A Behavioral Framework for Time Diversification
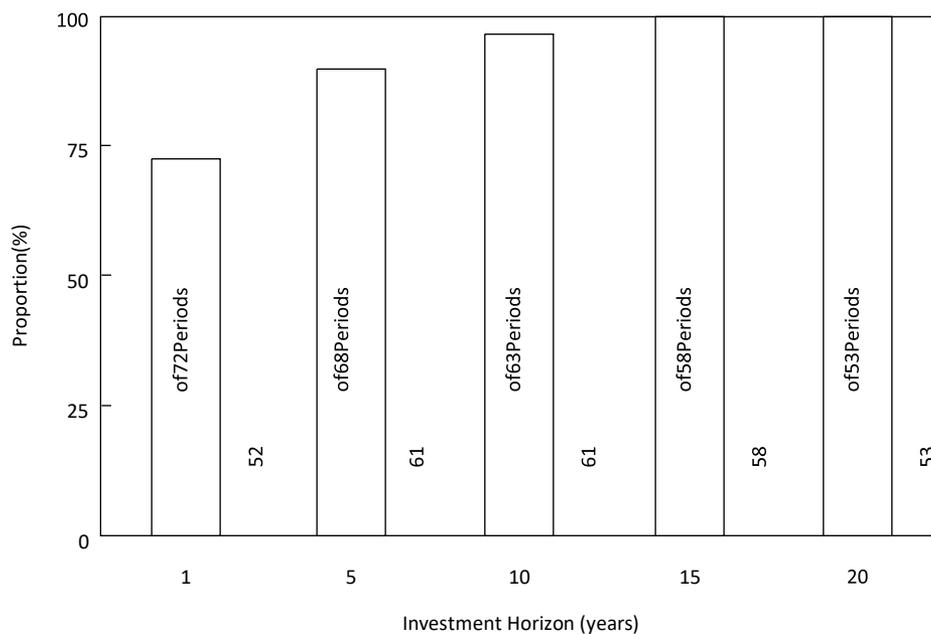
Figure 1. Proportion of Periods When Stock Returns Were Positive, 1926–97

Proportion(%)

of72Periods 52
of68Periods 61
of63Periods 61
of58Periods 58
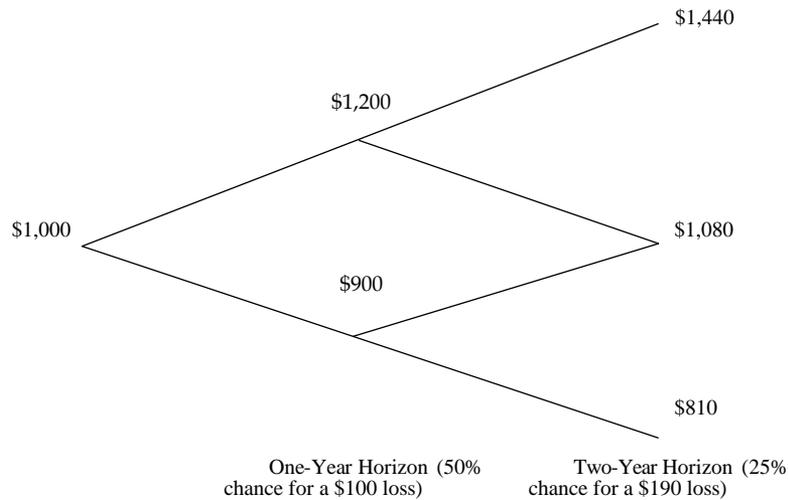of53Periods 53

Investment Horizon (years)

Opponents of Time Diversification (TD)

Samuelson's mathematical proof that TD does not work.

Samuelson's mathematical truth is that under his assumptions, the effect of time on the amount of losses is perfectly balanced in the mind of investors with the effect of time on the probability of losses. *If so, risk neither increases nor decreases as the horizon increases.*

An unstated assumption under the mathematical truth is that investors correctly assess the probabilities of losses.

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                                                    $1,440
                          $1,200
        $1,000                                      $1,080
                          $900
                                                    $810

        One-Year Horizon (50%        Two-Year Horizon (25%
        chance for a $100 loss)      chance for a $190 loss)
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Proponents of Time Diversification

