Portfolio Pension Planning and Assessment Process:

A Review and Case Study

Marie Barnard

John Becker

William Montague

Peter Swiatek

Investment Theory and Analysis

Professor Ian Hudson

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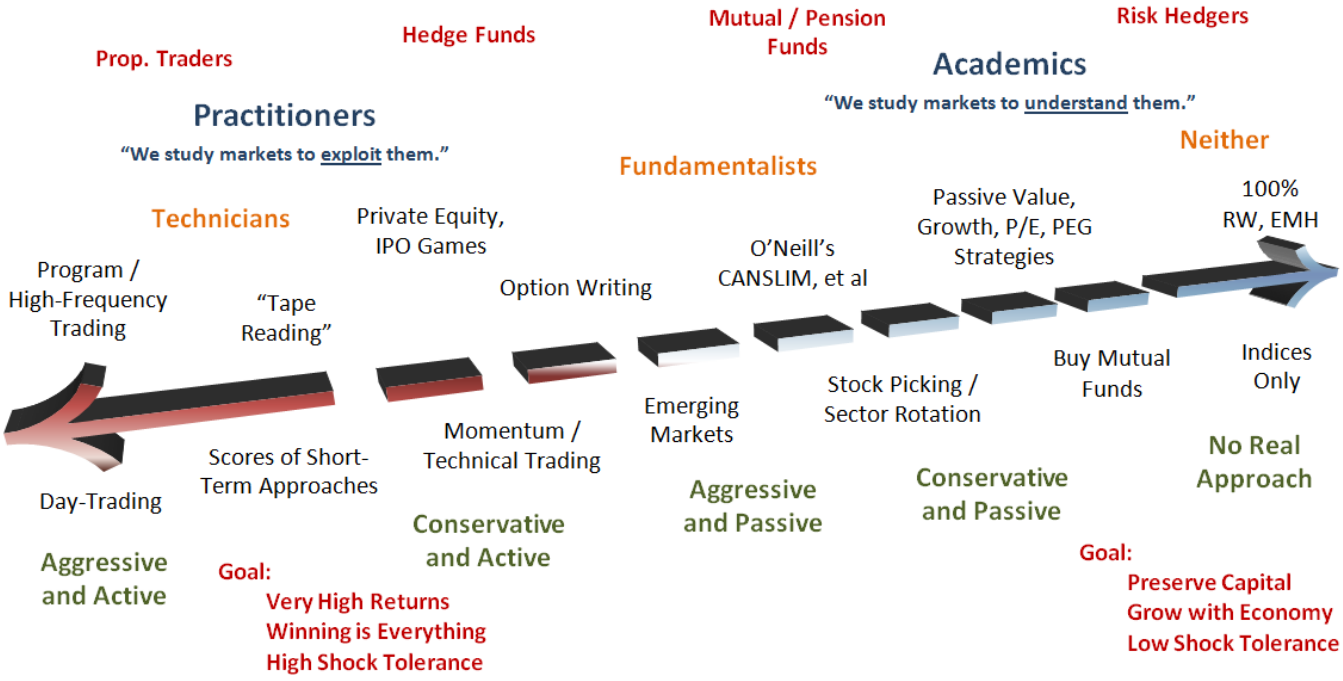
Introduction

A market, by definition, is a place where different people with different investment philosophies come together. After all, if everyone had the same philosophy, there would be very little need for a market in the first place. And there is a vast array of investment philosophies, to be sure - probably even more than actual investors. Every participant has at least one familiar approach. But there are so many unfamiliar areas to most investors.

Ignorance, of course, breeds misunderstanding and mis-characterization. Many investors are skeptical of other market players with very different investing philosophies. So for the purpose of discussion, allow me to submit a crude attempt to categorize many of these approaches in a "continuum of investment philosophies."



Naturally, this is not something you'll see every day. Generally speaking, each "side" on this continuum has little understanding of the other's stance and practice. On this scale, you will likely see many groups you have heard about in the press, but know very little about. Hence, most have some negative view of at least one group or convention mentioned above: quixotic, misled, even manipulative.

