

1. Alpha/Beta Separation

James L. Haskel, Director-Portfolio Strategy, Bridgewater Associates, Inc. proposed that the single greatest improvement to a traditional portfolio is to convert a “bad” risk budget (with risk essentially concentrated in a single asset class) to a “good” risk budget, where risk is highly diversified among asset classes. He pointed out that the risks of traditional portfolios are unnecessarily concentrated in equities and thus highly vulnerable to the fate of the equity market. In other words, beta risk dominates. This is probably not surprising for largely passive portfolios. But it also turns out that active management is unnecessarily tied to underlying asset allocations and is also concentrated in equities and hence beta risk. Separating market risk from active management risk, and reducing each by diversification can result in hundreds of basis points of additional return at the same overall risk.

It may come as particularly surprising that assets that are invested to produce alpha are likely to involve highly significant beta risk and comparably minor alpha risk.

The task then is separating beta and alpha risk. We begin with beta risk. A typical graph of expected total return against expected risk shows cash as the low return, low risk asset, with debt and equity classes, emerging equities, and finally private equity displaying higher expected returns and risks. The classes offering high expected returns appear to demand substantial equity risk. However, Haskell pointed out that the leverage-adjusted expected excess returns for a number of asset classes are comparable to those for equities. Some simulations offered by Haskel showed that we could equal the total return on

a typical portfolio (with significant beta risk) with a diversified beta portfolio with far lower beta risk. The Sharpe ratio for the typical portfolio with a return of 10.8% was 0.40. The Sharpe ratio for a diversified beta portfolio with a total return of 10.9% was 0.70. We could also have constructed a diversified beta portfolio to match the risk of the typical portfolio and increase the total return to 13.9% while holding the Sharpe ratio at 0.70.

Over the past six years there has been a substantial shift toward the diversified beta portfolio in assets under management from essentially zero to ten billion dollars. Bridgewater Associates is not the only organization to make the shift.

Haskel turned next to building a better alpha portfolio. Alpha is a zero sum game in which weaker players lose to stronger players. Our objective is to exploit the ability of alpha managers, while keeping the alpha risk low through diversification. This means making heavy use of both long and short positions. It is important to understand that a degree of leveraging can *reduce* risk. Once again over recent years, in this case from 1991 to 2007, the diversified alpha approach has replaced and overtaken the traditional approach as a percent of total assets under management.

In response to a question, Haskel suggested that the allocations among the alpha assets depended on confidence in those making the investment decisions. In connection with beta diversification, he said he does not depend upon correlations among asset classes, because these are highly volatile over time. What is more important is the correlation of asset returns to the economic environment.

Evolving Alpha and Beta Concepts and Wealth Demographic Issues

2. Panel: Exploring Capacity Issues

Joanne M. Hill, Managing Director, Goldman Sachs & Co. moderated a panel exploring capacity issues. The panel consisted of Dan Bienvenue, Portfolio Manager-Global Equities, CALPERS, Knut Kjaer, CEO Norges Bank Investment Management, and Matt Yamini, Managing Director –Head of Global Equity Trading, TIAA-CREF. Hill had made available an article she wrote for *The Journal of Trading* entitled “Equity Trading Capacity Revisited: Growth, Fragmentation and Fluidity.”

The article reviews developments in securities trading, including the trading of portfolios, the use of derivatives, and exchange traded funds (ETFs). It explores some trends and issues in cross-product equity market capacity. In the last several years, trading costs (both explicit and implicit) have fallen with greater applications of technology, more competition, and lower equity market volatility. But questions on capacity of strategies and markets are becoming more difficult to answer because of the fragmentation and fluidity of market capacity. Some equity derivative products, like futures, swaps and ETFs, tend to attract a larger than average number of sellers (short positions), while others, like stock options, index options and portfolio trading have more balanced flows but tend to have more net flow from buyers.

Capacity growth still has a “dark” side. Flow-induced volatility can occur when macro needs or a sizeable shift in risk tolerance leads many investors to attempt to transact in a short time window in different products and venues. These short-term liquidity demands can spiral into a volatility shift

as a large magnitude market move leads high risk position holders to liquidate further, exacerbating price movements and causing feedback effects that can produce an even greater strain on market capacity.

The purpose of the panel was to explore, for three large pools of capital, the connection between strategy and capacity, the practical factors affecting capacity, and effects on the use of external and internal management. Kjaer, distributed a set of slides entitled “Exploring Capacity Issues: Building a Fund from \$30 bn in 1998 to \$324 bn at year end 2006 While Keeping the Alpha Capability.” The \$324 bn consists of the Global Pension Fund of Norway at \$286 bn, Norway’s Foreign Exchange Reserves at \$36 bn, and the Petroleum Reserve Insurance Fund at \$2 bn. The largest asset by far consists of petroleum in the ground, at \$200 bn. The balance of the fund is invested in an oil fund, equities, and bonds. He identified four important conclusions from his trading experience.

- Actively managing and monitoring all trading costs is important.
- Lowering commissions is only a small start.
- The ability to influence the trading mix has changed dramatically over the last 5 years giving the buy-side the tools to actively manage total trading costs.
- The key to lowering trading costs is data and access to data. Good data are important not only for improving trading costs but should also be extended to improving portfolio management decisions.

