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Idiosyncratic risk and the cross-section of stock returns: Merton (1987) meets Miller (1977)

Rodney D. Boehme[a], Bartley R. Danielsen[b], Praveen Kumar[c,*], Sorin M. Sorescu[d]

[a]*W. Frank Barton School of Business at Wichita State University, USA*
[b]*North Carolina State University, USA*
[c]*C.T. Bauer College of Business, University of Houston, Houston, TX 77204-6021, USA*
[d]*Mays Business School at Texas A&M University, USA*

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Abstract

Merton [1987. A simple model of capital market equilibrium with incomplete information. Journal of Finance 42, 483–510] predicts that idiosyncratic risk should be priced when investors hold sub-optimally diversified portfolios, and cross-sectional stock returns should be positively related to their idiosyncratic risk. However, the literature generally finds a *negative* relationship between returns and idiosyncratic risk, which is more consistent with Miller's [1977. Risk, uncertainty, and divergence of opinion. Journal of Finance 32, 1151–1168] analysis of asset pricing under short-sale constraints. We examine the cross-sectional effects of idiosyncratic risk while explicitly recognizing the confounding effects that dispersion of beliefs and short-sale constraints produce in the Merton framework. We find strong support for Merton's [1987. A simple model of capital market equilibrium with incomplete information. Journal of Finance 42, 483–510] model among stocks that have low levels of investor recognition and for which short selling is limited. For these stocks, the relation between idiosyncratic risk and expected returns is positive, as predicted by Merton [1987. A simple model of capital market equilibrium with incomplete information. Journal of Finance 42, 483–510].

JEL classification: G10; G12; G14

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*Corresponding author. Tel.: +1 713 743 4770.
E-mail address: pkumar@uh.edu (P. Kumar).

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According to the textbook capital asset pricing model (CAPM), idiosyncratic risk is not priced because investors hold efficiently diversified portfolios. However, the model makes no predictions concerning the effect of idiosyncratic risk on equilibrium returns if investors are constrained from forming diversified portfolios because of transactions costs (e.g., information or trading costs).

In an influential paper, Merton (1987) presents an extension of the CAPM where idiosyncratic risk plays a role in equilibrium. Merton forwards the investor recognition hypothesis (IRH), which posits that, because of incomplete information on security characteristics, investors only hold securities whose risk and returns characteristics they are familiar with. Consequently, they hold under-diversified portfolios and, in the static mean-variance setting considered by Merton, they demand compensation for securities' idiosyncratic risk.[1] Thus, in equilibrium, cross-sectional stock returns are positively related to their idiosyncratic risk.[2]

Direct tests of Merton's (1987) model are rare. Merton's predictions are cross-sectional in nature, but Ang et al. (2006) appears to be the only cross-sectional test of Merton (1987) that directly sorts stocks into portfolios ranked on idiosyncratic volatility. Observing that stocks with high idiosyncratic volatility have "abysmally low average returns," they conclude their results are directly opposite to the implications of Merton's (static) IRH.

Meanwhile, Diether et al. (2002) offer an indirect test of Merton (1987). Since dispersion in analysts' forecasts likely indicates a more volatile, less predictable earnings stream, Diether et al. (2002) suggest that the dispersion of analysts' forecasts reflects the type of idiosyncratic risk to which Merton refers. Their results do not support Merton's theory, and they note "our results clearly reject the notion that dispersion can be viewed as a proxy for risk, since the relation between dispersion and future returns is strongly negative," (p. 2139). Similarly, when Gebhardt et al. (2001) use forecast dispersion as a risk proxy for estimating cost of capital, they are surprised to find the "wrong sign" on the variable at statistically and economically significant levels.

Thus, both in direct tests using idiosyncratic volatility as a proxy for idiosyncratic risk, and in indirect tests that use analysts' forecast dispersion as a risk proxy, cross-sectional results are incorrectly signed, compared to Merton's (1987) predictions, at high levels of statistical significance. Based on the empirical tests to date, the literature concludes that Merton's hypothesis, while both intuitively appealing and theoretically well grounded, is not supported by the data. Instead, Diether et al. (2002) argue that their results, along with those of Gebhardt et al. (2001), are more consistent with predictions of Miller (1977).

Miller (1977) argues that dispersion of opinion, in the presence of short-sale constraints, leads to systematic security overvaluation because the most optimistic market participants set a stock's price. Thus, dispersion of investor opinion is priced at a *premium* when short-sale constraints are present. Miller's theory implies that *if* short-sale constraints are

[1] Mayers (1976) and Levy (1978) produce similar predictions in CAPM extensions where investors hold under-diversified portfolios. Barberis and Huang (2001) produce a prospect-theory model where idiosyncratic risk produces positive expected returns.

[2] Shapiro (2002) generalizes the IRH to a dynamic setting and shows that this conclusion need not hold when the investment opportunity set is stochastically evolving, since higher volatility stocks may still provide a more effective hedge against shifting investment opportunities, compared to lower volatility stocks.