Portfolio Management without Market Signals

In the first method, you invest part of your liquid assets in the stock market (e.g. in the S&P 500 market) and you hold your stock, ignoring all market fluctuations (buy-and-hold strategy). The following example scenarios are meant to give you a preliminary answer to the following questions:

- What percentage of stock should I choose?
- What is the average return on investment for this percentage of stock for various time periods?
- What is the loss probability for my total portfolio (stock plus risk-free assets)?

The answers to these questions mainly depend on your personal risk-return behavior and the amount of interest on your risk-free assets (e.g. the yield of short-term bonds).

In the example scenarios, the parameters for the average yield of stock and stock volatility are the typical long-term values for the US S&P 500 market between 1964 and 2009: 0.13% for the weekly rate of return and 2.2% for the weekly volatility, i.e. 5.8% for the annual rate of return and 17.1% for the annual volatility.

Four results can be highlighted:

- The most likely return for the portfolio (the mode of the return distribution function) as a function of the stock proportion shows a flat maximum. The associated optimal stock proportion $x_{optimal}$ can be approximated by:
  $x_{optimal} \approx 1/3$ (average stock return – risk-free return) / (average stock volatility)^2
  (Returns and volatility are all over the same time period, either daily, weekly or yearly)
- Halving the optimal stock proportion reduces the loss probability much more than decreasing the rate of return, provided that you have invested in the "diversified market".
- Increasing the stock proportion beyond the optimal proportion only leads to an increase of the loss probability. The most probable return for the total portfolio decreases even further.
- Whenever significant changes occur in the interest on risk-free assets or the volatility of the stock market you should modify your stock proportion.

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Scenario 1: Average Conditions

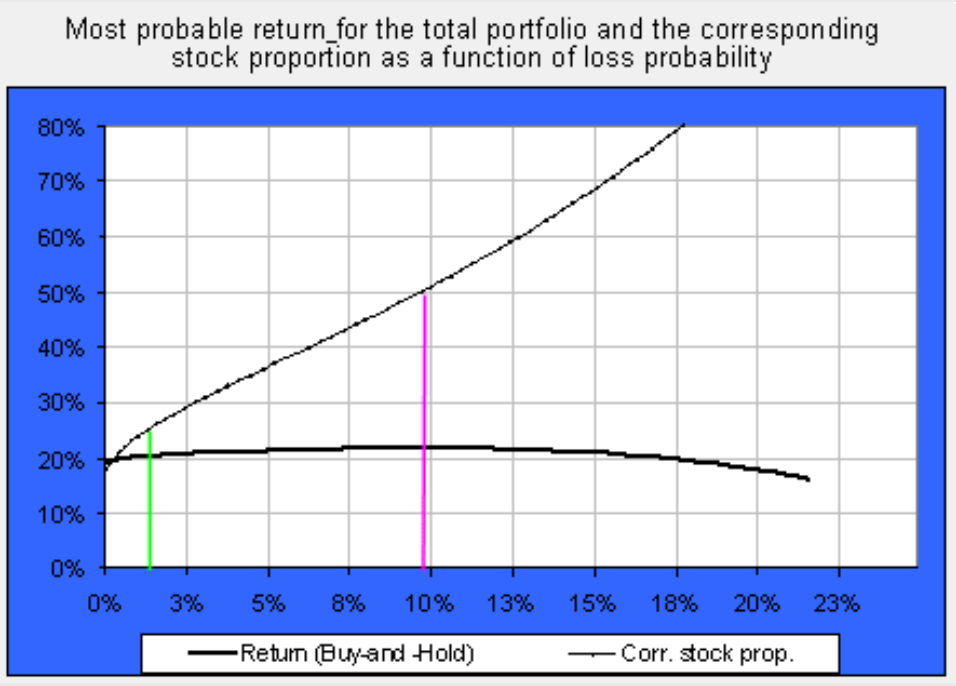
Time period of investment: 5 years

Average annual return for risk-free assets: 3%

Return Expectation and Loss Probability:

- Without any stock and therefore without risk the total return after 5 years would be 15.9%.
- The most probable total return increases to a maximum of 21.8% at a stock proportion of 50%, with an associated loss probability of 9.9%.
- In a worst case scenario (total loss of stock assets which might occur if one had invested in non-diversified stocks instead of the market index) the total portfolio would decrease by 42.0% at a stock proportion of 50%.