With respect to the alpha challenge, he said that a move to more scalable alpha-strategies may imply a decline in the information ratio which was at present 1.22. NBIM prefers relative value and fundamental strategies but they may be forced to move to more factor based strategies. He went on to discuss the principles behind NBIM's active management, and observed that active managers should forecast as often as possible (the fundamental law), and that mathematics cannot overcome ignorance/lack of information.

Continuing the discussion of the consequences of rising capacity, Yamini observed that while transactions costs are important, process was especially important. Bienvenue added that for CALPERS the emphasis is on beta strategies, and that alpha strategies may not be worth the capacity complications. High capacity strategies are best done in-house to keep costs low, while lower capacity strategies can be managed externally.

Hill turned to the importance of quantitative methods and their ability to deal with high capacity. The three panelists agreed that quantitative methods were becoming more important. Yamini saw them leading to more products, a decrease in volatility, and more complete markets. Transaction cost models were especially useful. He expects to see more quantitative tools made available, and an increase in trading efficiency with reduced transactions costs. Kjaer added that quantitative developments are creating more opportunities.

3. The FundCreator Approach to Hedge Fund Return Replication, Fund Creation and Performance Evaluation

Harry M. Kat, Professor of Risk Management, Sir John Cass Business School, made available a number of working papers on hedge funds, by himself and Helder P. Palaro, including: "Hedge Fund Indexation the FundCreator Way", "Replication and Evaluation of Fund of Hedge Funds Returns", "Superstars or Average Joes? A Replication-Based Performance Evaluation of 1917 Individual Hedge Funds", "Tell Me What You Want, What You Really, Really Want! An Exercise in Tailor-Made Synthetic Fund Creation", and "Who Needs Hedge Funds? A Copula-Based Approach to Hedge Fund Return Replication". Kat had spoken before on the subject of hedge funds at the Q-Group® Fall Seminar in 2003.

On this occasion, he was introduced by Richard Michaud, who observed that Kat had taken his study of hedge funds to a new level, and wondered how much alpha is left in hedge funds, are hedge funds a diversifiable asset, and what about fees? Kat proposed that synthetic funds would solve many problems. These included excessive fees for regular hedge funds, lack of liquidity and transparency, lack of capacity, hidden operational risks, annoying managers, a drift in style, and potential regulation.

Two approaches are possible for the creation of synthetic funds. One could use a traditional factor model, trying to match the risk exposures of a fund or index of funds. If successful, this produces the same month-to-month returns and therefore the same properties as the target fund or index of funds. His alternative, less ambitious than the factor model, aims to generate returns with the same statistical properties as a given fund or index, but not necessarily the same month-to-month returns. He discussed factor models, and concluded that:

1. Factor models cannot replicate individual funds.
2. Factor models cannot replicate most hedge fund indices.
3. Factor models can replicate the most diversified indices, but these don't make very interesting investments. Put simply: It works when you don't really need it to work!
4. When replication is not accurate the statistical properties of the returns generated are unclear.

The FundCreator system designs futures trading strategies that generate returns with predefined statistical properties based on two ideas:

1. The sequence of returns is of no importance for investors as long as they have the desired properties.
2. In the longer run the market pays a return in line with the bottom line risk you have taken.

He proposed as an example a fund with the following characteristics:

- Synthetic fund generating returns with 12% volatility, no skewness or excess kurtosis, and zero correlation with stocks and bonds.
- Trade 3M-Eurodollars, 10Y-Note, 30Y-Bond, S&P 500, Russell 2000, and GSCI futures.
- Start the fund in 1995 and work forwards to the present, using only information available at the time.

Kat demonstrated graphically that the performance of the fund he synthesized from March 1997 – March 2006 came very close to delivering the specified characteristics.

Lest there be some skepticism about the dynamic trading strategy he used, he pointed out that it is the same strategy used by banks all over the world to hedge the sale of an option.

Explaining further, he observed:

- Every payoff function implies a return distribution. Use reverse reasoning: If you can find a payoff function that implies the desired return distribution then you can generate that distribution by executing the hedging strategy for that payoff function.

Next he turned to how one might use a synthetic fund. It could be used to move money through time. It might be a reserve asset, the main source of uncertainty. It might be a reference portfolio, to correct the relationship between the reserve asset return and the reference portfolio return. One might wish to create an investment that has zero correlation with an existing portfolio. He went on to display some out-of-sample tests showing examples of replicating the performance of portfolios, for example one consisting of 50% S&P 500 and 50% Treasury bonds. Continuing with uses for synthetic funds, he showed how hedge fund index returns could be achieved with highly liquid futures and without the hedge fund fees with a number of examples.

In conclusion he observed:

- Factor models only work well in cases where we don't really need them to work.
- The properties of factor model based funds are unclear.
- FundCreator allows investors to design funds that optimally fit into an investor's portfolio.

