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CONFERENCE SUMMARIES

Harry M. Markowitz, Harry Markowitz Co.,
Keynote Speaker
Consumption, Investment and Insurance in the Game of Life

The present paper amplifies on a proposal in Markowitz (1991) which argues that financial decisions for the individual or family should be considered as part of the "game as a whole" which the individual or family plays out. Even reducing this game to its essentials, it is surely too complex to solve analytically, therefore requires computer simulation to think through. The object analyzed is the nuclear family consisting of an unattached individual, a couple, or a family with children and perhaps a residing elder. Typically in the course of events, the residing elder (if any) dies or is placed in a nursing facility; the children leave home to set up their own nuclear families; the original family then consists of husband and wife. One spouse dies; one survives. When the remaining spouse dies the subject family's wealth is distributed to heirs and charity, and the game of life is over for the subject family. We look to a Rational Decision Making (RDM) economic unit for guidance for recommended behavior, rather than describing a real (perhaps dysfunctional) family unit.

Kenneth Blay, 1st Global,
Speaker
Individual & Institutional Investment Management Issues

Tax-Cognizant Portfolio Analysis (TCPA): Maximizing the After-Tax Utility of Wealth. The most prominent methods of incorporating taxes in the portfolio construction process are the preliminary adjustment of asset allocation inputs for taxes and the post-optimization application of asset location heuristics. We argue that these methods are unsatisfactory in that they fail to address the dynamic nature of taxation. In this paper we present Tax-Cognizant Portfolio Analysis (TCPA) as a methodology that addresses taxation dynamics in seeking to maximize expected after-tax wealth. Rather than maximizing end-of-period wealth, TCPA focuses on maximizing the wealth an investor can ultimately consume over a lifetime based on specific investing and wealth consumption decisions. This is accomplished through the

simulation of after-tax wealth consumption cash flows from asset class investments held within taxable, tax-deferred, and tax-exempt accounts. The averages, standard deviations and correlations of the present values of cash flows from a series of simulations are then used as inputs for a mean-variance optimization. The benefits of applying TCPA relative to traditional mean-variance approaches using unadjusted inputs are notable with the greatest improvements in after-tax wealth outcomes generally occurring in the lower-risk segments of TCPA efficient frontiers.

The results of the research presented in this paper have practical significance to investors who seek to maximize after-tax wealth. We contribute to asset allocation literature in three key areas. First, we detail the TCPA methodology that effectively incorporates the dynamic impact of taxation into the process of constructing portfolios that seek to maximize after-tax wealth. TCPA creates tax-cognizant efficient frontiers by simultaneously identifying the approximately optimal allocations to asset class investments and the location of those investments across account types with different taxation characteristics. Second, the lognormal distribution of present value outcomes necessitates that tax-cognizant portfolios be presented using different, more intuitive, risk and return metrics for portfolio selection. We propose the use of cash flow-confidence efficient frontiers that allow investors to select portfolios that maximize expected real after-tax periodic cash flows for a given probability of achieving those cash flows. Finally, because the impact of taxation is dependent on the length of the investment horizon and the timing of taxation events we suggest the use of dynamic portfolio glide paths that balance tax efficiency with the risk of not achieving desired after-tax wealth outcomes. Two specific glide paths are proposed: constant confidence and increasing confidence. An opportunistic approach that allows investors to opportunistically select cash flow-confidence portfolios over time as market conditions change is also suggested.

Sanjiv Das, Santa Clara University,
Speaker
Social Network Modeling in Finance

The presentation comprises three parts.

The first part of the presentation introduces basic network theory concepts. We start with understanding two types of graphs: *random* and scale-free. The former type is more robust and less susceptible to contagion, whereas networks that are scale-free and resemble a hub-and-spoke type network allow contagion to spread rapidly. From a practical standpoint, the fact that most financial networks are *scale-free* suggests we live in a world plagued by contagion—financial distress is hard to contain.