Conclusion: If you are risk-averse you can still gain a probable total return of 20.3% with a stock proportion of 25%, i.e. half of the optimal stock proportion of 50%. The loss probability has decreased from 9.9% to only 1.5%. A stock exposure between 20% and 30% is also the result of **an alternative approach using utility functions** (http://www.sigmadewe.com/fileadmin/user_upload/pdf-Dateien/The_Benefit_of_Utilities.pdf)



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Scenario 2: Long-Term Investment

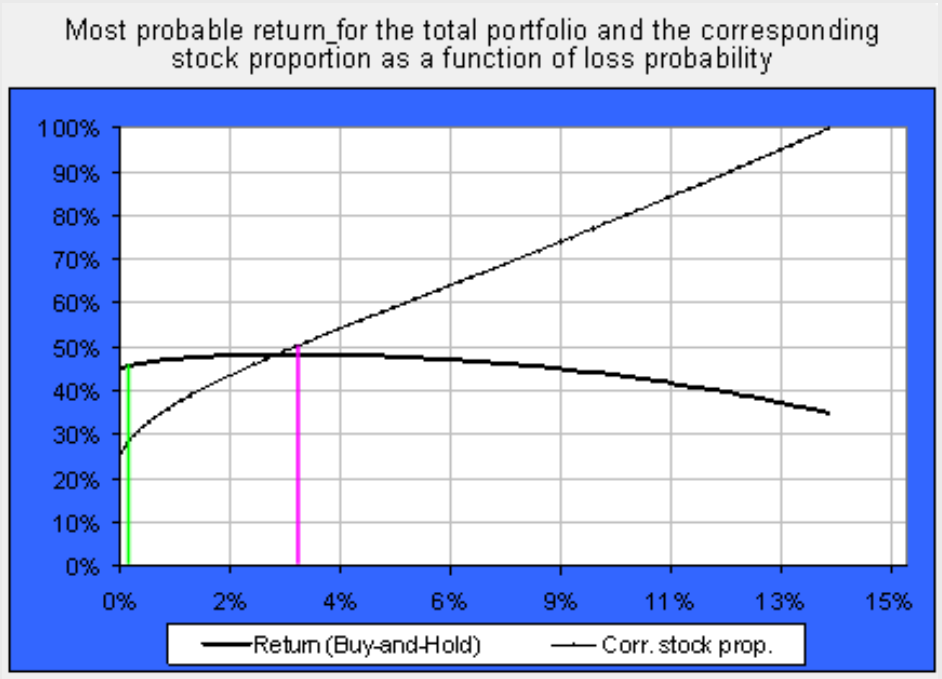
Time period of investment: 10 years

Average annual return for risk-free assets: 3%

Return Expectation and Loss Probability:

- Without any stock, and therefore without risk, the total return after 10 years would be 34.4%.
- The most probable total return increases to a maximum of 48.2% at a stock proportion of 50%, with an associated loss probability of 3.4%. With a stock proportion of 25% you can reduce the loss probability to 0.1% with only a slightly lower return of 44.8%.

Conclusion: In the long run it pays off to invest part of your liquid assets in stock, as you can achieve more return with only a very low risk of loss.



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Scenario 3: Short-Term Investment

