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The Results from a 40-Year Investment in a Retirement Portfolio of Twelve Mutual Funds¹

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The objective of this paper is to present the results of investing a regular sum of money for 40 years in a retirement portfolio. Twelve mutual funds were chosen for the portfolio and assembled in accordance with the methodology of an investment triangle. The portfolio was started with the sum of the minimum initial investments necessary to purchase each mutual fund. Then \$10,000 per year was invested in quarterly intervals. This sum roughly matches the current, annual, maximum tax-free investment allowed in a 401(k), and a quarter is the time needed to accumulate sufficient funds to meet the minimum additional investments in each mutual fund simultaneously. The portfolio was compounded using five separate rates of return. These were the five- and 10-year averages of each fund and then 75, 50 and 25 percent of the 10-year averages. The maximum accumulation was a little more than \$500 million, and the minimum was \$1.5 million.

Introduction

The continuing boom in the U.S. stock markets has encouraged individual investing. Employees rarely stay with just one employer, so they become concerned with pension transfers. There is growing

skepticism about the rewards from social security and whether it will provide much retirement income. Thus, the average American is increasingly involved in personal investing and retirement funding. Governments are faced with voters growing demand that they be allowed to look after their own futures rather than relying on the dubious wisdom of unknown bureaucrats to do it for them.

There are several tax-deferred plans that allow people to save for retirement. The money invested reduces taxable income and will only be taxed at retirement when, presumably, an individual's tax bracket is lower. For example, investing \$200 per month in one of these plans reduces annual taxable income by \$2,400. Perhaps the most common plan is the 401(k), which allows employees to invest a certain maximum annual amount of their wages in an investment program. The maximum varies a little depending on an individual's circumstances but is typically \$10,000 per year. Pressure is currently being placed on Congress to increase the maximum allowance. Some 401(k) plans also allow employer contributions.

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Objectives and Assumptions

The objective of this paper is to design a diversified retirement portfolio for a young, married couple. Both husband and wife are 25-years-old, and their goal is to retire financially independent, with a portfolio that generates sufficient income through interest and dividends to allow them to live comfortably for the rest of their lives. They plan to retire at age 65, which gives them 40 years of investing. It is assumed that the couple has enough money to open a portfolio immediately. The portfolio is made up entirely of mutual funds, and each mutual fund has a minimum initial investment. The sum of these minimum investments is \$27,000.

It is also assumed that the couple earns sufficient income to contribute \$10,000 annually to the 401(k). These assumptions are made to keep things simple and to encourage the reader to focus on the main points of this paper. Obviously, the results will change a bit if the couple has to build up the portfolio over a period of time rather than in a lump sum. Note that the couple is allowed to invest \$20,000 annually between them while this paper assumes a \$10,000 contribution.

This \$10,000 is invested in quarterly installments of \$2,500. This procedure is used only because of the arithmetic of this specific portfolio. It takes \$2,500 to meet the minimum additional investment requirements of all the mutual funds simultaneously. The quarterly contributions allow the couple to dollar cost average. This means that the couple invests the same dollar amount every quarter regardless of the price of the shares of each mutual fund. Thus, more shares are bought when the prices are low, and fewer shares are bought when the prices are high. Dollar cost averaging is essential for long-term investors. It avoids market timing, which is the attempt to buy when prices are lowest and when prices peak. No investor can successfully time the market regularly. It is much better to dollar cost average on the assumption that the market will be higher 10 or more years from now than it is today.

Investment Plan

The investment portfolio consists of 12 stock mutual funds. Stock mutual funds vary in their investment objectives. These funds typically are classified as growth and income, growth, aggressive growth and sector funds. Growth and income funds invest primarily in firmly established companies that pay high dividends and expect some appreciation in share price. Growth funds invest in firms that are established but are early in their business cycle and expect growth and later some price appreciation. Aggressive growth funds primarily select new and emerging companies in which to invest. These funds offer higher returns at higher risk due to the instability but high potential of the component companies. Sector mutual funds invest in only one sector of the economy, such as technology or health care.