In our case study this week, we watch our protagonist, Lloyd Clark, Jr., present some new money management ideas to an established firm. The narrative here is very much the collision of two worlds – two schools of thought. And in finance, schools of thought are very insular.

Lloyd has just earned his business degree from a top-rate university, and he is ready to put it to work at a small investment fund run by his father. The firm is primarily a pension fund, and what may become Lloyd's bankroll is in the accumulation phase, with twenty years before projected payouts. The investment committee has achieved an impressive track record largely by selecting stocks believed to have high odds of future appreciation. Lloyd has a more academic orientation and is learned in modern portfolio theory, but may be unfamiliar with the firm's current approach to portfolio management and asset selection. Specifically, Lloyd feels he should diverge from his retiring predecessor's active "stock-picking" approach, despite her success with her method (Lashgari, 2005). In our previous graph, Lloyd would be very much on the right side, and as it exists now, the fund would be pretty centered.

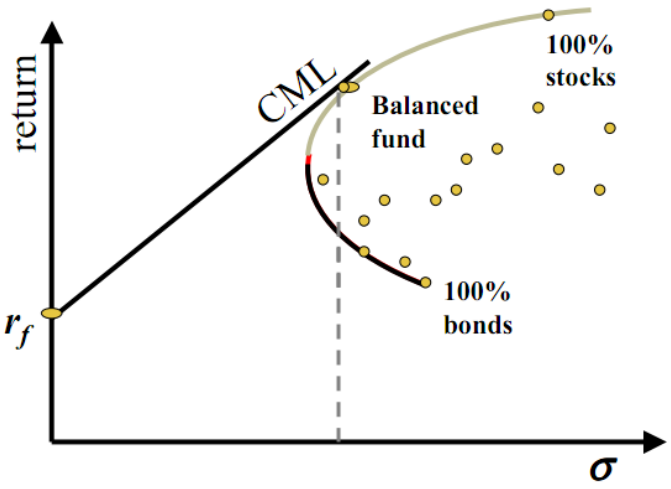
We join the action as Lloyd is invited to an introductory meeting with the investment committee to present his ideas. He prepares a pilot study, in which he suggests two portfolios of passively-managed, index-based assets. The first, designed for smaller investors, is an 80/20 mix of the Vanguard Index 500 Fund (S&P 500) and short-term US government debt. The second portfolio is an equally-weighted quartet: the Vanguard Index 500, the Vanguard Growth Fund, an active value-oriented fund, and Treasuries with an average maturity of 5 years.

The aim in each portfolio is capital preservation together with steady economic growth, and the Sharpe ratio is the primary metric used. The two proposals are given in Appendix 1.

After Lloyd's presentation, five questions are asked by members of the investment committee. These questions are given in Appendix 2. What follows is analysis of each question posed.

Question 1: Juniper

For the sake of comparison, charts representing Juniper's suggestion and a compromise position are given in Appendix 2. Take a moment to review these. The Sharpe ratio for Lloyd's original equally-weighted portfolio is slightly superior to that of the portfolio recommended by Juniper. Juniper's idea would result in a higher average return (15.55% versus 15.00%), but it would come with a higher variance of returns (standard deviation of 12.09% versus 10.96%). The higher Sharpe ratio indicates that we are not getting as much return per unit of risk taken by emphasizing the growth stocks at the expense of the government debt. On a risk-return graph common in modern portfolio theory, the slope of the ray describing Juniper's portfolio is flatter than the one representing Lloyd's portfolio. The equally-weighted approach presents a superior risk-return profile.



While this math is helpful (and the Sharpe ratio is only one of many portfolio metrics), asset allocation often benefits from professional experience. Presumably, Juniper is a more seasoned investment analyst then Lloyd, and prudence would warrant an examination into whether Juniper's recommendation has merit on a qualitative basis that outweighs its quantitative shortcomings. Juniper likely has some educated opinion on the relative value of many stocks following a steep sell-off in 2001. Many successful investors were looking to buy there.

