



American Finance Association

The Arbitrage Pricing Model and Returns on Assets Under Uncertain Inflation: Discussion

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Source: *The Journal of Finance*, Vol. 38, No. 2, Papers and Proceedings Forty-First Annual Meeting American Finance Association New York, N.Y. December 28-30, 1982 (May, 1983), pp. 563-564

Published by: Blackwell Publishing for the American Finance Association

Stable URL: <http://www.jstor.org/stable/2327991>

Accessed: 27/11/2009 07:59

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Reasonable values for the noncritical variables in Eq. (11) are $\theta = .3$, $d/q = .035$, $c = .15$, and $g = .025$. With these values and with $\underline{k} = .06$ when $\pi = 0$, the post-tax yield is $\underline{\kappa} = .0458$. If we assume $\underline{k}$ remains unchanged when the inflation rate rises to $\pi = .07$, then $\underline{\kappa}$ would fall to .0353. However, under the more reasonable assumption that as π rises to .07, $\underline{\kappa}$ remains equal to .0458, $\underline{k}$ would rise from .06 to .0702. Under the second assumption, practically the entire increase in the pre-tax share yield between 1960 and 1980 would be due to the personal tax consequences of inflation.

The major conclusion we have reached is that the large fall in q , the ratio of the market value of equity to its replacement cost, between 1960 and 1980 can be adequately explained by the fall in corporate profitability and the rise in the pre-tax yield that investors require on shares. The decline in profitability made the small rise in expected growth inadequate to offset the large reduction in the dividend per dollar of equity. A number of factors contributed to the rise in the required yield, among which the rise in the effective rate of the personal tax on share income is directly attributable to the rise in the inflation rate. Thus we see that irrationality in valuing shares on the part of investors need not be invoked to explain the fall in q .

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DISCUSSION

ZVI BODIE*: I find myself in complete agreement with Elton, Gruber, and Rentzler (EGR) regarding the significance of the topic they have chosen to deal with and their basic theoretical results. I think they have done a fine piece of work. My main purpose in these comments is to clarify some aspects of their paper by highlighting its connection to the work of those who have applied

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Robert C. Merton's "consumer services" model to the issue of equilibrium asset returns under uncertain inflation.

The authors begin by pointing out that despite its tremendous popularity as a model of equilibrium returns, the Arbitrage Pricing Theory of Ross suffers from a major deficiency—it offers no economic theory for identifying the factors in the linear return generating process. EGR explore the theoretical rationale for a two-factor APT model characterizing real equilibrium returns in which the first factor is a "market factor" and the second an "inflation factor."

Merton (1973) has developed a general multifactor model for describing equilibrium returns along the lines suggested by EGR. In the Merton framework, consumer/investors are assumed to maximize the expected utility from their lifetime consumption. Because they are risk averse they have hedging demands for assets which arise from the desire to eliminate adverse stochastic shocks to their optimal consumption stream which can arise from many sources. To the extent that an asset is valuable as a hedge against a risk facing an investor, he will be willing to accept a lower expected rate of return on the asset. In equilibrium, that asset's expected return will be lower (higher) if the net hedging demand in the aggregate (i.e., summed over all investors) is positive (negative).

EGR's discussion of the theoretical reasons for us to expect the equilibrium mean real return on an asset to reflect an inflation factor in addition to a market factor seems to fit quite neatly into Merton's analytical framework. Indeed, two previously published papers have applied Merton's model to derive some of the same results as EGR do. Specifically, my paper (Bodie 1982) derives the Friend, Landskroner, Losq results in real terms and shows how the two-factor model in nominal terms collapses into a single-factor model in real terms. Fischer (1975) uses Merton's framework to derive explicit hedging demands and mutual fund theorems when different consumers are concerned with different price indexes.

I believe the main original contribution of EGR's paper is its demonstration that an arbitrage pricing model with two non-zero factors can be consistent with a single-factor mean-variance model of equilibrium yield relationships. I agree entirely with them that this result should serve as a cautionary note against interpreting the presence of multiple-priced factors in the APT framework as evidence against the single-factor CAPM in the absence of a real riskless asset.

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DISCUSSION

DAVID M. MODEST*: This paper by Kane, Rosenthal and Ljung follows the work of Fama (1975) in examining the adjustment of nominal interest rates to expected

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