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The RJR Associates Approach to Portfolio Construction

The purpose of this paper is to outline how we structure financial portfolios to achieve our clients' investment objectives. The fundamental principle that forms the basis of all our decisions is that capital markets work. This principle means that all of our decisions are about trying to apply the science of capital market behavior gleaned from the literature to the investment problem; it is not about identifying short-term market trends, prescient managers or incorrectly priced assets.

Some of the Science of Capital Market Behavior

The Separation Theorem

It is straightforward to prove that in a well-functioning market that includes a single risk-free asset and many risky assets that there are two separate and distinct steps to construct an optimal portfolio for any particular investor. This result is the so-called separation theorem. The two steps to constructing an optimal portfolio are to first develop a portfolio of risky assets and second, to combine that risky portfolio with the risk-free asset to maximize the investor's utility for trading-off risk for expected return. Additionally, in a well-functioning capital market it can be shown that the risky portfolio would be identical for every investor regardless of their utility function; it is only the relative percentage of the risk-free asset that is unique. This is the separation theorem: the construction of a portfolio of risky assets is separate from developing a portfolio to optimally meet the needs of a specific investor. And, the RJR Associates approach to constructing financial portfolios for our clients is based on this theorem.

The Risk-Free Asset

To apply the separation theorem to our work, we consider a well-diversified portfolio of fixed-income securities as a risk-free asset. Of course we acknowledge that fixed income assets bear both interest rate risk and credit risk. However, oftentimes we construct fixed-income portfolios to reflect only interest rate risk, opting not to bear any credit risk in the equity portfolio. Additionally, depending on the investor's time horizon and need for liquidity, interest rate risk can be minimized with a "laddered" portfolio of U.S. Treasury securities (duration matching). Typically, notwithstanding any unique cash flow needs of the client, the fixed-income portfolio will bear the interest rate risk of the domestic bond market. Fixed-income portfolios that bear both interest rate risk and credit risk will consist of an index fund designed to replicate these risks inherent in the domestic bond market at the lowest cost, or a portfolio of U.S. Treasury securities that bear the market level of interest rate risk combined with a conservatively managed portfolio of high-yield corporate debt securities. Once we construct the fixed-income portfolio it is viewed as a risk-free asset in our implementation of the separation theorem.

Our approach to the fixed-income portfolio is conceptually consistent with others that share our investment philosophy. We are all seeking some proxy for the risk-free asset and assume that proxy to be a low-cost passively managed portfolio of fixed-income securities.

The Optimal Portfolio of Risky Assets

The optimal portfolio of risky assets is one that maximizes the so-called "Sharpe Ratio." The Sharpe Ratio, named after the Nobel Prize winning economist William F. Sharpe, is the ratio of a portfolio's expected return minus the risk-free rate divided by the portfolio's risk. This optimal portfolio, which would be identical for every investor, is constructed by including various assets until the Sharpe Ratio is maximized. We don't need to know anything about the particular investor/client to construct this portfolio. What we need to know is the expected return, risk and correlation matrix for a given investment opportunity set. Therefore, the first problem to constructing the optimal risky portfolio is to identify the investment opportunity set.

Our Implementation Strategy

The Investment Opportunity Set

Conceptually, the investment opportunity set is all the risky assets in the world. Of course, finding the input variables for this investment opportunity set is impossible. This task is simplified considerably by constructing asset classes from all the risky assets in the world. An asset class can be thought of as a portfolio that includes those assets in which the returns are correlated with one another. Thus, identifying input variables for these asset classes and putting them through some optimization program becomes more practicable. Once the investment opportunity set is identified and the input variables determined, the rest is a straightforward quantitative exercise.

At RJR Associates, as a first pass we reduce all the risky assets in the world to just three asset classes – (1) domestic large-cap stocks, (2) domestic small-cap stocks, and (3) international equities. Furthermore, we don't put these asset classes into a single optimization program. Our methodology is to start with a single asset class and look to add a new asset class to the extent it makes the two-asset portfolio optimal. The resulting two asset portfolio then becomes a single portfolio to which we add a third asset class until the resulting portfolio is optimal. We can then use this same procedure with any new asset class. Additionally, it allows us to define an asset class (i.e. an asset class is one that when added to an existing portfolio improves its Sharpe Ratio). While most approaches follow some form of constrained optimization process, it seems more realistic to look to add new asset classes one at a time versus considering all potential asset classes in one fell swoop.

