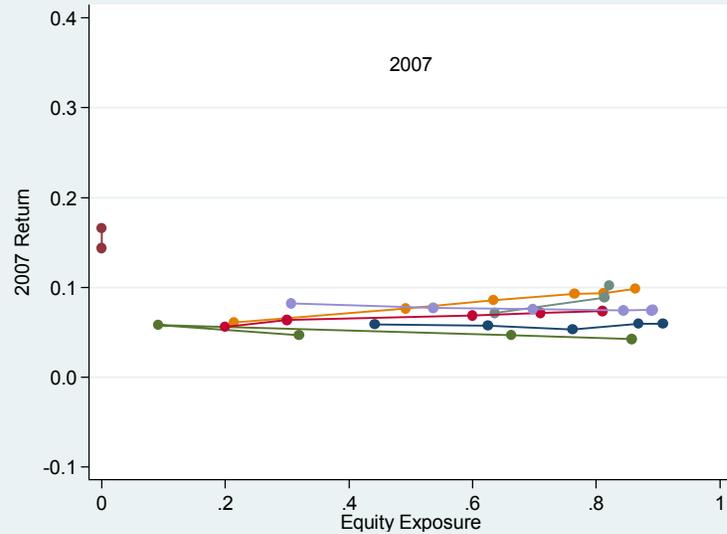
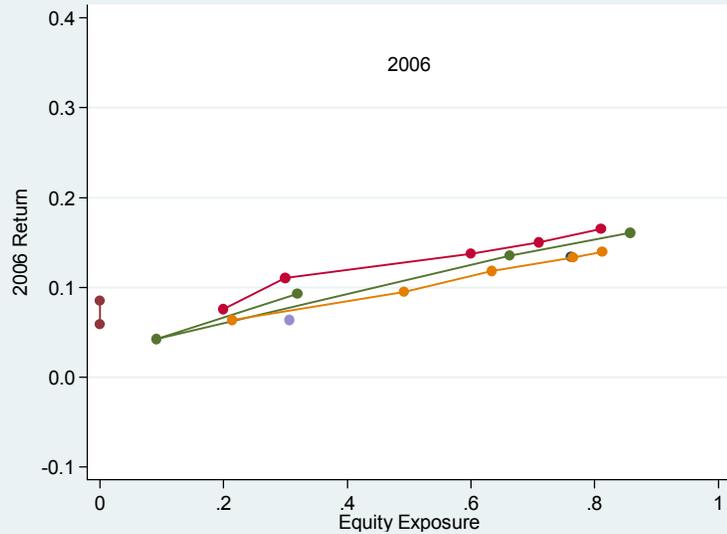
Equity shares in 2010 funds range from 0% to 64%