Let's remember that our clients have at least $500,000 in their respective pension portfolios, which they will not need for the next twenty years. Juniper clearly believes that

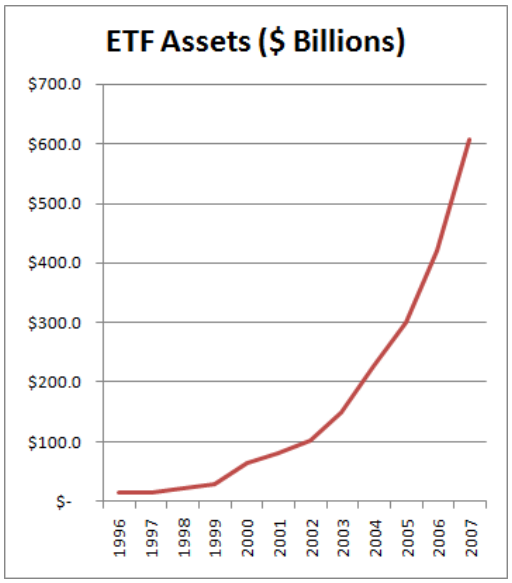
Lloyd's original proposal is a bit too conservative for these investors. She feels that much of the bond money would be better used in equities. A more growth-oriented pose is certainly reasonable for these clients, given the length of the accumulation phase ahead.

Let's look for some satisfaction to both demands: more growth and a high Sharpe ratio. A little time with Microsoft Excel's Solver tool reveals that the optimal Sharpe ratio of 0.813 happens to yield the returns of Juniper's suggestion with the standard deviation of Lloyd's original portfolio. This is achieved with a 34 – 0 – 43 – 23 weighting. It is reasonable to demand at least some exposure to all four asset groups, so let us set a 15% minimum weight. Now, Solver finds another very attractive composition at 15 – 15 – 55 – 15. This yields a return of 16.039% at a Sharpe of 0.795. This is far superior to either party's suggested portfolio and is given in Appendix 3 as "Our Solution."

It should be noted that this is a bit close to "curve-fitting" – the practice of devising the perfect system for a given set of past data. As we know, past data does not repeat exactly. However, given that we are dealing with indices and many years of data, it is reasonable to conclude that this portfolio will outperform the other two in the future. Not only have we improved returns, but risk-adjusted returns. Both Lloyd and Juniper would be pleased.

Question 2: Lloyd's father

On its face this suggestion is a great one. A diagram of the creation of an ETF is featured in Appendix 4. From their inception in the early 1980's to the present day the amount of funds invested in ETF's has been nothing short of astonishing (Bansal & Somani, 2002). As recently as May of 2010, total assets invested in ETF's was right around $800 Billion. They allow investors the flexibility of intraday trading just like regular shares of stock; they have extremely low operating expenses; they generally have strong trading liquidity; and they are efficient tax structures (Gold & Ali, 2001). They also offer lower management fees, continuous pricing,



reinvestment of dividends, no loads, and increased transparency (Bansal, 2002). Given this list of benefits it is hard to see why anyone would want to invest in a traditional mutual fund, or even an index fund, when an ETF is available. Many argue that they render traditional mutual funds totally obsolete (Gold, 2001).

On the other hand, the dangers of some ETF's were very apparent in the "flash crash" of May 6, 2010. An ETF is an exchange-traded financial instrument like any other. Under volatile market conditions, some less liquid ETF's can exhibit gross mispricing. Elanor Laise of the WSJ advises the following: know your tolerance for technical jargon and your willingness to follow the trends of this particular market; "try not to trade on a volatile day; use the right kind of trade order; check the underlying value of the fund holdings before trading" (2010). Of course, possibly the best defense is to stick to the most liquid ETF's – including the SPY, DIA, and QQQ. There is no replacement for market depth.