Another important concept is *eigenvalue centrality*. Using the adjacency matrix that represents the entire network we can compute which nodes are the most critical, i.e., the failure of which might bring down the entire network. *Fragility* is another metric we compute that is the ratio of mean node degree squared divided by mean degree (degree is the number of connections of a node). Fragility is computed for the network and if greater than 2 implies a network that is fragile, which is important as well for it summarizes network risk and also allows a comparison between networks that are fragile and those that are not, but it also allows gradation of networks based on their fragility score. We also compute clusters of nodes in a network that engage in heavy interaction compared to other nodes outside the cluster, and these are denoted as *communities*. This allows us to test whether there is something special about within community interaction versus across community interaction.

The second part of the talk presents an analysis of the interbank lending network. The network

is derived from text mining hundreds of loan filings with the SEC, parsing out the details of the loan from several pages of loan documentation. These loans are then used to populate an adjacency matrix and the centrality score of various banks is computed. The ranking of these banks by centrality has a very important practical use under the Dodd-Frank Act, i.e., the ranking of firms by their level of systemic risk to identify SIFIs (systemically important financial institutions). Fragility, centrality, etc., are computed for five years including the great 2008 recession and the critical banks are easily identified.

The third part of the talk analyzes thirty years of data comprising more than 400,000 financing rounds from which a network of venture capitalists is constructed. This network is subjected to a community detection algorithm that designates communities for every rolling block of five years. Communities seem to be formed by VCs that are similar on style (industry, geography, stage) but community VCs differ a lot in their age and influence, measured by assets under management. Overall, the practical significance is that VCs should have a small group with whom they repeatedly interact (communities). Community funded startups perform better than those not funded by community VCs in terms of the likelihood of an IPO, the time to exit, and the ability to get follow-on financing.

Russell Fuller, Fuller & Thaler
Asset Management,
Speaker
In Search of a Better Alternative Index

Based on several very strong assumptions, Sharpe (1964 *JOF*) and Linter (1965 *RES*) show that the ex ante cap-weighted Market Portfolio will lie on the *ex ante* efficient frontier, and a corollary is all stocks are correctly priced *ex ante*. These assumptions are essentially: (1) all investors hold the same expectations regarding a stock's expected return over some future time period, (2) all investors have unlimited ability to borrow and lend at the risk-free rate, and (3) stocks can be traded without frictions and costs.

Of course, these assumptions are not literally true and, as a result, over any specific *ex post* time horizon some stocks will be mis-priced, the stock market will not be perfectly (efficiently) priced and the *ex ante* dcap-weighted Market portfolio, by construction, will be over-weighted in the "losers" and under-weighted in the "winners", resulting in the *ex ante* Market Portfolio plotting below the *ex post* efficient frontier. The question is "how much" does the mis-pricing amount to? Fuller, Han & Tung (2012 *JOIM*) develop one method of measuring "how much" and find in the large-cap sector (defined as the top 1,000 US stocks by market value) the maximum total mispricing averaged about 6–7% of that index's value on an annualized basis. If one can construct an index that has less mis-pricing *ex ante*, that index will provide better *ex post* results than cap-weighted indexes.

Thus, considerable effort in recent years has gone toward developing indexes that may be superior to cap-weighted indexes—these are typically called "alternative indexes," and also "alternative beta indexes". Chow *et al.* (2011 *FAJ*) empirically examine seven of the more commonly proposed "alternative indexes" and conclude that "Fundamental Indexing (FI)" and "Mean Variance Portfolios (MVP)" provide the best return/risk tradeoffs, both of which are superior to conventional cap-weighted indexes. In this paper, we suggest a new alternative index that is based on the notion of: (1) using the variable that is commonly taught in security analysis courses to be the single most important fundamental variable in determining the price an investor should be willing to pay for a stock—the stock's ROE; and (2) using the optimization techniques used in forming MVP portfolios to form a portfolio

that provides the minimum variance of ROE. It turns out that this portfolio (MV(roe)P), has superior risk/return characteristics to all of the alternative index portfolios examined in Chow *et al.* (2011 *FAJ*). Thus, (MV(roe)P), should be considered as one of the major alternative index strategies that has superior risk/return characteristics compared to traditional cap-weighted indexes.

