

Conservation of Energy: Theory and Applications in Finance

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Introduction: Theory of Conservation of Energy

According to the theory of conservation of energy, the total energy of a closed system remains constant, although the form of energies can be converted from one form to another.

Most of the ideas in this article are inspired by the discussions made by the grandmaster of trading, Mr. Victor Niederhoffer, in his book 'Practical Speculation' (Victor Niederhoffer, 2005). Any valuable insights belong to him, and I'm responsible for any mistakes made.

Applications in Finance

When Number of IPOs Declines

Under the thinking framework of conservation of energy, we assume that the capital available to invest in stocks are constant over time. Since money invested in stocks can either be invested in the form of existing stocks or new initial public offerings, these two quantities are expected to be negatively correlated. We further claim the hypothesis that when more money is invested in IPOs, less money will be available to invest in existing stocks in subsequent period. If this theory really holds, then their correlation should be expected to be around -0.7^2 .

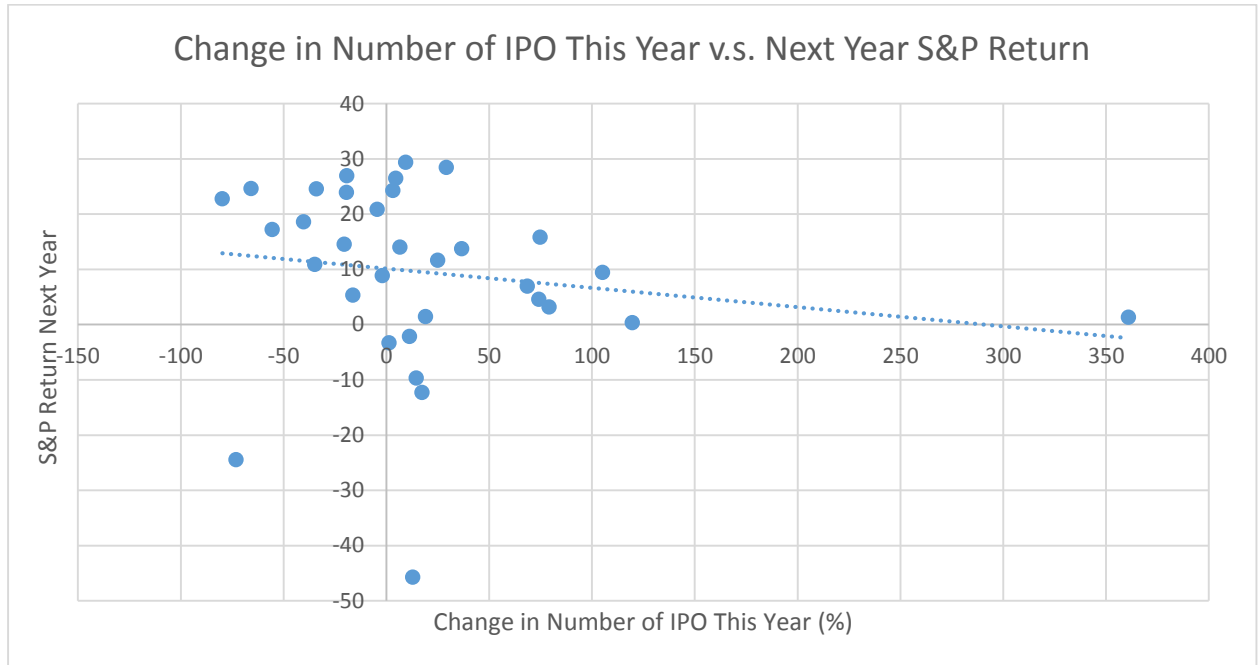
Statistically, the test shows that declines in annual IPO offering numbers are highly bullish for the stock market returns next year. Concretely, the Historical monthly US IPO Statistics data from 1960 to 2014 provided by Professor Jay Ritter in University of Florida is used for constructing the regression and correlation test. The correlation between the gross number of IPOs (the gross count, which includes penny stocks, units, closed-end funds, etc.) of the current year and the S&P return of the next year is -17%, and the least square regression shows a regression relationship of:

$$r_{s\&p} = 10.15 - 0.03 * chg_{IPO}$$

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² Assuming X is the dollar amount available to buy initial public offerings, Y is the total dollar amount available to buy stocks, and then the amount available to buy existing stocks is Y-X. Assuming X and Y are uncorrelated with equal variance, then it can be shown that $\text{corr}(X, Y - X) = -\frac{1}{\sqrt{2}}$, which is approximately -0.7

Therefore, if the number of IPOs decrease by 50%, then the next year stock return is expected to increase by 1.5%. A scatter plot together with a regression line is plotted below for ease of illustration:



Equity/Money-market Ratio

When more money is moving from equities to money-market funds, it suggests a good time to buy equities. Low level of equities/mm ratio suggests a higher than average monthly returns in equities market.

Bibliography

Victor Niederhoffer, L. K. (2005). *Practical Speculation*. Wiley.