Despite that fateful day, ETF's are still an important option for investors who are comfortable and confident enough to handle their sharp edges. Because of their many strong points, it seems logical to replace the index funds with ETF's. Even though these instruments are still a bit new as of 2001, the most liquid forms had strong trading histories and faithful records. As a firm of professional wealth managers, Lloyd's group should have the expertise to manage ETF's to their clients' advantage. Given all of the benefits in comparison to their mutual fund and index fund brethren, it is clear that the most heavily traded ETF's, tracking the major indexes, are the best way to gain exposure to these segments of the market.

Question 3: Iris

This is where we break away from the quantitative aspects of asset selection and move into the area of human discretion. The Vanguard Index 500 follows the S&P 500 Index, a value-weighted index of the 500 largest US companies. The Vanguard Extended Market Index (VEXMX) aims to give the investor broad exposure to small-cap and mid-cap firms in the US. Founded in 1987, the VEXMX currently has over 4,000 stocks in these tiers, and has performed well in the past several years (Vanguard, 2011). This represents a sizeable shift up the security market line: higher return, higher risk.

With a much more aggressive risk profile than the S&P 500, you would think the return would be commensurate. However, as of 2001, performance had been disappointing. The chart below from Yahoo! Finance shows ten years of history, ending in 2001, compared with the S&P. The VEXMX is shown as candlesticks; the red line is the S&P. It should be noted that the VEXMX also underperformed the Russell 2000 by quite a margin over this period.

In Lloyd's "small investor" portfolio, there is essentially no allocation for this smaller group of companies. Lloyd's original proposal deems this too aggressive. Deciding whether this

exposure is beneficial for these smaller clients is a matter of much deliberation and fiduciary responsibility, not of mathematical precision. It would be unwise to entirely replace such a proven bulwark as the Vanguard Index 500 with a young index that has, to date, shown inferior returns with much higher risk. While it may make sense to give the small investors some exposure to small and mid-cap stocks, this should not replace the S&P exposure entirely and there may be better ways to do it than the VEXMX.

Whatever sense the VEXMX makes in Lloyd's smaller portfolio, in which simplicity is paramount, it makes far less sense to replace the Vanguard Index 500 in the larger portfolio. This allocation already has a healthy complement of small and mid-cap firms by way of the growth and value groups. One could certainly argue that, if a firm in the VEXMX does not get the attention of the Vanguard Growth fund or the chosen value fund manager, we simply don't want it. Our growth and value denominations are targeting the "best of breed" among smaller firms, and judging by the performance data as of 2001, the same cannot be said of VEXMX.

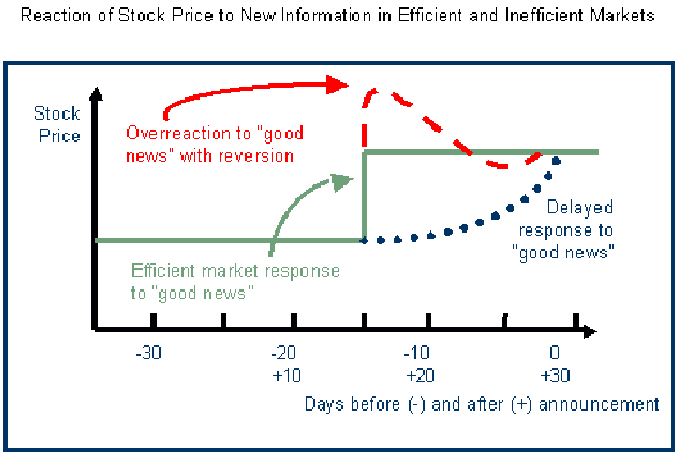
So, Iris' rationale that more attention should go to smaller-capitalization stocks is at least reasonable in the small investor portfolio. We noted that the larger portfolio already has this exposure in some form. Giving this exposure more weight in the larger portfolio would perhaps better be done by increasing allocations to the existing high-beta groups rather than taking on the VEXMX. Likewise, better tools exist for giving the small investor access to the smaller-caps. We would recommend a pure Russell 2000 fund.

