
2005-09-01

PRESS RELEASE

An international analysis of earnings, stock prices and bond yields

NBB Working Paper No. 73 - Research Series

www.nbb.be

This paper assesses the possible contemporaneous relationship between stock index prices, earnings and long-term government bond yields for a large number of countries and over a time period that spans several decades. Although neither endorsed nor suggested by the Fed, the name 'Fed model' was coined by market practitioners in the late 1990's to designate a possible valuation model that determines the acceptable earnings yield for a stock index with respect to the prevailing long-term government bond yield. More specifically, proponents of this model argue that there is an equilibrium relationship between the earnings yield of a stock index and the 10-year government bond yield. In a nutshell, when the earnings yield is below (above) the 10-year government bond yield, the stock market is supposed to be overvalued (undervalued). Thus the 'fair value' for the stock index should be equal to the earnings level divided by the prevailing 10-year government bond yield. The main rationale of this model is the (possibly flawed) use of a discounted cash-flow model. In a simplified setting, decreasing (increasing) government bond yields imply a smaller (larger) discount factor, hence a smaller (larger) denominator in the valuation formula, hence a higher (lower) stock price. Since a couple of years, there has however been a growing criticism of this simplified valuation model. Critics argue that the logic behind the valuation argument is flawed in the sense that an element is missing (the risk premium, which is known to be time-varying) and that the concept of 'inflation illusion' should be taken into account. Indeed, lower bond yields suggest lower anticipated inflation, hence firms should witness smaller growth rates for their earnings per share because of a likely decrease in corporate pricing power. Therefore, when the discount factor is decreased in the valuation formula, the earnings per share growth rate should also be decreased. This implies that higher stock prices are not necessarily warranted. Thus, this approach stresses that the growth rate and discount factor variables are interrelated in the valuation formula.

The goal of the paper is thus to assess explicitly the contemporaneous relationship between stock indexes, earnings and long-term government bond yields for a large collection of countries (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Italy, Japan, Switzerland, The Netherlands, United Kingdom and the United States) and over a time period that spans 30 years. In particular, the analysis looks at three hypotheses using the cointegration framework. First, is there a long-term contemporaneous relationship between earnings, stock prices and government bond yields? Second, does a deviation from this possible long-run equilibrium impact stock prices such that the equilibrium is restored? Third, do government bond yields play a significant role in the long-run relationship or does the latter only involve stock prices and earnings? Furthermore, we also study the short-term impact of changes in long-term government bond yields on stock prices and discuss our short-term and long-term results in light of the recent developments in the literature.

Our empirical results show that a long-run relationship between stock indexes, earnings and long-term government bond yields indeed exists for many countries (including the United States and the United Kingdom) but that the long-term government bond yield is *not* statistically significant in this relationship, i.e. the long-term government bond yield does not affect the 'equilibrium' stock market valuation. Focusing next on the short-term effects, we nevertheless show that rising/decreasing bond yields do impact contemporaneous stock market returns and thus have an important short-term impact on the stock market. The fact that the bond yield is left out of the picture in the long-run relationship is in agreement with the academic literature that stresses the importance of valuation ratios (such as the P/E ratio) when appraising long-run stock market performance.