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On the systematic volatility of unpriced earnings ☆

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ABSTRACT

Some important puzzles in macro finance can be resolved in a model featuring systematically varying volatility of unpriced shocks to firms' earnings. In the data, the correlation between corporate debt and stock market valuations is low. The model accounts for this via the opposing effect of unpriced earnings risk on levered debt and equity prices. The model also explains the low (or nonexistent) risk-reward relation for the market portfolio of levered equity via the opposing effects of unpriced and priced uncertainty (both components of stock volatility) on the levered equity risk premium. Versions of the model calibrated to empirical measures of both types of fundamental risk can quantitatively substantiate these explanations. Variation in residual earning dispersion accounts for a significant fraction of observed disagreement between debt and equity valuations and of realized stock volatility. The implication that the two components of risk should forecast the levered equity risk premium with opposite signs is also supported in the data. The results are a notable advance for risk-based asset pricing.

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1. Introduction

An unexplained fact in macro finance is that aggregate credit spreads often move in the same direction as the equity values of the underlying companies or, equivalently, debt and equity prices move in opposite directions. The correlation between the Standard & Poor's (S&P) 500 price–earnings (P/E) ratio and Baa–Aaa credit spreads since 1927 is only about -0.50, for example. The two numbers move in the same direction in over 40% of the monthly observations. Equilibrium asset pricing models typically imply that this should almost never happen.

Panel A of Fig. 1 shows rolling five-year correlations of the two series, which are positive for extended periods. A simple measure of disagreement between valuation levels is just to sum these series (after normalizing each). This statistic, shown in Panel B, has a range of over ± 2. At times, equity valuations and credit spreads are simultaneously near historical highs (e.g., both normalized series ≥ 1) or lows (both ≤ -1).

These observations are closely related to the finding of Collin-Dufresne, Goldstein, and Martin (2001) of a strong common component in changes in firms' credit spreads that is not accounted for by changes in their stock prices or other controls. Explaining this finding has proved challenging and continues to be an active focus of research. We view it not as a puzzle about bond markets, but as a puzzle about the joint dynamics of bonds and stocks. We argue that resolving the low correlation of debt and equity valuations sheds important light on the understanding of fundamental risk.

Recent advances in asset pricing theory have integrated modeling of debt and levered equity with equilibrium

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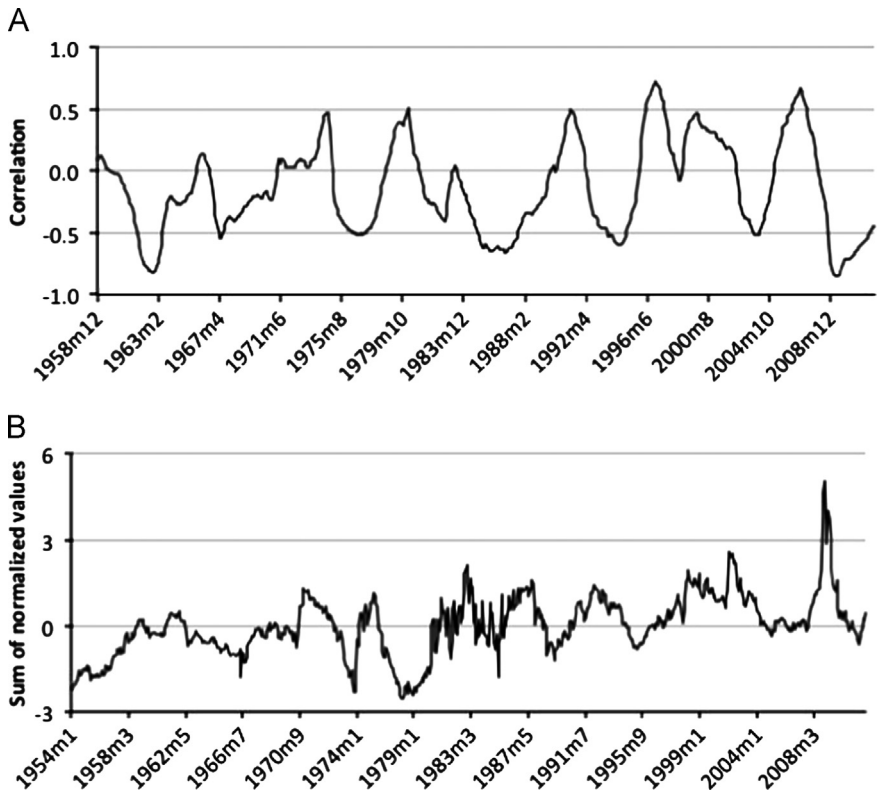

Fig. 1. Stock price–earnings (P/E) ratio and corporate bond spreads. Panel A shows the correlation between the Standard & Poor's 500 index's log P/E ratio and the Moody's Baa–Aaa corporate bond spreads over the rolling window of past 60 months. Panel B shows the sum of the two normalized time series.

determination of discount rates. Yet it is not easy to pinpoint state variables in these models that could move debt and equity values in opposite directions. Changes in risk aversion or market prices of risk and shocks to profitability and growth rates should all affect aggregate stock and bond prices in the same fashion. Discrete corporate events that change leverage (e.g., leveraged buyouts) could move debt and equity in opposite directions for individual firms. However, this channel is largely shut down for fixed credit rating portfolios. Thus, while the issue has yet to be examined in an equilibrium setting, we think it unlikely that the puzzle can be explained by dynamic capital restructuring.

From a purely empirical standpoint, the literature following Collin-Dufresne, Goldstein, and Martin (2001) has ruled out leverage fluctuations as a source of the independent variation in credit spreads. The variation in the first principal component is also not explained by nominal interest rate fluctuations and a host of other candidate factors. In our empirical work, we likewise consider the degree to which measures of valuation divergence can be explained by controls, including inflation and debt quantities. Our conclusions are similar.

One mechanism that can account for opposing movement in bond and stock valuations is fluctuations in the volatility of the unpriced component of firm cash flows. In partial equilibrium settings such as Merton (1974), it is well-known that increases in the (exogenous) volatility of unlevered asset values lower the risk premium of levered equity and raise its price, while having opposing effects on risky debt. Less well known is that the argument, in general, fails with equilibrium determination of asset values and their volatilities. Fig. 2 illustrates what happens to the valuation of a Merton (1974) firm's claims under two otherwise highly successful models as fundamental uncertainty changes. Panel A shows the levered price–dividend ratio and credit spread as a function of volatility when the underlying asset is priced by the Campbell and Cochrane (1999) model.[1] The horizontal axis in the figure is the volatility of the log-surplus consumption ratio, which is a monotonic function of the level of surplus consumption, the model's main state variable. Panel B does the same calculation under the model of Bansal and Yaron (2004), varying the second moment of consumption (while holding the first moment fixed). In both panels, as uncertainty increases in the economy, credit spreads widen while an increase in discount rates lowers underlying asset values. This is more than enough to counteract the positive effect of convexity on the price of levered equity.[2] What is

[1] We implement the correction to the model described in Chen, Collin-Dufresne, and Goldstein (2009).

[2] The nonlinear valuation functions in these models mean that linear measures of association—correlation coefficients—do not pick up the perfectly monotonic relationship between debt and equity. We thank the referee for this observation. Other measures could be more revealing. Both these models imply, for example, that debt and equity price changes almost always have the same sign.

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