Question 4: Todd

Todd raises an excellent point that strikes right at the heart of the Efficient Market Hypothesis and the Random Walk Theory. The true believer in this creed would have to confess that there is nothing inherently superior about investing in indexes versus common stocks. After all, indexes are just collections of different stocks, and if there were some special characteristic

whereby index investing was superior to stock investing, the clever arbitrageur would get long indexes and short stocks for a risk-free profit. Lloyd has been taught that regular, persistent, risk-free profits are impossible.

And it is true that companies become a part of indexes after they have made the "big time." They are removed only after they have fallen dramatically. The index-follower is buying the stock after the tremendous run-up and selling after the catastrophic loss – not before.



Fortunately, this exact scenario is rare, but the principle is accurate. Most firms never make it to the S&P 500, or even the Russell 2000. These are the firms with compelling stories, making it to the top group of firms in the United States. They are the winners – until they stop winning.

So Lloyd would have to agree that nothing is superior about indexes from an investing standpoint, other than perhaps increased aggregate data. Lloyd would further agree that index investing is indeed "buying high and selling low." But here the thorny question emerges: Is there a better way? Presumably, Lloyd would say no. The markets are random and efficient. The best you can do is to grow along with the economy (with the help of inflation) at various risk-return points along the efficient frontier. Then Todd would say yes, a better way is out there. We've been doing it for years. There is no single "efficient frontier" for every market participant, but a vast range of points on that risk-return graph. Different points are within reach of different people based on the resources available to them: information, experience, capital, ability, etc.

And there is the essential disagreement. Lloyd says investment professionals as a whole don't beat the market; Todd says investment professionals as a whole are the vast majority of the

market, so there are simply not enough losers to make every investment professional a winner. And on and on they go.

It must be said that this discussion may benefit the most from a chart detailing the performance of this firm run by Lloyd's father from 1981 to 2000. If a statistically-significant amount of data implies that they are beating the S&P on a risk-adjusted basis, then Todd has a very strong case here. Maybe they are the next Quantum Fund – who knows? If the performance isn't there, Lloyd has a strong case. Either way, Todd has a valid critique of index investing, at least in theory. Is there a better way? We will not likely live to see a consensus on that point.

Question 5: Alan

A response to Alan's question would benefit from the firm's performance data in the same way as the previous response, but here we also address the marketing aspect. What do the clients want from this firm? It seems that the existing clients want their money managed the way it has been managed; otherwise they would find a new money manager. If Lloyd put his plan in place, he would essentially be offering a brand new service at the firm, one that would appeal to a different group of customers.

The clients of Lloyd's predecessor should be advised of the change in investment philosophy and encouraged to shift to a comparable manager at the firm if they so desire. Certainly, many will see Lloyd as overly academic and inexperienced. But as long as the previous "active management" services are still available, it is hard to see a downside to offering a more complete portfolio of money management solutions to clients. Lloyd certainly has a coherent, well-

researched plan. He will likely achieve his goal of competitive, risk-adjusted return in the coming 20 years.

Of course, it would be unwise to try to push satisfied customers from other portfolios at the firm into one of Lloyd's funds, and it would be unrealistic to think that no rivalry will exist between the active funds and Lloyd's passive approach. Whether this will be a benefit or a disadvantage to the firm is a business strategy question, but I see no reason why the same firm cannot offer both alternative approaches to clients. Ideally, the two would complement and refine each other.

Conclusion

In conclusion, let us come back to the tenet that portfolio management is both science and art. It is both computational and experiential. Lloyd has presented a well-thought-through plan for investing during the accumulation phase of this pension fund, and it is not at all in the mold of his predecessor. His creativity, knowledge, and courage to change something that has been working are all good qualities. Lloyd would make a strong addition to this firm.

We have also argued that Lloyd's approach is not inherently better or worse than that of the investment committee. While performance information on the firm is clearly wanting, it is telling that the firm has a solid base of clients who vote (with their money) for the current investment philosophy. If Lloyd is hired, the firm has an excellent opportunity to grow as a result of this interaction - the collective learning that accompanies multiple investment approaches. No doubt each approach will be refined by ideas from the other. The future is bright indeed.