To determine the input variables for each asset class we use historical data from benchmarks that are generally used as a proxy for our three asset classes. Our optimal portfolio based on our three asset classes and variables developed from the corresponding benchmark is as follows:

Asset Class	Market Benchmark	Current Optimal Weighting
Domestic Large cap stocks	S&P 500	36%
Domestic Small cap stocks	Russell 2000	24%
International equities	MSCI EAFE	40%

So, our investment opportunity set is simply these three asset classes. We use the past results of the corresponding benchmarks as the input variables necessary to construct the optimal mix among these asset classes. Furthermore, this optimal portfolio becomes the base portfolio to determine the value provided by any new asset class. In other words, a new asset class is added if by its addition it improves the Sharpe Ratio of the current optimal portfolio. It is very straightforward to implement the single risky portfolio for all RJR Associates' clients by using readily available Index Funds to replicate each of the three asset classes. An extension of this optimal portfolio, which forms the basis of much of our work, is to reduce the risk of the optimal portfolio to match that of the S&P 500 by adding an appropriate commitment (currently 6%) to the money market.

From Index Funds to Asset Class Investing with Structured Portfolios

The goal of moving from Index Funds to Asset Class investing is to achieve a better representation of each of the three asset classes used in the construction of the optimal risky portfolio. It is not a search for additional asset classes. For example, the S&P 500 is not the domestic large-cap stock market – it is simply a popular proxy for that market. So, we look to include segments of each broad asset class as a way to improve the risk/expected return characteristics (Sharpe Ratio) of our commitment to that asset class. Dimensional Fund Advisors (DFA), a large investment management company that is dedicated to the idea that capital markets are efficient and several independent risk factors describe worldwide returns, provide the opportunity to use several funds that reflect a particular market segment and thereby improve the characteristics of our asset class portfolios. We use our one-segment-at-a-time methodology and add to an S&P 500 Index Fund, a fund that includes those stocks in the domestic large cap market with a greater than average book-to-market ratio and a fund that includes REIT portfolios that are traded in well-functioning markets. Using the same methodology we seek to improve the Sharpe Ratio of the Russell 2000 by adding to the domestic small cap asset class a commitment to a portfolio that includes those small cap stocks with a greater than average book-to-market ratio and a portfolio that includes the smallest 20% of traded common stocks. Finally, we seek to improve the EAFE's Sharpe Ratio by adding to a portfolio of international large cap stocks a portfolio of international large cap stocks with a higher than average book-to-market ratio, then a portfolio of international small cap stocks and finally a portfolio of common stocks traded in international markets. The follow portfolios result:

Domestic Large Cap Market		Domestic Small Cap Market		International Equity Market	
Total Large cap	36%	Total Small cap	28%	Large cap	23%
High book-to-market	34%	High book-to-market	33%	High book-to-market	26%
REIT market	30%	Micro cap	39%	Small cap	18%
				Emerging markets	33%

It is the structured DFA portfolios that provide the investment opportunity set to improve the Sharpe Ratio of each of the three broad asset classes. Recent returns, correlations with market benchmarks and the corresponding Sharpe Ratios of each of the benchmarks and the improved portfolio are presented in the following table (returns are for periods ending December 31, 2009):

Market/Asset Class	Quarter	One Year	Three Years	Five Years	Ten Years	Correlation Coefficient	Sharpe Ratio
Large cap stocks	6.2%	29.6%	-8.1%	0.9%	4.8%	0.85	0.21
Small cap stocks	2.9%	32.1%	-7.6%	-0.1%	7.2%	0.98	0.20
International equities	3.3%	51.1%	-1.1%	8.8%	8.4%	0.86	0.20
Benchmarks							
S&P 500	6.0%	26.5%	-5.6%	0.5%	-0.9%		0.20
Russell 2000	3.9%	27.1%	-6.0%	0.6%	3.6%		0.16
EAFE	2.2%	32.0%	-5.6%	4.0%	1.6%		0.07

