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Bills, Notes, Bonds, or Stocks? A Return-Risk Differential Examination



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Abstract

Using monthly data from 1953 to 1992 and calculating the yearly returns for the one-month T-bill, the one-year T-bill, the two-year Treasury note, the five-year Treasury bond, and the value-weighted index, a risk-return analysis is performed to compare the relative attractiveness of these five financial instruments. The results indicate that the risk-return tradeoff has changed over time and depends on the slope of the yield curve. Over the last 20 years, returns for stocks have averaged 15.6% per year following relatively steep yield curves, as opposed to 4.0% for years following a relatively flat yield curve. However, the 20 years preceding 1973 witnessed just the opposite result.

Introduction

Historically, equity returns have far exceeded returns on fixed income securities. In fact, the return differential has been so large, it is essentially unexplained by current economic models and has been dubbed the equity premium puzzle. (See Mehra & Prescott, 1985). However, despite the fact that the return differential is large, the additional return one can expect to attain by purchasing equities is not equally attractive in all time periods.

To determine the cost of additional expected return when moving from one risky asset to another, the return-standard

deviation ratios are calculated for several classes of assets. Specifically, they are calculated for the one-month T-bill, the one-year T-bill, the two-year T-note, the five-year T-bond, and the value-weighted market index. Similar analysis has been performed by Tsiang (1972), who dealt with moving wealth from a risk-free asset to a T-bill, and Trainor (1992), who dealt with moving wealth between two short-term T-bills relative to a market portfolio. The analysis in this paper deals with moving all wealth from one particular kind of risky asset to another, commonly referred to as Tactical Asset Allocation.

After dividing the 1953–92 time period into two samples, one containing those years that follow a relatively steep yield curve and the other those years that follow a relatively flat yield curve, it is found that the return-risk tradeoff is vastly different for the two samples.¹ Additionally, it is found that the risk-return tradeoff is quite different when comparing the 1953–72 time period to the 1973–92 time period. The results suggest that the cost of higher expected return in terms of standard deviation has changed over time and is affected by the slope of the term structure.

Empirical Results—Methodology

Using monthly data from 1953 to 1992 and calculating the yearly returns for the one-month T-bill, the one-year T-bill, the two-year T-note, the five-year T-bond, and the value-weighted index, a risk-return analysis is performed to compare the relative attractiveness of these five financial instruments. Initially, the 1953–92 data are separated into two samples, one of which contains those years that follow a relatively steep yield curve and the other those years that follow a relatively flat yield curve. (These differences are calculated at the end of December preceding each year, as measured by the annual yield difference between the one-year and one-month T-bill.) We differentiate the samples by the yield curve to determine when it is more attractive to move into longer term securities. A steeper yield curve does not necessarily indicate that longer-term securities are more attractive on a return-risk basis.

We employ the same sample splits for the 1953–72 and the 1973–92 time periods to determine whether the risk-return tradeoff has changed over time. These two time periods are fairly distinct because the latter period is associated with relatively higher interest rates. Additionally, the 1973–92 time period has distinguished itself by failing to empirically validate traditional economic models, such as CAPM. (See Fama & French, 1992).

Table 1 below shows the average yearly returns and the standard deviations for each of the five assets for the 1953–92, 1953–72, and the 1973–92 time periods.² Within each time period, the averages are also shown for those years that follow a relatively flat yield curve versus those years that follow a relatively steep yield curve.³ The numbers below the standard deviation figures are simply each asset's average return divided by its respective standard deviation. These numbers can be interpreted as the cost of return in terms of their variability.

Table 1

Percentages below represent average yearly returns with their respective standard deviations. Samples within the time periods are separated according to whether the year followed a relatively flat or relatively steep yield curve. The numbers below the standard deviation figures are the means divided by the standard deviations.

	<i>1-Month T-bill</i>	<i>1-Year T-bill</i>	<i>2-Year T-note</i>	<i>5-Year T-note</i>	<i>Value- Weighted</i>
<i>1953–92, All Years</i>					
Average	4.92	6.16	6.50	6.76	10.71
Std. Dev.	2.74	3.16	4.04	7.18	13.94
Avg./ Std. Dev.	1.80	1.95	1.61	0.94	0.77
<i>Flat Yield Curve, 53–92</i>					
Average	4.23	4.92	4.76	3.48	8.21
Std. Dev.	2.87	2.88	2.90	3.13	17.23
Avg./ Std. Dev.	1.48	1.71	1.64	1.11	0.48

