IS THERE TOO MUCH VOLATILITY IN STOCK PRICES?

This is a test of the rationality of the stock market. Shiller argues that share prices can be viewed as predictions of company dividends. Therefore it is reasonable that the variation in prices (the forecasts) should be no greater than the variation in dividends (the variable being forecasted). The discussion is to be found in

Shiller, “Do stock prices move too much to be justified by subsequent changes in dividends?”, American Economic Review, June 1981, 421-436.

P_t = price of the share at time t

= the **forecast** of the present value of dividends; this is what investors think they are buying

P^*_t = the **actual** present value of dividends from time t onwards; this is what investors do actually purchase. This variable is constructed with hindsight.

Given that we have a forecast and an actual, the difference between them is the forecast error.

Then:

$$P^*_t = P_t + e_t$$

and

$$\text{Var}\,(P^*_t) = \text{Var}\,P_t + \text{var}(e_t) + 2\,\text{cov}(P_t, e_t)$$

One property of an rational forecast is that it is uncorrelated with the forecast error; that is, there is zero covariance between P_t and e_t. Given this, it then follows that

$$\text{Var}\,(P^*_t) = \text{Var}\,P_t + \text{var}(e_t)$$

Since the var(e_t) will be positive (there are bound to be mistakes in forecasting the present value of dividends), this means that $\text{Var}\,(P^*_t) \$ \text{Var}\,P_t$. This is the variance bounds test. That is, the variation of the forecast should not be more than the variation in the item that is being forecast.

Shiller finds that, using data from 1870-1970, the reverse holds. $\text{Var}\,(P^*_t) < \text{Var}\,P_t$ and therefore the forecast implied by P_t is not rational. This means that markets are driven by irrational predictions. At some points the market is far too optimistic relative to the underlying fundamental about dividends; and at other points in time, the marker is far too pessimistic. Investors act as if this is not happening; they do not seem to realise this.

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Bulkley and Tonks, “Are UK stock prices excessively volatile”, Economic Journal, December 1989, 1083-1098

Of course, the Shiller findings have been investigated thoroughly, and there is not agreement on their results. For example, Bulkley and Tonks criticise the findings on the grounds that the variable P^*_t (the present value of dividends) is constructed with hindsight. It assumes that investors know the future, that is, what the dividend payments are going to be. When they adjust the test so that P^*_t is based on information available at the time, then the excess volatility falls substantially.

However, this effectively means that the excess volatility is due to the fact that markets cannot forecast very well. This is hardly good news for those who believe that the stock market provides an effective disciplinary mechanism over companies through the takeover mechanism.