- FundCreator based funds have predefined statistical properties. You get what you ask for.
- Neither factor models nor FundCreator truly “replicate” or “clone” hedge fund returns.
- Roughly 80% of hedge funds and funds of funds have not provided returns that could not have been generated mechanically trading a basket of liquid futures contracts.
- Hedge fund performance has deteriorated over time.
- Successful hedge funds tend to become less successful over time.

4. Modeling Alpha

Eric H. Sorensen, President and CEO PanAgora Asset Management, and Edward Qian, Director-Macro Strategies, PanAgora Asset Management, made available a paper by themselves and Ronald Hua entitled “Information Horizon, Portfolio Turnover, and Optimal Alpha Models.”

Sorensen began the presentation. The IR (Information Ratio) is the annualized ratio of the averaged IC (Information Coefficient) to the standard deviation of the IC . And $IR = IC\sqrt{N}$ where IC is the cross-sectional correlation coefficient between the factors value at the start of time t and the security returns over the time period t . Some investor behavior assumptions are necessary.

- Manager knows the metric of skill
- Manager applies (optimizes) skill, according to CAPM

In addition, security behavior assumptions are:

- Same skill level applies to all asset choices
- Sources of information are independent

Now we want the factor weights that maximize IR . At this point Qian took over the presentation. We must convert the raw IC to a risk adjusted IC , and Qian showed the large difference between the two. The true active risk consists of $\sigma = std(IC)\sqrt{N\sigma_{model}}$ the strategy risk component is $std(IC)$ and is different for different factors. The fundamental law of active management is true only if $std(IC) = \frac{I}{\sqrt{N}}$, implying that IC is time invariant, which is not likely to be quite true.

He turned next to the maximization of multifactor models:

A quantitative framework for combining for multiple factors

- Similar to optimal allocation problem for multiple active managers

Individual factor (one manager)

- Average IC (expected alpha), standard deviation of IC (active risk)

Multi factor (managers)

- IC correlation: time series correlations between different IC s is key
- Analogous to correlations between excess returns of different managers
- The correlations between different factors are much less important
- Factor correlation is not the same as IC correlation

In many cases, IC correlations are significantly different from average factor correlations

IC correlations are critical to maximize multi-period IR

Factor correlations are useful for single-period composite scores

Sorensen took over the presentation at this point with the *IR* maximization of multi-factor models which led to:

Problem:

Maximize

$$IR = \frac{avg(IC_t)}{std(IC_t)}$$

Solution:

$$\overline{IC} = (\overline{IC}_1, \overline{IC}_2, \dots, \overline{IC}_M)' \sum_{IC} = (\rho_{ij,IC})_{i,j=1}^M$$
$$W^* \propto \sum_{IC}^{-1} \overline{IC}$$

Turning to contextual models, Sorensen showed:

Theoretical advances

- Conditional asset pricing

Practical approaches

- Style investing
- Sector models

Contextual modeling

- A piecewise linear model
- Partitioning the security universe according to risk/attributes
- It follows business cycle of individual stocks

He went on to discuss a two dimensional example, for growth and value factors and tabulated the factor weights. He also tabulated the unique factor weights for each of four stocks: IBM, GM, TYC, and VSAT.

Qian returned to take over the presentation, adding turnover constraints to an optimal alpha model, maximizing the net *IR*. Turnover is a function of the targeted risk, the number of stocks, the forecast autocorrelation, and the average specific risk. While turnover is sometimes treated as a constraint in portfolio optimization, the authors preferred an integrated approach – using optimal models with turnover targets built into them. Lower turnover may be achieved at the cost of alpha and an important question then is what is the right tradeoff. He showed the equations for constrained optimization to find the optimal weights, and tabulated the correlation matrix of current and lagged values for price momentum and earnings yield in an example.

Finally, he summarized advances in multifactor models as:

**Correct skill measure
– risk adjusted IC**

- Bridge the gap between model and actual performance

**Optimal modeling framework
- maximizing IR**

- Maximize *IR* not *IC*
- Incorporate *IC* volatility and *IC* correlation

**Contextual modeling
– not one-size-fits-all**

- Increase the depth of quant model
- Know where the market efficiency is

**Optimal models with costs constraints
– maximizing net IR**

- Integrate alpha model with implementation

5. National Politics Today – As I See It

Mary Cahill introduced the after dinner speaker, Cynthia Tucker, Editorial Page Editor, The Atlanta Journal-Constitution. Her topic was “National politics today – As I see it”. After a few general comments on presidential candidates, she turned to two public policy issues that we are not likely to hear about during the presidential campaign.

The first issue concerned which men and women we Americans will depend on to defend us. Will we continue to draw on working Americans while the rest of us contribute very little? How will we maintain our military strength? We simply do not dare to deal with these questions. We do not dare to question the sufficiency of our military, and we do not dare mention a draft. A draft would mean a widely shared sacrifice to defend our country.

Enlisted men and women are largely drawn from families earning about \$32,000 a year. They are not the poorest of the poor. But we are now accepting poorly educated candidates, and indeed many with criminal records. If those entering the military came from a broad middle-income class we would never have invaded Iraq. If we were truly serious about our country we would have a much greater military. If we had gone into Afghanistan the right way, we could not have gone into Iraq. And we don't have the resources to deal with Korea.