Stock mutual funds invest in different regions or globally, regardless of region. Thus, some invest only in Asian countries, the United States or in companies in the New England states. Consequently, they are classified as domestic, global or international — domestic funds invest in companies located in the United States, global funds invest in companies worldwide and international funds invest in companies outside the United States.

This portfolio invested only in stock funds. Stock funds have out-performed bond funds in the long run. The average return for large company stocks from 1926 through 1993 was 12.3 percent while small company stocks returned 17.6 percent. Long-term corporate bonds earned 5.9 percent annually during the same period. Generally, bond prices are less volatile or less risky than stocks. Because the couple has 40 years before retirement, they can trade fluctuations in returns for higher long-term performance.

The portfolio invested in growth and income, growth, aggressive growth and one sector fund. Eleven of the 12 funds were domestic, and one was international. The criteria for selecting the funds were based on strong past performance and low expenses. Some preference was given to funds that were held by the authors. All but one fund were no-load, meaning

that there were no fees for investing. The sources used to obtain information on the funds were *Kiplingers Personal Finance Magazine*, *The Wall-Street Journal* and *Yahoo Finance*.

The Portfolio

An investment triangle was used to allocate the funds in the portfolio according to the proportion of money invested in each fund and the risk of the individual fund. This is accomplished by dividing the investment triangle into a number of *floors* (Figure 1). The first floor at the base of the triangle is the least risky, and the largest portion of the portfolio is designated for the funds in that level. The second level has investments that are slightly more risky and offer the potential for slightly higher returns but has a smaller proportion of the investment. This pattern continues throughout the triangle. Each successive floor has higher risk investments and decreasing proportions of the total investment.

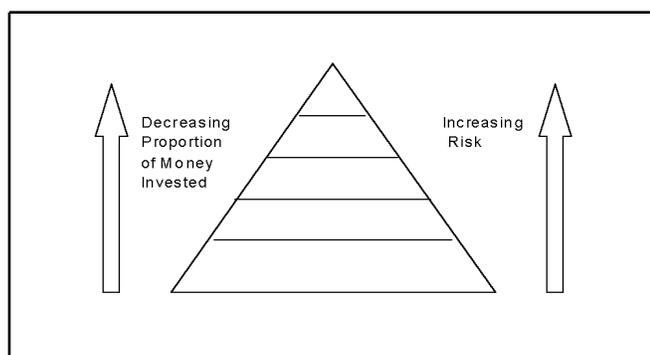


Figure 1. The Concept of the Investment Triangle.

This portfolio has five floors. The levels, names of the funds, volatility ratings and returns are shown in Table 1. The returns are annualized percent returns as of December 30, 1998. The volatility ratings show the risk of each fund. The higher the number, the greater the risk, but also the greater the potential returns, using a scale of 1 through 10. The volatility ratings were obtained from *Kiplingers Mutual Funds 1999*. Figure 2 is the investment triangle for this portfolio, and each floor's percentage of the portfolio is listed in Table 2.

The second floor has 28 percent of the portfolio. Ten percent was allocated to the Vanguard Extended Market Index. This fund tracks the performance of the Wilshire 5000 Equity Index, which consists of all

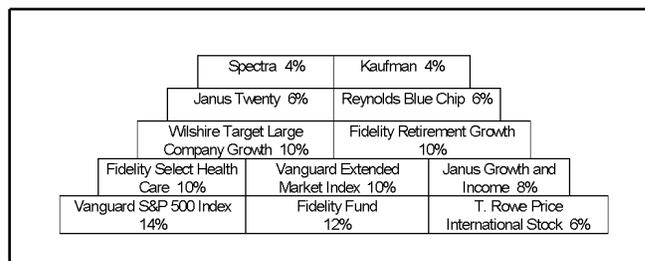


Figure 2. The Investment Triangle.