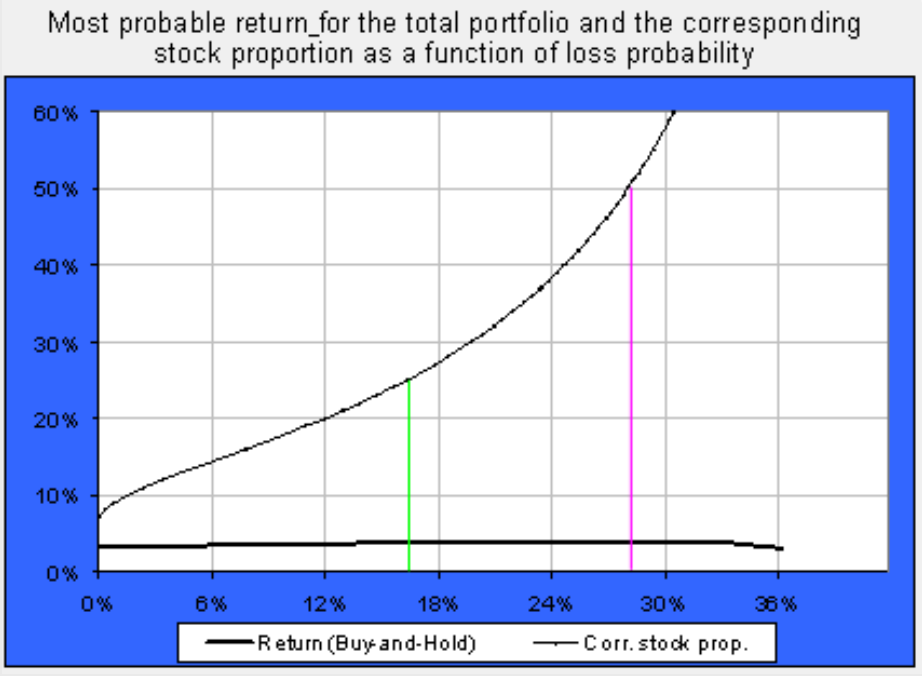
Time period of investment: 1 year

Average annual return for risk-free assets: 3%

Return Expectation and Loss Probability:

- Without any stock and therefore without risk the total return after 1 year would be 3.0%.
- The most probable total return increases to a maximum of 4.0% at a stock proportion of 50%, with an associated loss probability of 28.2%. With a stock proportion of 25% you can reduce the loss probability to 16.5%, however the return of 3.8% is only slightly above the risk-free return.

Conclusion: In the short run, and at an average interest rate for risk-free assets, it does not pay off to invest part of your assets in stock, as the risk of loss overwhelms the small probable return.



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Scenario 4: High Interest Rates

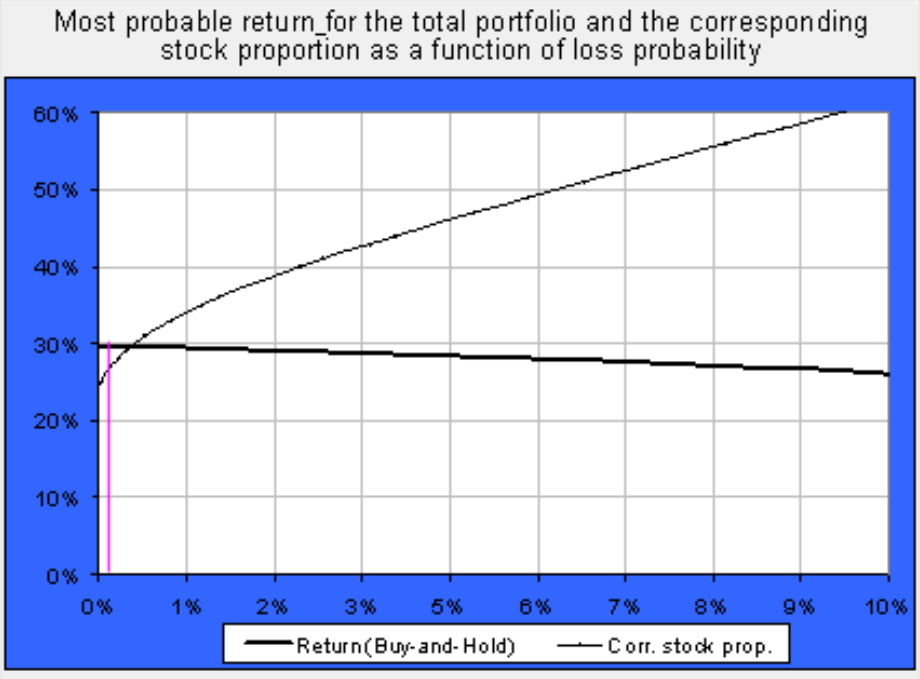
Time period of investment: 5 years

Average annual return for risk-free assets: 5%

Return Expectation and Loss Probability:

- Without any stock, and therefore without risk, the total return after 5 years would be 27.6%.
- Adding stock does not lead to a substantial increase of the most probable total return (the maximum of the most probable return is 29.7% with a stock proportion of 23%).

Conclusion: In a period of high interest rates it makes little sense to invest in stock, as you would increase the risk of loss without gaining much.



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Scenario 5: Low Interest Rates

Time period of investment: 5 years

Average annual return for risk-free assets: 1%

Return Expectation and Loss Probability:

- Without any stock, and therefore without risk, the total return after 5 years would be 5.1%.
- The most probable total return increases to a maximum of 17.3% at a stock proportion of 76%, with an associated loss probability of 19.4%.

Conclusion: In a period of low interest rates investing in stock is particularly reasonable. If you are risk-averse you can gain a probable total return of 9.9% with a stock proportion of 27%, while you have almost halved your loss probability from 19.4% to 9.9%.