“Income” or “Retirement” funds listed as 2000 funds

American Century funds fully in U.S. Treasury bonds

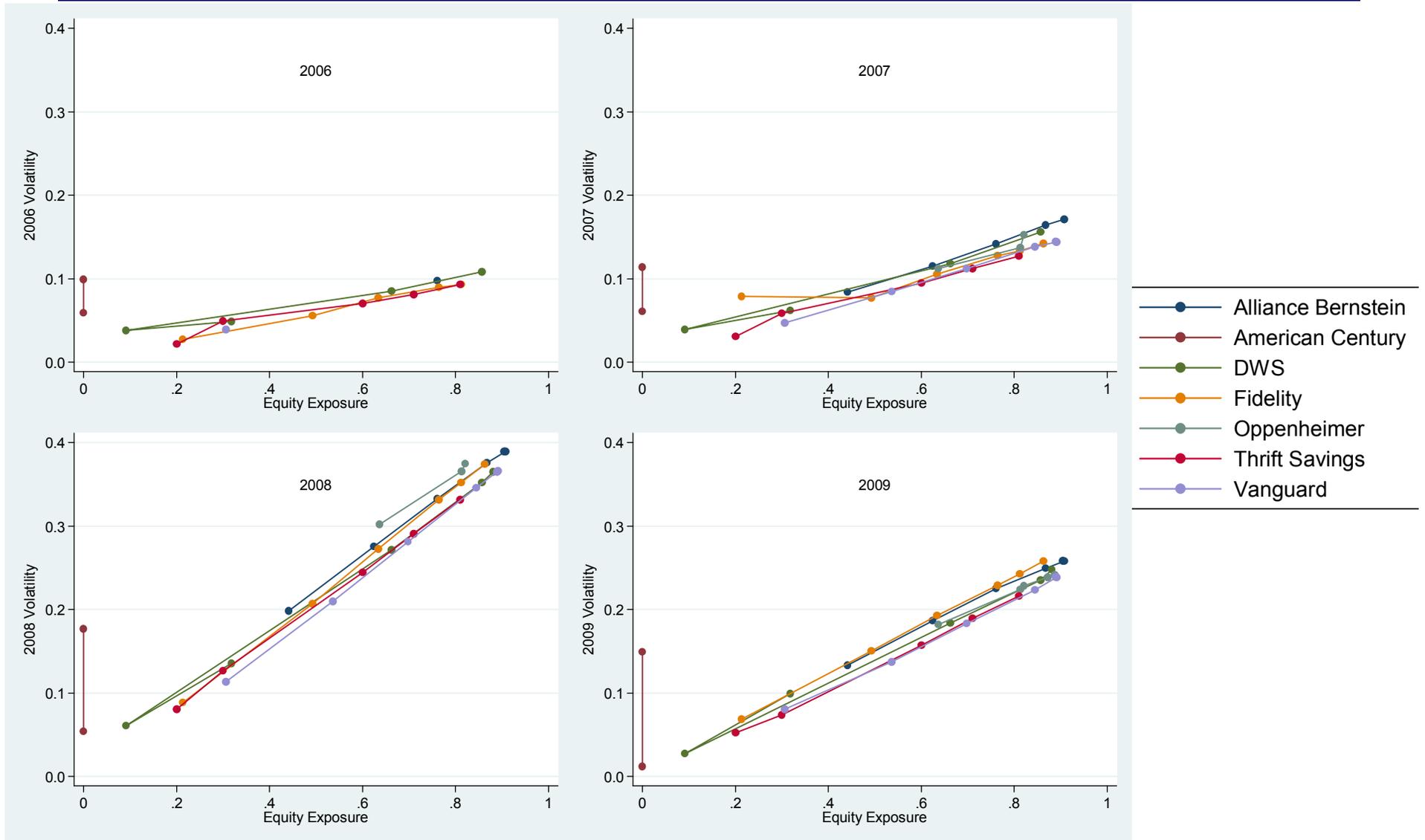
DWS Target 2010 fund separate from DWS LifeCompass fund family for other target years

Annual Returns by Equity Exposure



- Alliance Bernstein
- American Century
- DWS
- Fidelity
- Oppenheimer
- Thrift Savings
- Vanguard

Annual Volatility by Equity Exposure



Disclaimer

The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Government position, policy or decision, unless so designated by other documentation.

These presentation slides were accompanied by discussion from the preparers, which was an integral part of this report. Such discussion has not been provided herein and may have influenced a readers' understanding of these slides.

Work for this report was performed in accordance with the Statement on Standards for Consulting Services issued by the American Institute of Certified Public Accountants ("AICPA"). Our services were provided under contract DOLJ08327415 from the U.S. Department of Labor.

This document contains general information only. Deloitte Financial Advisory Services LLP ("Deloitte FAS") and Advance Analytical Consulting Group Inc. ("AACG") are not, by means of this document, rendering business, financial, investment, or other professional advice or services. This document is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action. Before making any decision or taking any action, a qualified professional advisor should be consulted. Deloitte FAS, its affiliates, or related entities and AACG shall not be responsible for any loss sustained by any person who relies on this publication.

For more information please contact:

Michael J. Brien, PhD

Deloitte Financial Advisory Services LLP

Tel.: +1 202 378 5096

E-mail: michaelbrien@deloitte.com

Constantijn W.A. Panis, PhD

Advanced Analytical Consulting Group Inc

Tel.: +1 310 866 2650

E-mail: stanpanis@aacg.com



About Deloitte

As used in this document, "Deloitte" means Deloitte Financial Advisory Services LLP, a subsidiary of Deloitte LLP. Deloitte Financial Advisory Services LLP advises clients on managing business controversy and conflict, executing deals, and maintaining regulatory compliance. Please see www.deloitte.com/us/about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries.

**Member of
Deloitte Touche Tohmatsu**



About Advanced Analytical Consulting Group Inc

Advanced Analytical Consulting Group Inc (AACG) provides economic, statistical, and computing consulting for business decisions and litigation. We provide expert testimony, support for academic experts, and advice and assistance identifying the right expert from academic and business settings. AACG Economic Consulting assists business clients with strategic and operational consulting based on in-depth quantitative analysis of corporate data and the client's position in the market.

For more information visit www.aacg.com.