These issues and questions say a lot about the character and morality of the United States. We are complacent at sending young men and women off to fight and die, while the rest of us are called on for no sacrifices. We are influenced by an economist's

observation that we send off to fight for us “low cost” bodies. We are not likely to hear about this during the coming campaign.

The second major issue concerns the growing income (prosperity) gap in the U.S. As the campaign progresses, we will hear about loss of jobs to overseas. But we are reluctant to face the bottom end of the economic scale in the U.S. Many Americans are doing well, and some claim that working class Americans are better off today than they have been in the past. There has however been a systematic loss. Wages and salaries have decreased as a share of GDP, while corporations are doing better. Working people are simply not sharing in the prosperity. They are losing health care and retirement benefits. The long-lasting factory jobs that provided significant benefits are decreasing. This loss is more important than the TV sets and cell phones working people are purchasing.

Tucker said she supports free trade, but we need to consider the consequences to the middle class who are employed in industry. Following World War II a shared prosperity fostered the “American Dream.” This dream was essential to the civil rights movement. We need to preserve that dream and the shared prosperity. But again, this is not a topic that is likely to be discussed in the campaign.

She turned next to the campaign itself. The acceleration of primaries, particularly in California, New York and Florida will give us presidential candidates by next March. She doubts that Obama has the experience to become President or Vice-President this time around. Clinton carries some baggage. In addition, the first woman to be President must be seen as tough, perhaps like Margaret Thatcher.

A year ago Tucker would have said that McCain would win. He may indeed get the backing of the Bush machine, but he is actually running behind Giuliani these days. The conservatives are not happy with him, and Giuliani may well get the nomination. Does Gore have a chance? Possibly, if Clinton fades.

6. The Major Provisions of the Pension Protection Act of 2006: Implications for Pension and Investment Management

Mark J. Warshawsky, Director of Retirement Research, Watson Wyatt Worldwide, made available a paper entitled "The New Pension Law and Defined Benefit Plans: A Surprisingly Good Match."

He began with some quotations from the Wall Street Journal and other sources highly critical of the new PPA. But as the title of his paper suggests, he believes the criticism to be unjustified. Among his conclusions he said the PPA should improve overall private defined benefit (DB) system and make the defined contribution (DC) somewhat more like the DB. The PPA makes automatic enrollment simpler, and provides a safe harbor from a number of tests, including a non-discrimination test. In November 2006 Watson Wyatt surveyed employers on the matters of automatic enrollment, default investments, and Department of Labor (DOL) proposed regulations. From 95 responses, a number of interesting statistics and observations were derived. The median number of funds offered in a primary DC plan is 15, with an average of 23. About one-third of the plans currently have automatic enrollment. The rest have been dissuaded, mainly by the cost and the potential legal liability, but about one-half of these are now considering the possibility.

Nearly all (94%) have a default investment in their plan. Most use it for circumstances when the participant has not made a selection. Other uses are for automatic enrollment, rollovers, or changes in investment options or service provider. The most common current default investment is the life cycle fund (38%), followed by stable value (27%), money market (18%) and balanced (8%) funds. Equity-based funds are more common now for use in auto enrollment (70%) than for other purposes, e.g. employee non-selections (47%). If regulation is put in place as published, 48% will have to change their default fund; 53% are considering doing so. The life cycle fund is first choice of the vast majority (94%) of respondents. Nonetheless, some (34% and 18%) said they were still interested in stable value and money market funds, respectively, if allowed by the DOL. The preference for stable value and money market funds is positively related to the respondent-assessed significance of outflows from plans.

Warshawsky described a simulated investment performance comparing Balanced and Life Cycle funds. The simulation assumes:

- Steady contributions of 6% of earnings over a 40-year career, with earnings starting at \$40,000 at age 25, growing 4% annually thereafter through age 50 and flat thereafter – best case scenario of no plan leakages and continual work profile.
- Stochastic asset real return based on 1960 – 2004 experience; investment expenses are not included.
- Equity/bond/cash mixes of average Balanced and Life Cycle funds in the marketplace.

From this simulation Warshawsky produced a table.

- The table shows distribution of account balance outcomes (inflation-indexed) at the end of career. The overall mean is \$529K for Balanced fund vs. \$515K for Life Cycle; Life Cycle outcome is higher in first two deciles. Balance fund outperforms life Cycle 57.3 percent of the time. But standard deviation for Balanced fund, particularly in the age 55 to 65 period, is much higher than for Life Cycle fund.

Regarding these results, Warshawsky offered the following:

- Other simulations have been done and more are possible. Interpretations are – Life Cycle funds makes more sense for an individual account investor with shortening horizon, but for a longer investment horizon of DB plan sponsor (Balanced fund) gives a higher expected return.

With respect to DC plans, despite DB-like features – automatic enrollment and life cycle default investment, higher allowable contributions for older workers, annuities, and diversification of employer securities – even the best-designed and managed “auto” 401 (k) plans still place risks (of investment, point-in-time annuity purchase price, opt-out, cash-out, etc) on plan participants. DC is not a substitute for a DB plan.

