International Asset Pricing: Evidence From Market Implied Costs of Capital

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WFA-Portland, June 2005
Review

- An application of implied costs of capital (IRRs) in the international setting

- Important determinants of the international cross-section of returns —
  lagged risk premiums, return volatility, size, b/m, growth forecast, and leverage

- Careful, comprehensive, and admirable empirical work!
Punchline

- Many strong assumptions — not clear IRRs dominate average ex post returns
- Caveat — an outsider’s perspective!

Outline

- IRR methodology
- The $Q$-model of implied cost of capital
IRR equates discounted dividends with stock price:

\[ P_t = \sum_{k=1}^{\infty} \frac{E_t[FCFE_{t+k}]}{(1 + r_e)^k} \]

where

\[
\begin{align*}
\text{Expected Dividends} & \quad \text{Earnings Forcasts} \quad \text{Plowback Rate} \\
\widehat{E_t[FCFE_{t+k}]} & = \widehat{FE_{t+k}} \times (1 - \widehat{b_{t+k}})
\end{align*}
\]

Assumption 1: exponential mean-reverting growth rates:

\[ g_{t+k} = g_{t+k-1} \times \exp\left[\log\left(\frac{g}{g_3}\right)/(T - 1)\right]; \quad \widehat{FE_{t+k}} = \widehat{FE_{t+k-1}} \times (1 + g_{t+k}) \]

Other parametric forms of mean-reverting?
Assumption 2: \( g \) — world average GDP growth rate plus the average US inflation

Recall “Expected return = expected growth + expected dividend yield”

A time-varying cross-section of average/expected growth?

Assumption 3: linearly mean-reverting plowback rates

\[
b_{t+k} = b_{t+k-1} - \frac{b_2 - g/r_e}{T-1}
\]

Other parametric forms of plowback rates?

Assumption 4: terminal value \( TV_{t+T+1} = FE_{t+T+1}/r_e \), where \( T = 15, 20 \)

Why a perpetuity form?
More Comments on IRR

- Standard errors in earnings forecasts and estimates of future plowback rates
- Quantify the standard errors for the IRR estimates?
- Then compare the standard errors with those in Fama and French (1997)
- Much harder to quantify the misspecification errors without theoretical guidance?
IRRs are based on accounting identities

Can we use economic theory to compute costs of capital without betas?

Yes!

Zhang (2005, “Anomalies”): An implied-cost-of-capital model from the Q-theory:

\[ r_{t+1} = \frac{\Pi_1(K_{t+1}, X_{t+1}) - \Phi_2(I_{t+1}, K_{t+1}) + (1 - \delta)\Phi_1(I_{t+1}, K_{t+1})}{\Phi_1(I_t, K_t)} \]

Estimate the parameters in \( \Pi \) and \( \Phi \) from the investment Euler equation

Covariances versus characteristics — not well-defined question
Advantages over IRR:

1. Only need one-period-ahead earnings and investment forecasts — dynamic-programming versus infinite-horizon formulations

2. A class of specifications of \( \Pi \) and \( \Phi \) guided by economic theory

**Conclusion**

- Admirable empirical piece!
- We can do a better job integrating economy theory and empirical practice
- An alternative implied-cost-of-capital model based on the \( Q \)-theory