1. Samuelson's mathematical proof is based on wrong assumption that investors are always risk averse.

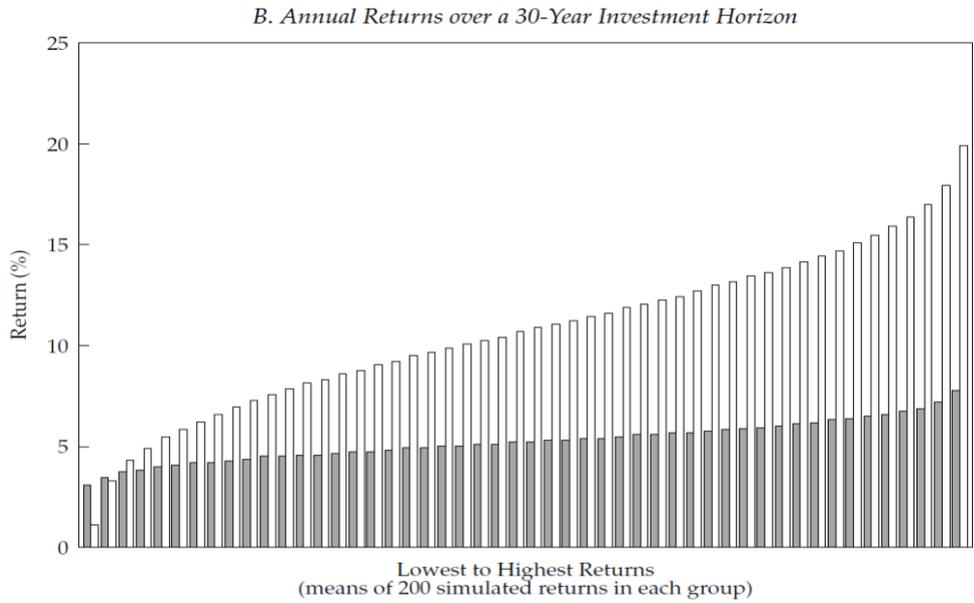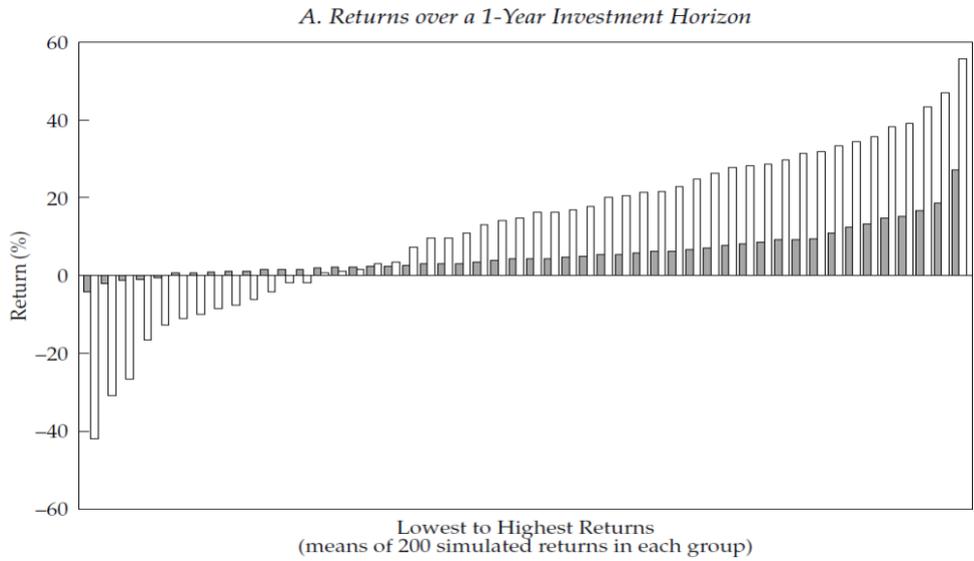   However, investors are not always risk averse (Prospect Theory)

2. Cognitive Errors are Pervasive

An unstated assumption under Samuelson's mathematical proof, however, is that investors correctly assess the probabilities of losses. They do not.

Common presentations of long-term returns of stocks, such as the picture in Figure 1, facilitate the cognitive error because they show no long periods with negative returns.

The "happy end" cognitive error that Samuelson pointed out stands in contrast to another cognitive error—"myopic loss aversion"—which was pointed out by Benartzi and Thaler (1995, 1997). See Figure 5. **The median allocation to stocks among those who saw the 1-year chart was 40 percent. The median allocation to stocks among those who saw the 30-year chart was 90 percent.**

Figure 5. Distribution of Returns over Different Horizons

A. Returns over a 1-Year Investment Horizon

Return (%)

Lowest to Highest Returns
(means of 200 simulated returns in each group)

B. Annual Returns over a 30-Year Investment Horizon

Return (%)

Lowest to Highest Returns
(means of 200 simulated returns in each group)

☐ Bonds   ☐ Stocks

3. Cognitive Errors and Self-Control

Three years of losses often turn investors with thirty-year horizons into investors with three-year horizons; they want out. The tendency of investors to extrapolate recent trends in stock prices is well documented.

This tendency is a manifestation of representativeness, a cognitive error. Resisting the temptation to action based on this cognitive error is an aspect for which investor self-control is important.

Some investors, recognizing their tendency to extrapolate three bad stock market years into a world-is-coming-to-the-end conclusion, use the stay-the-course rules of time diversification to stop themselves from cashing in their stocks.

4. Aversion to Regret

A stock bought for $1,000 might rise to $1,200, or it might fall to $900. The $200 monetary gain is accompanied by pride; the $100 monetary loss is accompanied by regret.

Kahneman and Tversky (1982) described regret as the frustration that comes, *ex post*, when a choice results in a bad outcome.

Ignorance is one way to combat regret. Investors who avoid information about the ups and downs of the market avoid the regret that comes when markets are down.

A shift of responsibility is another way to combat regret, because there is no regret without responsibility for choices.

Responsibility can be shifted to rules, such as rigid schedules. Time diversification comes with stay-the-course rules. These rules reduce regret over paper losses because paper losses leave alive the hope of breaking even.