Lawrence E. Harris, University of Southern California,
Speaker
Maker-Taker Pricing Effects on Market Quotations

Maker-taker pricing is an exchange pricing model in which active traders who submit market orders that "take" liquidity pay an "access fee" and traders who submit resting limit orders that "make" liquidity receive a rebate when they are executed. In the US, the typical access fee is just under 0.30c/share and the typical liquidity rebate is 0.25c/share.

Under maker-taker pricing, net spreads to takers are equal to quoted spreads plus the twice the access fee. For example, if the access-fee is 0.3 cents and the displayed bid price is $10.00, the net bid price is $9.997 because the marketable sell order will not receive the $10.00 displayed bid price, but rather the displayed bid price less the 0.3 cent access fee. Likewise, if the displayed offer price is $10.01, the true offer price is $10.013 as a marketable buy order will pay the $10.01 offer plus the 0.3 cent access fee. Thus, the net bid-ask spread is 1.6 cents rather than the quoted one cent, or 60% larger than is apparent.

This pricing scheme affects the incentives to supply liquidity in tight markets. In particular, traders who believe that value is at $2.00 would not be willing to buy or sell at that price without the liquidity rebate but they might be willing to bid or offer at that price with it. It likewise affects the incentives to take liquidity: Traders willing to buy or sell at $2.00 without access fees may not be willing to buy at $2.003 or sell at $1.997 with the access fees.

This study examines quote and trade dynamics to trace the effect of maker-taker pricing on stocks for which these fees and rebates are a significant fraction of the quoted spread. The analyses consider distributions of quotation sizes, values implied from these sizes, and changes in these sizes and values.

The results help inform the current debate on whether tick sizes should be made smaller for actively traded low price stocks. They also shed light on various problems associated with maker-taker pricing and its cousin taker-maker pricing, which allows traders to engage in sub-penny quotation behavior that legally violates the spirit of Regulation NMS.

Seoyoung Kim, Santa Clara University,
Speaker
Designed for Failure? Risk-Return Tradeoffs and Risk Management of Structured Investment Vehicles

In recent years, structured finance has emerged as an increasingly important means of transferring risk and obtaining access to capital. With the demise of the structured investment vehicles (SIVs) used to operationalize these deals, a natural question arises as to whether the risk controls and overall security design were sufficient to ensure promised repayment to senior note holders with AAA-level certainty. In this paper, we develop a model of SIVs in a parsimonious setting, and we explore, based on standard SIV parameters, whether these deals were structured in a way that was likely to provide safe returns to senior note holders in the SIV. In particular, we examine the implications

of the risk-management features of structured deals, whereby the risk controls, capitalization, and rollover horizon interact to determine the expected losses to the senior tranche of the SIV.

This paper explores a heretofore unattended aspect of structured investment vehicle design, specifically, the effect of risk controls on the quality of tranches issued by the SIV. We show that tranche ratings and risks are extremely sensitive to the primary form of risk control—leverage constraints mandated by the SIV—which if violated, lead to defeasance, i.e., early termination of the vehicle, and a fire sale of the SIV's assets. Paradoxically, tighter risk controls can increase the expected losses of the senior notes because the probability of defeasance increases sharply when leverage controls are tightened, making the senior notes more likely to lose value. This effect is more pronounced under greater fire-sale discounts.

Overall, we find that for many standard SIV parameters, these vehicles were designed to fail, and they require careful restructuring in order to provide safe returns to senior note holders. Our findings, thus, provide normative prescriptions as to the risk management of structured deals, whereby small changes to risk control level (i.e., the leverage ratio threshold) can cause large changes to the riskiness and value of the senior tranches, and thus, the rating achieved by these notes.

Martin Leibowitz, Morgan Stanley,
Speaker
Duration Targeting and Yield Convergence

Many bond portfolios are managed so as to maintain a roughly constant maturity or duration. As rates move over time, the price losses (or gains) in such "Duration Targeted" portfolios will be offset by higher (or lower) yield accruals, so that the annualized returns converge back towards the original yield values over horizons that are only modestly longer than the targeted duration. Moreover, even though adverse movements can prove painful in the interim, this convergence will occur largely regardless of the long term path of interest rates.

