

A Telltale About Asset Prices

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Chapter 5

Summary and Conclusion

In this dissertation, we investigated the impacts of the VIX index on stock prices from different angles. The VIX index, at any point in time, is derived from the value of the S&P 500 index and the options, traded on that. Therefore, the VIX index is a conditional measure. Moreover, since option prices depend on investors' expectation about the future path of the market, the VIX index is a forward-looking measure. This index reflects the investors' conditional expectation about the market volatility, and thus, it is considered as a barometer for investors' anxiety and fear.

Chapter 2: From Time Varying Risk-Aversion to Anomalies in Market Moments' Risk Premia

When investors are anxious about market future, they treat different assets, differently. For example, stocks that tend to have a good return when the VIX spikes up (stocks with positive loadings on the changes of VIX index) are extremely desirable. This attractiveness, compared to stocks that tend to perform poorly when the VIX increases, raises their prices and reduces their expected return. In fact the difference between the return of stocks with positive exposure and stocks with negative exposure to the changes of the VIX index is the premium that investors pay to protect themselves against an economic state with a high level of the VIX. In chapter 2, we show that the magnitude of this premium depends on investors' risk aversion. If investors are more risk averse, they accept to pay a higher premium to buy this insurance against the high levels of the VIX.

In this chapter, furthermore we show that the signs of prices of insurance against the market skewness and market kurtosis are both against the inter-temporal capital asset

printing model of Merton (1973). However, the magnitude of these anomalies decline with investors' risk aversion.

Chapter 3: Does Oil and Gold Price Uncertainty Matter for the Stock Market?

By estimating investors' uncertainty with the wedge between volatility under the risk-neutral and the physical measures, we find that not all types of uncertainty matter. Our empirical analysis in this chapter shows that only the uncertainty that originates from the stock market is significantly priced risk factor in the entire cross section of stock prices; Stock market uncertainty affects the time series and the cross section of all stocks.

The uncertainty that comes from the oil market is a sector-specific factor and it is only important for oil-relevant industries. Specialized investors in oil-relevant industries process and incorporate oil-uncertainty shocks in stock prices of these industries, quickly and efficiently. However, we do not observe any significant evidence for the spillover of oil-uncertainty news to other industries. Furthermore, we identify the gold uncertainty risk as an idiosyncratic factor. It can be diversified away, and therefore, exposure to this factor is not compensated.

These findings imply that for pricing any stock, investors must consider its exposure to the stock market uncertainty risk, because this is a systematically priced factor that affects the risk premium and the expected return of every stock. The investors in oil-relevant industries, in addition, must consider oil price uncertainty risk because as a sector-specific factor, it affects the risk premium and the expected return of the stocks in those industries. The investors, who hold sufficiently diversified portfolios, can ignore gold price uncertainty, as this type of uncertainty is asset-specific and it has negligible impact on diversified portfolios.

Chapter 4: Why is the VIX index related to the liquidity premium?

Compensation for liquidity provision depends on short-term price reversal. Existing studies find that the intensity of short-term price reversal in stock prices is highly correlated with the VIX index; when the VIX goes up, the intensity of short-term price reversal is larger and liquidity becomes more expensive.

In this chapter, we develop a 3-period economic model and explain why this is the case. In this model, there are two types of investors. Investors are initially identical and indistinguishable. Therefore, they all hold the market portfolio beside the riskless bond.

However after a while, a proportion of investors receive a risky endowment. Receiving the endowment persuades these investors to trade with the others and makes them *liquidity demanders*, as it departs their portfolio from optimality. The other investors, however, do not have any incentive to trade because they do not receive any endowment. Only if they receive sufficient price discount, they will trade and act as *liquidity suppliers*.

When liquidity demanders are more risk averse, even a small departure from optimality has a large impact on their utility. Consequently, after a liquidity shock they will be desperate to trade and they accept to pay a higher liquidity premium so that they can convince the liquidity supplier to trade with them. Moreover when assets are extremely volatile, due to the higher uncertainty about future payoffs, identical liquidity shocks create a stronger trade motivation in liquidity demanders, which urges them to pay a higher liquidity premium and trade immediately. Finally, when asset correlations are high liquidity shocks spread amongst assets more efficiently, and thereby, liquidity suppliers demand a larger premium for their service. Since the VIX index encapsulates these three factors, an escalated level of the VIX raises the expected return and the Sharpe ratio of liquidity providers.

To empirically test these theoretical findings, we construct a portfolio that proxies for liquidity providers' return. This trading strategy on average yields to 1.27% return per day. When investors' risk aversion or their expectations about stock variances and correlations increase by one standard deviation, the average daily return on this portfolio increases by 0.16%, 0.36% and 0.39%, respectively. Also while the annualized Sharpe ratio of this portfolio is 11.76, one standard deviation increase in each of these factors contribute to 0.84, 1.20 and 2.02 higher Sharpe ratio for liquidity suppliers.