Appendix 1: Lloyd's Proposals

For Small Investors

Weights:	80%	0%	0%	20%	
Risk Free:	6.66%				
	Large	Growth	Value	Bonds	Portfolio
1981	-4.91%	-8.12%	14.95%	9.45%	**-2.04%**
1982	21.41%	19.96%	29.14%	29.10%	**22.95%**
1983	22.51%	16.09%	29.98%	7.41%	**19.49%**
1984	6.27%	-2.98%	16.51%	14.02%	**7.82%**
1985	32.16%	32.76%	32.90%	20.33%	**29.79%**
1986	18.47%	12.24%	20.92%	15.14%	**17.80%**
1987	5.23%	4.99%	-2.76%	2.90%	**4.76%**
1988	16.81%	12.04%	25.39%	6.10%	**14.67%**
1989	31.49%	34.79%	29.42%	13.29%	**27.85%**
1990	-3.17%	-1.09%	-15.03%	9.73%	**-0.59%**
1991	30.55%	43.91%	28.84%	15.46%	**27.53%**
1992	7.67%	6.77%	24.25%	7.19%	**7.57%**
1993	9.99%	3.37%	21.24%	11.24%	**10.24%**
1994	1.31%	1.37%	-4.66%	-5.14%	**0.02%**
1995	37.43%	37.09%	35.83%	16.80%	**33.30%**
1996	23.07%	20.13%	14.87%	2.10%	**18.88%**
1997	33.36%	30.31%	32.91%	8.38%	**28.36%**
1998	28.58%	33.11%	12.07%	10.21%	**24.91%**
1999	21.04%	29.81%	5.40%	-1.77%	**16.48%**
2000	-9.11%	-13.40%	-0.16%	12.59%	**-4.77%**
Mean	16.51%	15.66%	17.60%	10.23%	**15.252%**
St. Dev.	13.69%	16.26%	14.08%	7.49%	**11.495%**
Sharpe	0.72	0.55	0.78	0.48	**0.747**

For Large Investors

Weights:	25%	25%	25%	25%	
Risk Free:	6.66%				
	Large	Growth	Value	Bonds	Portfolio
1981	-4.91%	-8.12%	14.95%	9.45%	**2.84%**
1982	21.41%	19.96%	29.14%	29.10%	**24.90%**
1983	22.51%	16.09%	29.98%	7.41%	**19.00%**
1984	6.27%	-2.98%	16.51%	14.02%	**8.46%**
1985	32.16%	32.76%	32.90%	20.33%	**29.54%**
1986	18.47%	12.24%	20.92%	15.14%	**16.69%**
1987	5.23%	4.99%	-2.76%	2.90%	**2.59%**
1988	16.81%	12.04%	25.39%	6.10%	**15.09%**
1989	31.49%	34.79%	29.42%	13.29%	**27.25%**
1990	-3.17%	-1.09%	-15.03%	9.73%	**-2.39%**
1991	30.55%	43.91%	28.84%	15.46%	**29.69%**
1992	7.67%	6.77%	24.25%	7.19%	**11.47%**
1993	9.99%	3.37%	21.24%	11.24%	**11.46%**
1994	1.31%	1.37%	-4.66%	-5.14%	**-1.78%**
1995	37.43%	37.09%	35.83%	16.80%	**31.79%**
1996	23.07%	20.13%	14.87%	2.10%	**15.04%**
1997	33.36%	30.31%	32.91%	8.38%	**26.24%**
1998	28.58%	33.11%	12.07%	10.21%	**20.99%**
1999	21.04%	29.81%	5.40%	-1.77%	**13.62%**
2000	-9.11%	-13.40%	-0.16%	12.59%	**-2.52%**
Mean	16.51%	15.66%	17.60%	10.23%	**14.998%**
St. Dev.	13.69%	16.26%	14.08%	7.49%	**10.956%**
Sharpe	0.72	0.55	0.78	0.48	**0.761**

Appendix 2: Discussion Questions

1. Juniper, a member of the investment committee, while in favor of Lloyd's recommendations, suggests that the weight associated with the growth fund for the medium size retirement portfolios should increase to 35 percent (from 25 percent) and bonds to 15 percent (from 25 percent).