Turning to the implications of the PPA for DB plans, Warshawsky said the average funded status of corporate DB plans in 2005 was 95%, on an ABO basis, according to financial accounting. “Our estimate for 2006 indicates average is above 100% on a PBO basis”. Plan sponsors with an ongoing plan or interested in avoiding complexity probably would want to improve status to around 100% quickly and maintain status going forward to avoid possible

benefit restrictions/maximize future funding flexibility/further reduce volatility. Generally, Warshawsky found there is still hesitancy to significantly overfund plans, however, unless the reversion tax is changed.

The environment should stabilize or improve for DB plans – less scope for future systemic abuses (moral hazard) and more sponsor flexibility and less volatility. The Image of plan participants should improve. The legal and regulatory regime is likely to be stable. PBGC financial situation and prospects improved in 2006.

With respect to the fundamental determinants of optimal investment approach for DB plans, investment policy should include:

- Horizon of plan sponsor, its tolerance for risk and structure of liability.
- For well funded active DB plans sponsored by growing companies, equities have an important role to play.
- The example above and other analysis show that required contributions are less volatile under new law than under old law.
- For older or frozen DB plans, more attention to liability is appropriate; this is consistent with signals sent by the PPA.

Moving now to implications for DC plans, Warshawsky raised the question of whether automatic enrollment would become a significant factor in the DC system. For some plan sponsors, auto enrollment plans are probably more costly and administratively burdensome than other safe harbor plans. We do not yet have enough robust information to judge whether auto enrollment will accomplish the public policy goal of

increased saving for retirement among lower-income workers, given possible opt-outs, and increase in outflows – loans, in-service “hardship” distributions and cash-outs – over time.

Watson Wyatt predicts that with DOL proposed default investments, more plan participants will tune out on investment information/advice, and trade less frequently. Therefore plan sponsor’s initial choice of default investment in 2007 will be critical.

DOL says that its proposed regulation will result in slightly higher equity allocation. There is, however, an already high share of DC investment in equities – 62 percent at the end of 2005 – little in money market, and Life Cycle and Balanced funds allocate a significant share to bonds.

7. Panel: Future Sources of Alpha

The moderator of the panel was Katrina F. Sherrerd, Principal – Strategic Planning & Affiliate Relations, Research Affiliates, LLC, and the panelists were: Chris Brightman, CEO, University of Virginia Investment Management Company, Craig W. French, Partner, Corbin Capital Partners, L.P., and Harinda de Silva, President, Analytic Investors.

Sherrerd ask the panel what is alpha? The panel had some difficulty responding. The simplest definition appears to be excess return over a benchmark. This however begs the question what benchmark? Perhaps some of what we think of as alpha is actually beta, or “exotic beta.” Some would relate alpha to factor exposures, but it may be hard to identify exposures to factors, there are many indexes, and there are compound factors. Brightman commented that the separation of alpha and beta is helpful as a theoretical construct. And it can have practical

application in liquid publicly traded markets. It is not useful in illiquid markets. He commented that the UVA Trustees are not really interested in alpha and beta. They want to compare the total return on their endowment with the total returns on other major endowments.

Sherrerd suggested that alphas start out uncorrelated, but later display correlation. French agreed with this and commented on experience of correlations moving towards one.

Sherrerd asked whether there is a meaningful alpha for an entire multi-asset portfolio. Some questions came in from the participants. One suggestion was that we should continue the use of alpha and beta as distinct measures, recognizing that the alpha depends upon a chosen benchmark. It may be more useful however, to focus on skills and factors.

The discussion turned to future sources of return, not simply sources of alpha. A distinction was clearly drawn between success at identifying discrepancies between intrinsic value and market value of investment vehicles, and perception of opportunities for increased financial or operational efficiency to add value. French and de Silva expanded on this, and de Silva moved on to the issue of whether increasing market efficiency will make alpha achievement more difficult. He judged that adding value, whether it is called alpha or not, is becoming more popular but that changing exposures to different factors will continue to be a source of return. French suggested that taking advantage of under-leveraged balanced sheets remains an attractive source of return. Special situations are likely to persist. There will be plenty of opportunities to be discovered by clever analysts and managers.

Sherrerd asked how do we estimate alpha in advance? This led back to whether the focus should be on improving the value of an enterprise over time through increased efficiency, or on the difference between intrinsic and market value. Brightman went back to the question whether alpha and beta separation is useful or practical. Finding skill in investing is very important, and hence finding the best way to look for skill is important.

8. Demographics and Finances of the Baby Boomers

The presentation by Olivia S. Mitchell, International Foundation of Employee Benefit Plans and Professor at the Wharton School, University of Pennsylvania was based upon the book "Redefining Retirement: How Will Boomers Fare?" edited by herself, Brigitte Madrian and Elizabeth Soldo. The book will be published in the summer of 2007 by the Oxford University Press and the Pension Research Council, The Wharton School, University of Pennsylvania.

The baby boomers form an unusually large cohort of individuals born between 1946 and 1966. The book provides a detailed and thoughtful assessment of how the 77 million baby boomers will fare in retirement. Actually, there are three cohorts of interest today. Those born between 1936–1941, for which we have a study, a second consisting of those born between 1942-1947 (the war babies) for which we have another study, and the early boomers born between 1943-1953, for which we have a study performed in 2004.