Note: The results presented above for the various asset class portfolios are based on actual returns of those DFA Funds that reflect the market segments outlined in the preceding in the appropriate percentages. These returns are after the fees/expense ratios of each fund and, on a weighted average basis, are approximately 0.33%. The benchmark returns are before any fees. This data is presented to show the long-term relationships between returns and investment risk of the pro forma portfolios. It is not intended to present performance results experienced by clients of RJR Associates. Also, the reader should recognize that future investments would be made under different economic conditions. It should not be assumed that you would experience returns, if any, comparable to those shown above. The information given is historic and should not be taken as any indication of future investment results.

The Role of Exchange Traded Funds (ETFs)

In our view ETFs were developed as a way for brokerage firms to earn fees even after the actively managed products they provide are exposed to be suboptimal. These firms earn a fee for structuring the ETF and for trading the product. The underlying objective of the brokerage firms sponsoring the ETF notwithstanding, there may be some value afforded investors in ETFs. This value can come from two sources: (1) the opportunity to better manage the incidence of taxation, and (2) the opportunity to add a market or a market segment to improve the established risky portfolio. We have substituted ETFs for various DFA funds where taxes are important.

Summary

While quite robust, our initial application of the separation theorem was primarily ad hoc. Our risky portfolio was not developed from a rigorous analysis of past data, nor was our fixed income portfolio always structured and thought of as risk-free. Yet, the model portfolios that resulted provided the opportunity for clients to match a desired level of risk to what capital markets allowed as well as produced an ability to communicate to clients in a simple, straightforward and understandable way. Our first extension of our initial model portfolio approach was to better separate the construction of the risky portfolio from the decision to allocate funds to the fixed-income portfolio. While this extension did provide analytical rigor, it did not change significantly the risk/expected return characteristics of our model portfolios. Our next extension was to improve the risk/expected return characteristics of each market benchmark by adding commitments to various structured DFA portfolios. This extension did produce a material improvement in the characteristics of each model portfolio as shown in the following table (periods ending December 31, 2009):

Risk profile/Alternative	Quarter	One Year	Three Years	Five Years	Ten Years
Conservative*	1.0%	11.6%	3.9%	4.9%	5.6%
Additional Markets**	0.8%	9.6%	4.7%	5.4%	6.9%
Moderate*	1.8%	16.2%	1.6%	4.3%	4.6%
Additional Markets**	1.7%	17.6%	2.6%	5.4%	7.2%
Aggressive*	2.5%	20.7%	-0.9%	3.6%	3.5%
Additional Markets**	2.6%	25.6%	0.1%	5.1%	7.3%
All Equity*	3.7%	27.4%	-4.9%	2.2%	1.5%
Additional Markets**	4.0%	37.3%	-4.2%	4.2%	7.0%

* Reflects the results before fees of various benchmarks allocated according to various levels of risk based on allocations to fixed-income markets as measured by the Barclays Government/Credit Index.

** Reflects the results of portfolios allocated among several broad equity and fixed income markets according to RJR Associates model portfolios but substituting the results of well-diversified commitments to additional market segments designed to provide incremental diversification beyond the widely followed market benchmark. The fixed income market reflects the results of the 5-year Treasury Index.

The data in the preceding table provides the impetus to move beyond our initial robust index fund model to embrace the extension provided by the DFA structured portfolio models as we continue to explore the value provided by additional market segments available from utilization of ETFs. This conclusion generally reflects where we are now in the evolution of RJR Associates' approach to managing investment portfolios. The risky portfolio for any new client will be structured based on an optimal mix of our three broad asset classes. And, each asset class will include a commitment to various market and market segments beyond what is reflected in index funds, typically using DFA portfolios. We will continue to examine existing client portfolios to efficiently replace current index funds with the appropriate mix of DFA portfolios as appropriate. Finally, we will continue to use our fixed-income portfolios as a proxy for the risk-free asset in the proper mix to achieve our clients' tolerance for investment risk.