This convergence effect can be viewed as either good news or bad news depending on the investor's level of comfort with the prevailing rate structure.

In asset allocation studies, these results suggest that the long term volatility of bonds will be far lower than that predicted by the standard square root of time. A corollary result is that the bond component may have to be surprisingly large and/or have quite a long duration to materially diversify a portfolio away from the overriding role of its equity exposure.

For investors in the municipal market with its more consistently positively shaped yield curves, the longer term returns converge to the "rolling yield"—the hypothetical one year return derived by rolling down a static yield curve. With positive curves, this rolling yield is generally larger than the portfolio's average yield.

Retail investors in the municipal market often rely on so-called "ladder portfolios" with approximately comparably-sized investment in maturities spaced one year apart. As the shortest bond matures, the proceeds are reinvested into a new "top-rung bond" corresponding to the original ladder's longest position.

As in the general case, the convergence process drives the long term return towards the ladder's average rolling yield. However, for the very special case of the ladder portfolio, this average rolling yield can be shown to be the standard yield of the top-rung bond. For positively

sloped curves, this top-rung yield—which serves as the long term convergence target—may be significantly greater rather than the standard average yield of the ladder's component bonds.

The typical bond ladder will have positions that run from one year up to the top-rung maturity. However, one can also envision ladder segments in which the bottom rung is higher than one year, with the bottom rung being sold each year and the proceeds reinvested into a new top-rung bond. With certain yield curve shapes, it turns out that such a ladder segment may have even greater average rolling yields than the corresponding traditional ladder.

Terrance Odean, University of California Berkeley,
Speaker
What risk factors matter to investors? Evidence from mutual fund flows

Multi-factor-models such as the Fama-French 3-factor model and the Fama-French-Carhart 4-factor have become popular in both the academic literature and the practice of finance. These models fit cross-sectional equity returns better than the 1-factor Capital Asset Pricing Model. There is, however, controversy about whether the higher returns earned by small firms, high book-to-market firms, and high momentum firms are compensation for risk or the result of persistent mispricing.

When selecting an actively managed equity fund, investors seek to identify fund managers who are able to generate positive risk-adjusted performance (alpha). To assess risk-adjusted performance, investors must apply a model of risk when ranking funds; thus, we can infer the risk model that investors use by the fund choices that they make. Based on this observation, we analyze the sensitivity of fund flows to alphas calculated using competing models of risk: market-adjusted returns, the Capital Asset Pricing Model (CAPM), the Fama-French three-factor model (which adds size and value factors), and the Carhart four-factor model (which adds a momentum factor). We first find that the CAPM-based alpha better explains fund flows than the three- or four-factor alphas. We then decompose fund performance into five categories—(1) four-factor alpha and returns that can be traced to the (2) market (beta), (3) size, (4) value, and (5) momentum tilts of the fund. We find that investors are most sensitive to a fund's alpha. Fund returns that can be traced to size, value, or momentum are discounted, but not much (with sensitivities ranging from 67–84% of that observed for alpha). However, fund returns that can be traced to the market beta of the fund are heavily discounted (with a sensitivity less than 25% of that observed for alpha). These results indicate that mutual fund investors care about market risk when evaluating mutual funds, but most do not treat factor returns as compensation for risk when evaluating the performance of actively managed mutual funds.

If investors do not see factor returns as compensation for risk, how should those who manage money on behalf of investors treat factor returns? As risks or opportunities? Should factor returns be discounted by plan sponsors when evaluating money management performance?

Jack Treynor, Treynor Capital Management,
Speaker
The Level of Demand a Country Can Afford

Textbooks recognize the importance of demand failure; a very different problem textbooks don't recognize is limits on the level of demand a country can afford. There are two limits: inflation: cost of product and a trade deficit: excess of imports

over exports. Both limits require a different kind of plant investment. Policy makers need to know which limit is binding, hence which kind of plant their country needs—preferably before the problem gets too big.

They also need to understand how to encourage the appropriate investment. Because it reduces plant capacity, failure to save and invest results in chronic trade deficits, chronic inflation, or chronic unemployment.