It seems that the early members of the boomer generation are better educated, more ethnically diverse and

less likely to be married than previous cohorts. They also have significantly higher earnings, housing values and net worth than their earlier counterparts and they are expected to continue working longer. On the other hand, although boomers are better off than their forebears in terms of wealth levels, this wealth will not be enough to guarantee retirement security. There are important pockets of vulnerability and these appear to be growing.

Health prospects for the boomers are mixed. Boomers are smoking less than their predecessors but obesity is an increasing problem, together with diabetes and self-reported pain. But the fraction of boomers reporting a work disability fell by 11% compared to earlier respondents. A study by two of the three editors of the volume concludes that boomers are in poorer health than their counterparts a dozen years ago. In particular women tend to report worse health (even if they live much longer). The indication is that boomers have poorer self-perceived health than earlier groups, and the fraction of boomers lacking health insurance is reported as slightly higher than for prior generations.

Turning to retirement financing, the discussion coalesces around pensions and private housing equity. There has been a long-term shift from defined benefit (DB) to defined contribution (DC) plans over the past two decades. This means a shift of capital market and longevity risk to workers.

There are substantial differences in stock market investment among workers, depending on their pension characteristics. Employees covered for a long time in a DB plan hold riskier investments outside the pension. But workers with DC plans invest more in the stock market overall. What seems quite significant is that many workers

have little or no idea what they can expect in pension benefits during retirement. One study shows that as many as 1/3 of boomers have not given any thought to retirement prospects even if they are only a few years away. Planning for retirement is positively associated with having more retirement wealth, and this is true across cohorts. Non-planners are concentrated disproportionately among the less educated, those with low income, and households which seem to have been largely unaffected by financial education programs instituted during the 1990s.

The role of home equity in retirement saving is a critical one. Many older persons own their homes and the homes represent a substantial asset. Boomers have more housing wealth than their predecessors but they have borrowed more against their homes. One judgment is that boomers have not acquired enough net worth to keep constant the replacement ratio of net worth to pre-retirement household income. Given boomers longer life expectancies, the result may be that the cohort is worse off in old age. There is evidence that retirees are tapping into their home equity and either spending it or putting it into financial assets.

Turning from reported research to their own judgment, the editors conclude that boomers' expectations about working into retirement may be realistic. They also find that boomers' health capital is about as good as it was for earlier cohorts. However, they see a complex picture. While most boomers are relatively well off, there is much dispersion in the data. In addition, many people are still not planning adequately for retirement, and as a result they are failing to save effectively. Many boomers may be vulnerable to old age shocks and have few resources to cope. Boomers have not shown that

they can adjust their spending patterns to align these with changing circumstances. They have enjoyed lifetime economic prosperity so many have never had to scrimp and save as did their parents and grandparents. Indeed for many, the whole idea of retirement risk management is unfamiliar. Some in the boomer generation have shown a tendency to spend now and worry about tomorrow later, whereas retirees who experienced the great depression are reluctant to part with their savings.

Mitchell turned to discuss some specific issues she felt to be important. Boomers may not understand or appreciate the value of life annuities. Housing assets might be better used for retirement. Many boomers feel housing is something to be sold only in time of crisis, when it might be sold and turned into a life annuity. Especially among those toward the lower end of the wealth scale, education about retirement planning seems urgently needed.

9. Non-Cap Weighted Indexes

Robert D. Arnott, Chairman, Research Affiliates, LLC and Clifford S. Asness, Managing Principal, AQR Capital Management, LLC, engaged in what some might call a discussion and others a debate over the use of fundamental indexes as a substitute for market weighted indexes.

Arnott began the session with a comparison of the performances of capitalization weighted averages (the S&P 500 being an obvious example) with returns on the same sets of stocks weighted by fundamentals. The fundamental index funds offered by Research Affiliates make use of measures including sales, book value, cash flow, and dividends in place of capitalization for weighting. Arnott showed the substantial superiority in

annual rates of return and annual alphas for various factor weightings. In general, it seemed fair to say that he relied primarily on value characteristics for weighting. His time periods included various decades, bull markets and bear markets, and he made use of the S&P 500 and Russell indexes, as well as foreign and international indexes.

Asness responded that he had no quarrel with the superior performances of indexes tilted toward value. His dispute with Arnott rested on the manner in which Arnott characterized the use of fundamental indexes. In short, Arnott appeared to him to be claiming that his fundamental indexes were something of a new invention, when, Asness argued, value tilts and their superiority had been known and demonstrated for a long time. Arnott's position is that he has gone well beyond a simple value tilt in devising his fundamental indexes. Little was said at the seminar about the ease with which Arnott's fundamental indexes can be traded as ETFs. This makes them especially attractive to those who like the weighting scheme.

Questions were raised about turnover and while Arnott agreed that there is more turnover with the fundamental index than with the cap-weighting index, he said the difference is not great enough to affect seriously the superiority of returns. It was not entirely clear how the maximum size of trades might differ between the fundamental and cap-weighted indexes. In any case, Arnott took the position that the fundamental index would be a useful benchmark against which to judge manager performance.