2. Lloyd's father asks whether exchange traded funds should be employed instead of index mutual funds. Provide comments on the merits of this suggestion.

3. Iris, a member of the investment committee would like Lloyd to replace the Vanguard Index 500 with the Vanguard Extended Market Index. Among her reasons are that more attention should be paid to the entire market portfolio including small capitalization stocks. Provide a response to this comment.

4. Todd, an active money manager, dislikes the idea of indexing, since he feels that during good market conditions it is tantamount to "buy high, sell low." Comment on the validity of his argument.

5. Alan, a senior portfolio manager and a long-time member of the firm, states that clients have been attracted to the firm because of their special talents in stock selection. Thereby, such clients may dislike Lloyd's new approach. Provide a response to these issues.

Appendix 3: Juniper's Suggestion

Juniper's Suggestion

Weights:	25%	35%	25%	15%	
Risk Free:	6.66%				
	Large	Growth	Value	Bonds	Portfolio
1981	-4.91%	-8.12%	14.95%	9.45%	**1.09%**
1982	21.41%	19.96%	29.14%	29.10%	**23.99%**
1983	22.51%	16.09%	29.98%	7.41%	**19.87%**
1984	6.27%	-2.98%	16.51%	14.02%	**6.76%**
1985	32.16%	32.76%	32.90%	20.33%	**30.78%**
1986	18.47%	12.24%	20.92%	15.14%	**16.40%**
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1988	16.81%	12.04%	25.39%	6.10%	**15.68%**
1989	31.49%	34.79%	29.42%	13.29%	**29.40%**
1990	-3.17%	-1.09%	-15.03%	9.73%	**-3.47%**
1991	30.55%	43.91%	28.84%	15.46%	**32.54%**
1992	7.67%	6.77%	24.25%	7.19%	**11.43%**
1993	9.99%	3.37%	21.24%	11.24%	**10.67%**
1994	1.31%	1.37%	-4.66%	-5.14%	**-1.13%**
1995	37.43%	37.09%	35.83%	16.80%	**33.82%**
1996	23.07%	20.13%	14.87%	2.10%	**16.85%**
1997	33.36%	30.31%	32.91%	8.38%	**28.43%**
1998	28.58%	33.11%	12.07%	10.21%	**23.28%**
1999	21.04%	29.81%	5.40%	-1.77%	**16.78%**
2000	-9.11%	-13.40%	-0.16%	12.59%	**-5.12%**
Mean	16.51%	15.66%	17.60%	10.23%	**15.541%**
St. Dev.	13.69%	16.26%	14.08%	7.49%	**12.088%**
Sharpe	0.72	0.55	0.78	0.48	**0.735**