U.S. stocks regularly traded on the New York and American stock exchanges and the Nasdaq over-the-counter market, excluding the stocks in the S&P 500 Index. The Extended Market Index's 10-year average return is 14.8 percent, and its volatility rating is 6. It is considered a growth fund. The Fidelity Select Health Care fund is a sector fund that invests solely in health care stocks. It makes up 10 percent of the portfolio. Its 10-year average return is 25.7 percent. Although its volatility rating is 4, the authors consider it more volatile because it invests in only one sector. The Janus Growth and Income fund makes up eight percent of the portfolio. Its volatility rating is 6, with an average annual return since inception (1991) of 25.3 percent.

Two growth funds with volatility ratings of 6 make up the third floor. Each takes 10 percent of the portfolio. Since its inception in 1992, the Wilshire Target Large Company Growth fund has had an average annual return of 26.7 percent. The Fidelity Retirement Growth funds average return for 10 years is 17.4 percent.

The fourth floor has two growth funds with volatility ratings of 7 with each comprising six percent of the portfolio. The Janus Twenty fund's 10-year average annual return is 25.8 percent while the Reynolds Blue Chip funds 10-year average return is 19.1 percent.

The fifth and final floor in the triangle has two aggressive growth funds, with each contributing four percent to the portfolio. The Kaufman fund invests only in *small-cap* stocks, or stocks whose market capitalization is less than \$1 billion. The volatility ratio for this fund is 7, and its 10-year average return is 19.98 percent. The Spectra funds 10-year average return is 25.8 percent, and its volatility rating is 8.

Results

Table 3 contains the weighted average return for one-, five-, and 10-year returns. The weighted average for each was calculated by multiplying the return for each mutual fund by the weight of the quarterly contributions that go into that fund. The sum of each funds weighted average in the portfolio equals the portfolios weighted return. The average weighted return for the portfolio over the past five years has been 22.8 percent annually. The 10-year average weighted return of the portfolio is 20.4 percent annually.

Different 40-year forecasts of the portfolios value are presented in Table 4. The forecasted returns were compounded quarterly, starting with the initial investment of \$27,000 and the continual addition of \$2,500 quarterly payments over 160 periods. (There are 160 quarters in 40 years.) All dividends and capital gains are re-invested in each fund. The results, as shown in Table 3, are little short of astonishing. With the last five years average return from each fund, the couple would end up with a bit more than one-half of a billion dollars after 40 years. Using the 10-year annual average, they would still get nearly \$220 million. Obviously, both of these performances need to be taken with a pinch of salt. The United States has more stock than ever in its history. While history does repeat itself, it is unlikely to be so beneficent. Consequently, the table discounts these returns by reasonable factors of 25, 50 and 75 percent.

In a 40-year period, history shows that there will be cycles of expansion and recession. During a recession, the returns will be much lower than during an expansion. These discounted forecasts use the 10-year weighted average return as their base. The use of 75 percent of this base yields a return of 15.3 percent, and the portfolio is worth some \$38 million. This is perhaps more historically realistic when comparing the weighted rates with the returns of large companies stocks and small companies stocks, which have been 12.3 and 17.6 percent, respectively. The fourth forecast of 50 percent of the base returned 10.2 percent annually, which compounded the portfolios future value to about \$7 million. The final discount of 25 percent earned five percent annually and produced \$1.5 million after 40 years.

For comparison, the final value in Table 4 puts the entire portfolio in Treasury Bills (T-bills), which is the essential investment used for Social Security. The average return for U.S. T-bills from 1926 through 1993 was 3.7 percent. Using this rate of return for the portfolio, the forecasted future value in 40 years was a little more than \$1 million.