No vote was taken as to who might have prevailed in the debate.

10. Alpha Migration: Issues and Consequences

Richard Michaud introduced Andrew B. Weisman, Managing Director, Hedge Fund Development, Merrill Lynch, noting that he had spoken before, at the Q-Group® Spring 2001 seminar. Weisman and Sandeep Patel, Portfolio Analytics, Merrill Lynch, made available a draft paper entitled "Chasing Your Tail", co-authored by Anil Suri. In their abstract, the authors comment that they focus on the development of a portfolio construction framework that integrates intuition with relevant financial engineering in the presence of tail events (particularly left tail events) and short track records. The first framework they deal with accommodates non-normality, extreme co-movements, and drawdown related risk measures. The second framework addresses additional issues pertinent to hedge fund investments: short and unequal track records, illiquidity, estimation error and the absence of meaningful priors on return distributions. They believe these frameworks represent a significant advance beyond the original Markowitz Mean-Variance Optimization.

However such procedures are highly data dependent and frequently do not provide adequate guidance on the estimation of future loss distributions – a significant limitation in the presence of "peso problems". To better understand this issue they discuss sources of hedge fund "alpha" that often lead to significant negative returns, and develop a simple intuitive framework to estimate future loss distributions. Their analysis shows that expected losses are directly related to the magnitude and propensity of observed gains. Finally, they show the efficacy of their simple framework in

predicting drawdowns against a broad range of hedge fund strategies and equity markets.

Weisman identified a number of advances in portfolio construction analytics. To deal with non-normality, we can estimate marginals by kernels. For tail correlation, we can use the t-Copula methodology. For estimation error, we can do resampling. There are relevant risk measures for drawdown. An extension of Black-Litterman to a non-normal market can be helpful. To deal with the absence of priors, unequal history for managers and illiquidity, he referred to Kullback-Leibler, Masking Technology and a Barrier Option model.

The paper describes these conditions and goes into some detail with respect to ways of dealing with them. A particularly interesting exercise is the simulation of returns for managers with unequal track records. He showed a histogram of the observed returns history of manager 1 for 84 months, and another for the observed returns history for manager 2 for only 24 months. Using semi-nonparametric resampling, the authors created a set of simulated returns as a guide to future performance. The results were consistent with the empirical intuition that even though manager 2 had a lower observed volatility it had to be "handicapped" because of its shorter history.

To deal with non-normality in hedge fund indices, the authors analyzed quarterly index-level hedge fund returns using a wide variety of distribution functions, and showed the results for 7 types of hedge fund indexes. What was particularly interesting was the extension of left tails in the distributions. Referring to sources of tail risk in hedge fund returns, they noted that the first and most obvious reason is that the

instruments hedge funds hold and trade exhibit tail risk. Two other sources are illiquidity and short optionality. A graph of weekly returns for a variety of traded commodities over 20 years ending January 2007 showed that each of the major traded commodities had exhibited a 5 sigma or higher weekly return event, and in certain cases 20 sigma or even higher.

A particularly interesting problem shows up in the presence of reasonable doubt as to the "appropriate value" of an illiquid security at a specific point in time. Weisman showed a smoothing algorithm that can lead to significant valuation disparities. When a manager's smoothing results in too obvious an overvaluation in the portfolio, investors tend to demand capital back. At the same time, prime brokers tend to react by demanding the sale of some or all of the portfolio, or by restricting or withdrawing financing for leveraged investments. In either case, a sudden forced liquidation of potentially highly illiquid securities is triggered. The authors presented a simple barrier option model to capture this economic behavior and then analyze the necessary adjustment to forward-looking estimates of returns.

The authors examined a third source of tail risk by noting the similarity in the return profiles of hedge funds and simple options-based strategies. It is not entirely evident why investors are attracted to hedge fund strategies that produce return outcomes with significant left tail skew. To better understand this, the authors structured what they referred to as the Alpha Transfer Experiment between two simple investment strategies: long and short option positions. Briefly, at the beginning of each month manager 1 sells an out-of-the-money call option on a common stock which expires at the end of the month, while manager 2 buys

the same call option at the same price. The underlying stock price paths are generated using Monte Carlo simulation assuming geometric Brownian motion. Three cases are examined: where the option is over-valued, when it is fairly valued, and where it is under-valued. In the first case, alpha is transferred from manager 2 to manager 1; in the second there is no alpha transfer, and in the third it is transferred from manager 1 to manager 2. Each of the three transfers are repeated for ten years, and the results are rather interesting. For a constant level of alpha, manager 1 does better than manager 2, although all the investors in manager 2 do better than the investors in manager 1. This is because the short option strategy maximizes incentive fees for a given skill level, that is for ability to generate alpha. So fund managers are economically incented to prefer short option strategies even when the underlying options are underpriced. These findings, the authors conclude, go a long way to explain why the hedge fund industry tends to exhibit such a pronounced left tail skew as a broad range of investment processes pursued by hedge fund managers generate option-like payoffs.