	<i>1-Month T-bill</i>	<i>1-Year T-bill</i>	<i>2-Year T-note</i>	<i>5-Year T-note</i>	<i>Value- Weighted</i>
<i>Steep Yield Curve, 53-92</i>					
Average	5.60	7.40	8.24	10.04	13.22
Std. Dev.	2.48	2.99	4.33	8.57	9.43
Avg./ Std. Dev.	2.26	2.48	1.90	1.17	1.40
<i>1953-72, All Years</i>					
Average	3.01	3.96	4.00	3.76	11.62
Std. Dev.	1.42	1.79	2.56	4.77	14.01
Avg./ Std. Dev.	2.12	2.21	1.57	0.79	0.83
<i>Flat Yield Curve, 53-72</i>					
Average	2.72	3.39	2.91	1.53	14.45
Std. Dev.	1.63	1.77	1.36	2.22	17.70
Avg./ Std. Dev.	1.67	1.92	2.15	0.69	0.82
<i>Steep Yield Curve, 53-72</i>					
Average	3.30	4.52	5.09	5.99	8.78
Std. Dev.	1.18	1.72	3.05	5.66	9.13
Avg./ Std. Dev.	2.79	2.63	1.67	1.06	0.96
<i>1973-92, All Years</i>					
Average	6.82	8.37	8.99	9.76	9.81
Std. Dev.	2.39	2.65	3.73	8.01	14.18
Avg./ Std. Dev.	2.85	3.16	2.41	1.22	0.69
<i>Flat Yield Curve, 73-92</i>					
Average	6.73	7.54	7.73	6.78	3.98
Std. Dev.	2.78	2.80	3.27	4.88	15.07
Avg./ Std. Dev.	2.42	2.69	2.36	1.39	0.26
<i>Steep Yield Curve, 73-92</i>					
Average	6.91	9.19	10.25	12.73	15.64
Std. Dev.	2.08	2.34	3.89	9.60	11.03
Avg./ Std. Dev.	3.32	3.94	2.63	1.33	1.42

Return Comparisons

For 1953–1992, the average returns and standard deviations increase monotonically as one moves from the one-month T-bill to the value-weighted market return. The equity premium over the one-month T-bill was approximately 5%, which is consistent with the average over the last 100 years.

The first interesting fact appears when we compare the 1953–72 time period to the 1973–92 time period. In the 1953–72 time period, equity returns were greatest in those years following a relatively flat yield curve, albeit with greater risk. However, in the 1973–92 time period, equity returns were greatest in those years following a relatively steep yield curve. This contrast is exacerbated by the fact that the higher equity returns in the years following a steep yield curve in the 1973–92 time period were associated with a relatively smaller standard deviation than the lower equity returns.

The Return-Risk Tradeoff

For the overall time period, the greatest return per unit of risk was the one-year T-bill, which had an average yearly return almost twice the value of its standard deviation. The worst return–standard deviation tradeoff was for the value-weighted market index, which had a ratio of 0.77 compared to the one-year T-bill's 1.95. However, the average return of the one-year T-bill was only 6.16% relative to the market's 10.71%.

The return-risk superiority of the one-year T-bill over the other assets is unaffected whether the yield curve is relatively flat or steep. What does stand out for the overall time period is that it seems that the return-risk tradeoff is much more favorable for years following a relatively steep yield curve. This is especially the case for the value-weighted market index, which had a return–standard deviation ratio of 0.48 for years following flat yield curves and a 1.40 return–standard deviation ratio for years following a relatively steep yield curve. An explanation may be that a steep yield curve represents greater risk aversion by investors, who require a more favorable risk-return tradeoff.

The most interesting result to come out of the analysis is the comparison of the 1953–72 to the 1973–92 time period. During 1953–72, the value-weighted index had an average return of 14.5% for years following a relatively flat yield curve as opposed to only 8.78% for years following a relatively steep yield curve. However, the return–standard deviation ratios were not all that different, meaning the higher returns following flat yield curves were associated with higher risk.

However, in 1973–92, the value-weighted index had an average return of only 3.98% for years following a relatively flat yield curve opposed to 15.64% for years following a relatively steep yield curve. In addition, the return–standard deviation ratio for stocks in years following a flat yield curve was only 0.26, the lowest on the table, opposed to the 1.42 ratio for stock investments following a relatively steep yield curve.

Conclusion

A return-risk analysis was applied to the one-month T-bill, the one-year T-bill, the two-year T-note, the five-year T-bond, and the value-weighted index for the 1953–92 time period in an effort to examine the relative attractiveness of these assets. It was found that the cost of expected return in terms of standard deviation is quite variable relative to the time period examined, depending on whether the yield curve is relatively flat or steep. The instability of the return-risk tradeoff makes it rather difficult to suggest a future course of action for investors based on this analysis.

If the next twenty years behave like the previous twenty years, investors should invest in stocks after the yield curve becomes relatively steep, and invest in short-term bonds as the yield becomes relatively flat. On the other hand, if the next twenty years behave like the 1953–72 time period, the opposite course of action is advisable. Unfortunately, this sort of advice makes it difficult to decide where to place one's wealth. As usual, there are no guarantees.

Notes

¹ When differentiating years by the slope of the term structure, the same samples would have been roughly derived if the years were differentiated by the level of interest rates. This is because the yield curve generally steepens as interest rates rise and flattens out when they fall.

² For fixed income instruments, these are actual yearly returns and not yields—i.e., the yearly return on the five-year bond is the yearly return realized by holding the five-year bond for one year and then selling it.

³ The sample splits are redone in each of the 20-year sub-periods; the samples associated with the flat and steep yield curves record 10 years of data each.

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