Conclusion

The main conclusion is obvious. The earlier investments are begun and the longer they continue, the better off the recipient will be. This is not news but it is nevertheless the essential point presented in every personal finance book or magazine. Compounding is one of the wonders of the world. For the long-term investor it is good to use an all-stock mutual fund portfolio for retirement saving to achieve maximum growth. It is also necessary to use consistent dollar cost averaging. Beginning a retirement investment plan as early in life as possible gives an investor a

tremendous edge with time and the power of compounding interest. In this example, if the 10-year weighted average return is achieved for 40 years, the portfolio has a future value of almost \$220 million. This is done with a total investment of \$427,000. Even if the portfolios return were only 75 percent of the weighted 10-year average, 15.3 percent, the future value would be \$37 million. This return is 37 times greater than the return from investing these same dollars in U.S. T-bills. With a diversified portfolio and consistent investment over a long period, long-term financial goals can be handsomely met with stock mutual funds.

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Table 1. Portfolio Fund Description.

Fund Name	Type	Initial Investment (\$)	Subsequent Investment (\$)	Volatility	Inception Date
Vanguard S&P 500	Domestic Growth Index	3,000	100	4	1976
Fidelity Fund	Domestic Growth Index	2,500	250	4	1930
T. Rowe Price International	International Growth Index	2,500	100	2	1980
Vanguard Extended Market	Domestic Growth Index	3,000	100	6	1987
Fidelity Select Health Care	Domestic Growth Index	2,500	250	4	1983
Janus Growth & Income	Domestic Growth Index	2,500	100	6	1991
Wilshire Target Large Company Growth	Domestic Growth Index	2,500	100	6	1992
Fidelity Retirement Growth	Domestic Growth Index	2,500	100	6	1983
Janus Twenty	Domestic Growth Index	2,500	100	7	1985
Reynolds Blue Chip	Domestic Growth Index	1,000	100	7	1988
Kaufman	Domestic Small Capital	1,500	100	7	1986
Spectra	Domestic Ag. Growth	1,000	100	8	1975

Table 2. Floor Number and Corresponding Percentage of Portfolio.

Floor Number	Percentage of Portfolio
5	8%
4	12%
3	20%
2	28%
1	32%

Table 3. Annualized Percent Returns for Funds and Portfolio.

Fund Name	Quarterly Investment	Percent of Portfolio	1-Year % Return	5-Year % Return	10-Year % Return
Vanguard S&P 500	\$350	14	28.6	24	18.7
Fidelity Fund	\$300	12	30.9	23	18.4
T. Rowe Price International	\$150	6	16.1	8.9	9.9
Vanguard Extended Market	\$250	10	8.3	16	14.8
Fidelity Select Health Care	\$250	10	41.3	31	25.7
Janus Growth & Income	\$200	8	34.9	24	25.3*
Wilshire Target Large Company Growth	\$250	10	40.7	27	26.7*
Fidelity Retirement Growth	\$250	10	35.9	17	17.4
Janus Twenty	\$150	6	73.4	30	25.8
Reynolds Blue Chip	\$150	6	54.1	28	19.1
Kaufman	\$100	4	0.7	15	20.0
Spectra	\$100	4	47.9	28	25.8
Portfolio	\$2,500	100	33.7**	22.8**	20.4**

* Indicates use of annualized returns from inception when fund is newer than 10 years.

** Indicates weighted return for the portfolio on an annualized basis.

Table 4. Forecasted Values for Portfolio.

Using:	Rate of Return (%)	Future Value of Portfolio
5-Year Average	22.8	\$504,271,377
10-Year Average	20.4	\$219,644,085
75% of 10-Year Average	15.3	\$37,695,308
50% of 10-Year Average	10.2	\$6,961,251
25% of 10-Year Average	5.1	\$1,500,606
U.S. T-Bill Average (1926-1993)	3.7	\$1,026,767
* Assumes initial investment of \$27,000 and quarterly investments of \$2,500 for 40 years and compounded quarterly.		