The paper continues, to deal with the periodically efficient market, a binomial loss model to estimate future loss potential, and particularly tail loss potential.

In conclusion, the inability to adequately parameterize asset returns based on historical data is not a new problem. The peso problem is a good example of the danger in using historical returns to calibrate a risk/investment model. The paper examines sources of the peso problem in the context of hedge funds, suggesting a simple and direct method to estimate unobserved tail losses that arise as a result of the peso problem and shows

the efficacy of this method in estimating potential tail losses for hedge funds and equity markets.

11. Extreme Bound Analysis

Benson Durham, Chief, Monetary and Financial Market Analysis Section Federal Reserve Board, worked from slides entitled "Stock Market Anomalies and Model Uncertainty." Extreme Bound Analysis (EBA) he proposed as a way to deal with model uncertainty. In explaining the motivation for EBA, he turned to the logic of scientific discovery. Model uncertainty is real. We generally want to build into a model what has already been explained in preceding versions, plus something new. EBA is designed to increase the information set as much as possible in a model, so that when we are given a set of possible factors, χ , we run M models following

$$Y = \alpha_j + \beta_{zj}z + \beta_{fj}f + \beta_{xj}x_j + \varepsilon$$

Where

Y is the dependent variable.

z is a "doubtful" variable of interest in χ .

f is the set of "free" variables.

x is an n -factor subset of χ .

Now we must decide whether to keep or reject the doubtful variable z . A traditional rule is the following:

- A. Given M estimates of β_{zj} and σ_{zj} , the "traditional" rule (Leamer, 1983) is:
 1. Upper Bound: $\beta_{zj} + 2\sigma_{zj}$
 2. Lower Bound: $\beta_{zj} - 2\sigma_{zj}$
 3. The upper and lower bounds must have the same sign.

Another decision rule is:

B. The “R2” Decision Rule
(Granger and Uhlig, 1990):

1. Create a subset, MR2, of the M regressions that satisfy

$$R_{zj}^2 > \alpha R_{MAXIMUM}^2$$

where $0 < \alpha < 1$

2. The extreme bounds among the MR2 regressions must have the same sign.

And a third is:

C. The “CDF” Decision Rule
(Sala-i-Martin, 1997):

1. Weight each β_{zj} and σ_{zj} by overall fit (R_{zj}^2), as in

$$\hat{\beta}_z = \sum_{j=1}^M \left(\frac{R_{zj}^2}{\sum_{i=1}^M R_{zi}^2} \right) \beta_{zj}$$

Still another approach is to avoid decision rules and cite the confidence interval.

$$\hat{\sigma}_z^2 = \sum_{j=1}^M \left(\frac{R_{zj}^2}{\sum_{i=1}^M R_{zi}^2} \right) \sigma_{zj}^2$$

He turned next to next to the CAPM, observing that there are dozens of empirical violations of the CAPM, but there is no consensus on specification. Fama and French (1992) proposed a three-factor model. Durham proposed using EBA.

His first example made use of 16 Emerging Market indexes, 14 factors, and the time period March 1988 - January 1995. None of the 14 factors was robust to traditional criteria. Two, plus another one when lagged, passed the CDF decision rule. When he went to a model of developed market anomalies, with 16 indexes, 15 factors, and the time period May 1984 - March 1999, and applied the EBA, all of the factors were rejected. Two were robust to the traditional criteria, and 3 passed the CDF decision rule.

Next, working with 32 indexes, and 15 factors, for December 1986 - December 1998, one factor, the total return on the world (MSCI) equity index, survived the EBA test. Five factors were robust to the traditional criteria, and one passed the CDF decision rule.

Finally, he showed the results of applying EBA to the cross-section of the NYSE, the AMEX, and NASDAQ with 23 factors, from July 1963 - December 2000. No factors passed the EBA test. Three variables passed the traditional criteria and 3 passed the CDF decision rule.

He continued with a discussion of strengths and weaknesses in the EBA approach. First he explained that EBA is not “data mining” and that it does not “waste information.” At the same time the EBA says nothing about “economic significance,” does not deal with statistical significance and transaction costs, and cannot bridge economic theory and empirics.

He suggested some improvements to EBA:

1. Identify problematic specifications: Under what conditioning assumptions are results fragile?
2. Incorporate indicators of multicollinearity
3. Modify the set of “free” variables, f

He suggested that it would be useful to determine which particular factors in χ produce the extreme bounds of z . And he suggested looking at the subsets of the estimates that include each element of χ . Looking at results over sub periods may also be helpful since

the importance of factors may well be changing over a long period.

Multicollinearity can clearly be a problem, and he discussed the significance of collinearity and ways to deal with it. He pointed that if a “doubtful” variable turns out to be robust to even the most stringent EBA criterion, problems remain. Other sensitivity analyses are critical, for parameter stability, alternative proxies, and simple economic logic. He turned specifically to a variable representing the anticipated stance of monetary policy. Earlier sub samples produced robust results, but more recent data and cross-sectional evidence suggest fragility. Economic logic tells us that unanticipated policy changes should be important. So an unexpected interest rate change may be important, while an anticipated change or level may not be. Clearly his work is an ongoing process.