APPLICATION OF THE OPTION PRICING MODEL TO ESTIMATE EXPECTED STOCK RETURNS

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ABSTRACT

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This thesis refines and tests an option-based methodology for estimating the expected rate of return on firms' equity, being an approach proposed by Hsia (1991). Hsia's approach is based on an option-theoretic model of the firm, as proposed by Merton (1974) and others. Tests of the Hsia approach are thus joint tests of the Merton model and of the Hsia approach. The Merton model is successfully fitted in its basic form by solving for firm asset volatility and, consistent with prior studies, the implied volatility for firms' assets is found, on average, to be higher than that expected from examining historical equity volatility. The Hsia-based expected excess returns on equity are then estimated and tested in regressions against realised excess stock returns. The Hsia-based expected excess returns are found to be only weakly, positively associated with realised excess returns, and not of statistical significance. When the sample is split in half on the basis of various option-like characteristics (such as higher gearing), the Hsia approach is found to work better for the more option-like sub-sample. This research thus provides some tentative support for the Hsia approach, but does not provide a clear conclusion about its ability to explain the variation in realised excess stock returns. It also provides some ideas and possible directions for further research into applying the Hsia approach.

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Any errors in this thesis are solely the author's responsibility.

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GLOSSARY

A	aggregate annual debt service charges of the firm
B	value of the firm's debt
CAPM	Capital Asset Pricing Model
CBOE	Chicago Board Options Exchange
CBOT	Chicago Board of Trade Options Exchange
d	Merton "quasi" debt-to-firm ratio
D	debt servicing as a percentage of the value of the firm's assets
FRB	US Federal Reserve Board
i	yield on the firm's debt
k_B	expected rate of return on the firm's debt
k_S	expected rate of return on the firm's equity
k_V	expected rate of return on the firm's assets
m	borrowing margin
μ	instantaneous rate of return on the firm's assets
MLHYM	Merrill Lynch High Yield Master II corporate bond index
MM	Modigliani and Miller
N(.)	cumulative probability of the standard normal distribution
OPM	Option Pricing Model
r	risk-free rate of interest
σ_S	standard deviation of rates of return on the firm's equity
σ_V	standard deviation of rates of return on the firm's assets
S	value of the firm's equity
T	time to maturity
V	value of the firm's assets
X	face value of the firm's debt, at maturity