Our Solution

Weights:	15%	15%	55%	15%	
Risk Free:	6.66%				
	Large	Growth	Value	Bonds	Portfolio
1981	-4.91%	-8.12%	14.95%	9.45%	**7.69%**
1982	21.41%	19.96%	29.14%	29.10%	**26.60%**
1983	22.51%	16.09%	29.98%	7.41%	**23.39%**
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1988	16.81%	12.04%	25.39%	6.10%	**19.21%**
1989	31.49%	34.79%	29.42%	13.29%	**28.12%**
1990	-3.17%	-1.09%	-15.03%	9.73%	**-7.45%**
1991	30.55%	43.91%	28.84%	15.46%	**29.35%**
1992	7.67%	6.77%	24.25%	7.19%	**16.58%**
1993	9.99%	3.37%	21.24%	11.24%	**15.37%**
1994	1.31%	1.37%	-4.66%	-5.14%	**-2.93%**
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1996	23.07%	20.13%	14.87%	2.10%	**14.97%**
1997	33.36%	30.31%	32.91%	8.38%	**28.91%**
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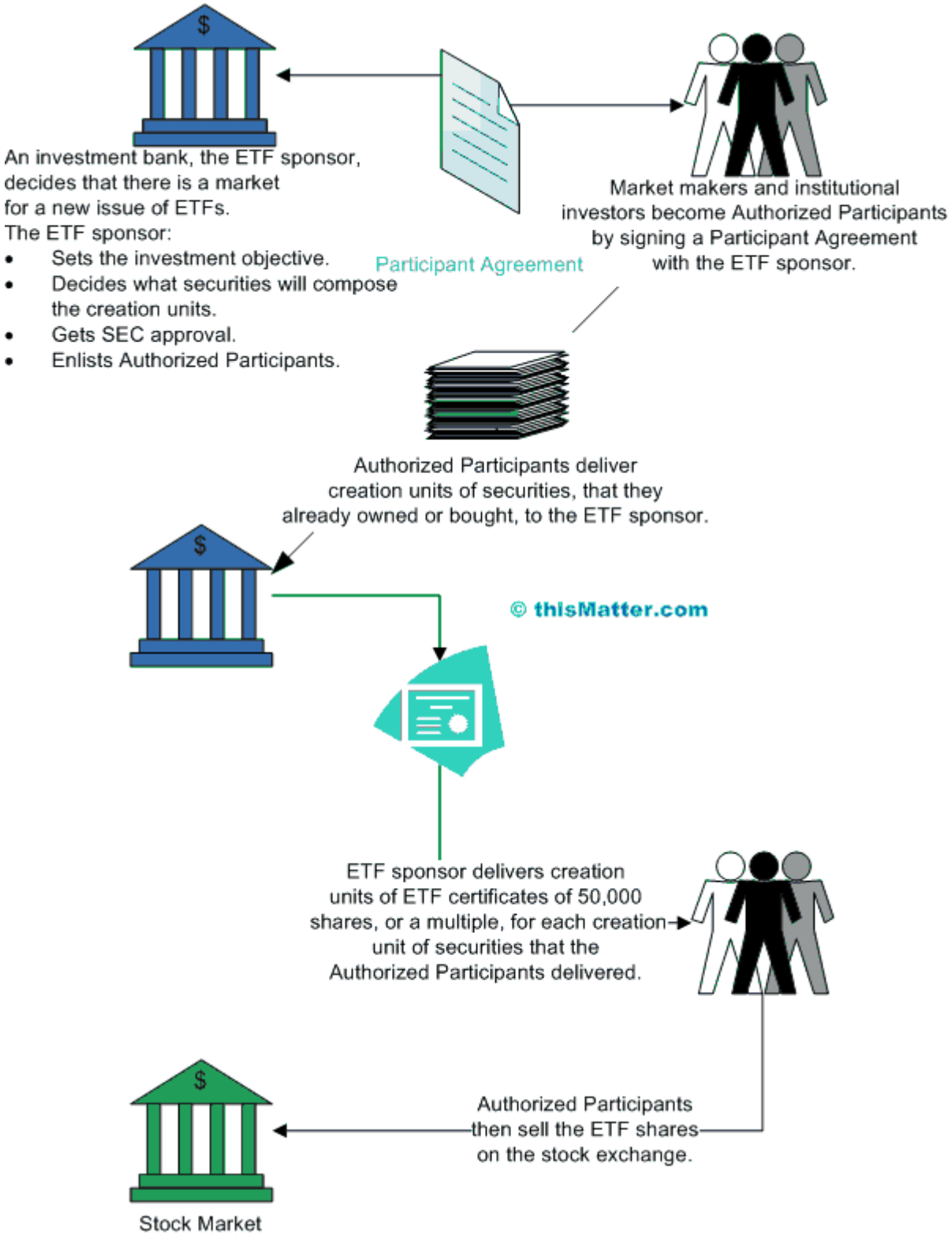
Mean	16.51%	15.66%	17.60%	10.23%	**16.039%**
St. Dev.	13.69%	16.26%	14.08%	7.49%	**11.793%**
Sharpe	0.72	0.55	0.78	0.48	**0.795**

Appendix 4: ETF Creation



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