Ibbotson Associates  
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The International Cost of Capital

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The International Cost of Capital:  
1. Motivation

- Widespread disagreement over approaches to international valuation

- Different methods provide sharply different hurdle rates in international context (compared to domestic)
The International Cost of Capital:
1. Motivation

- Disagreement comes at a bad time with growth in global investment
The International Cost of Capital:
1. Motivation

(Exports+Imports)/GDP Emerging

The International Cost of Capital:
1. Motivation

Foreign Acquisitions of US Companies

Source: Mergerstat
The International Cost of Capital:
1. Motivation

US Acquisitions of Foreign Companies

Source: Mergenstat

The International Cost of Capital:
2. Models

- Identical Cost of Capital (all locations)
- World CAPM or Multifactor Model (Sharpe-Ross)
- Segmented/Integrated (Bekaert-Harvey)
- Bayesian (Ibbotson Associates)
- Credit Rating (Erb-Harvey-Viskanta)
- CAPM with Skewness (Harvey-Siddique)
The International Cost of Capital:

2. Models

- Goldman-integrated sovereign yield spread model
- Goldman-segmented
- Goldman-EHV hybrid
- CSFB volatility ratio model
- CSFB-EHV hybrid

The International Cost of Capital:

3. Details

Identical Cost of Capital

- Ignores the fact that shareholders require different expected returns for different risks
- Destroys value
- Avoid
The International Cost of Capital:
3. Details

**World CAPM**

- Expected risk premium (in U.S. dollars) on investment that has average in a country
  \[ = \beta_t \times \text{world risk premium} \]
- OK for developed markets if we allow risk to change through time (Harvey 1991)

**World CAPM**

- Strong assumptions needed
- Perfect market integration
- Mean-Variance analysis implied by utility assumptions
- Fails in emerging markets
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Returns and Beta from 1970

\[ R^2 = 0.013 \]

Average returns vs. Beta

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3. Details

Returns and Beta from 1990

\[ R^2 = 0.0211 \]

Average returns vs. Beta
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Returns and Beta from 1990 through 1998:03

Segmented/Integrated CAPM

- Bekaert and Harvey (1995)
- If market integrated, world CAPM holds
- If market segmented, local CAPM holds
- If going through the process of integration, a combination of two holds
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Segmented/Integrated CAPM

- Expected return a function of covariance with world and covariance with local index
- Weights determined by variables that proxy for degree of integration, like size of trade sector and equity market capitalization to GDP

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Segmented/Integrated CAPM

- Weights are dynamic, as are the risk loadings and the risk premiums
- Downside: hard to implement; only appropriate for countries with equity markets
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Bayesian-Ibbotson

- World risk premium = U.S. risk premium divided by the beta vs. the MSCI world
- Steps
  1. Estimate beta vs. world index
  2. Multiply beta times world risk premium

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3. Details

Bayesian-Ibbotson

3. Add in 0.5 times the ‘alpha’ from the initial regression. “This additional premium represents the compensation an investor receives for taking on the considerable risks of the emerging markets that is not explained by beta alone.”
CAPM with Skewness

- Harvey and Siddique (1998) tests of a model that includes time-varying skewness risk
- Investors like securities that add positive skewness to their portfolios (hence lower expected returns)

CAPM with Skewness

- Investors do not like securities that add negative skewness to their portfolios (hence higher expected returns)
- Bekaert, Erb, Harvey and Viskanta detail the implications of skewness and kurtosis in emerging market stock selection.
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3. Details

CAPM with Skewness

- Risk premium for coskewness is negative. Hence, negative coskewness (adding negative skewness to portfolio) implies higher expected returns.

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The International Cost of Capital:
3. Details

Credit Rating Model

- Erb, Harvey and Viskanta (1995)
- Credit rating a good ex ante measure of risk
- Impressive fit to data
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3. Details

Returns and Institutional Investor Country Credit Ratings from 1990

\[ R^2 = 0.2976 \]

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3. Details

Returns and Institutional Investor Country Credit Ratings from 1990 through 1998:03

\[ R^2 = 0.0937 \]
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3. Details

Credit Rating Model

- Intuitive
- Can be used in 136 countries, that is, in countries without equity markets
- Fits developed and emerging markets

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Goldman-Integrated

- Estimate market beta on the S&P 500
- Beta times historical US premium
- Add sovereign yield spread
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3. Details

Goldman-Integrated-EHV Hybrid

- Goldman model only useful if you have sovereign yield spread
- Use EHV model to fit ratings on yield spread

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Real Yields and Institutional Investor Country Credit Ratings from 1990 through 1998:03

R^2 = 0.8784
The International Cost of Capital:
   3. Details

Goldman-Semitted

- Modified beta = standard deviation of local market return in US dollars divided by standard deviation of the US market return
- Beta times historical US premium
- Add sovereign yield spread

CSFB

\[ E[r_i] = SY_i + \beta_i \{E[r_{us} - RF_{us}] \times A_i\} \times K_i \]

- \( SY_i \) = brady yield (use fitted from EHV)
- \( \beta_i \) = the beta of a stock against a local index
- \( A_i \) = the coefficient of variation (CV) in the local market divided by the CV of the U.S. market where \( CV = \frac{\sigma}{\text{mean}} \).
The International Cost of Capital:
3. Details

CSFB

\[ E[r_i] = \beta_i \{E[r_{us} - RF_{us}] \times A_i \} \times K_i \]
- \( K_i \) is an adjustment factor to allow for correlation between risk free and risk premium (set = 0.6)

The International Cost of Capital:
4. Comparison

![Comparison Chart]
The International Cost of Capital:
4. Comparison

Estimated Equity Risk Premia:
Country Risk Models

IICCR: Institutional Investor Country Credit Rating
See Table 2 for details.
Estimated Bond Risk Premia:
Country Risk Models

[Graph showing estimated bond risk premia with lines for IICCR and ICRGC, indicating spread over US Tr vs. country risk rating.]

IICCR: Institutional Investor Country Credit Rating
See Table 2 for details.

The International Cost of Capital:
5. Using the Credit Rating Model

Java Version
The International Cost of Capital:
5. Using the Credit Rating Model

Excel version

International Cost of Capital Calculator (TM pending: Campbell H. Harvey)

[Image of Excel calculator interface]

Please enter the cost of debt (percentage terms)
Please enter the target earnings (percentage terms)
Please enter the marginal tax rate (percentage terms)
Please enter the market value of debt (percentage terms)
Please enter the market value of equity (percentage terms)

Calculate with

Debt standard deviations
Data correlation with equity

Other

Confidence level: 95%, 90%, 85%, 80%, Other

Double integration: Yes, No, Multiple (in percentage terms)

Calculate Results

[Image of Excel calculator interface]