Global Financial Management and Country Risk

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Global Financial Management

0. The Plan

▷ Reasons for investing in international markets
▷ FX risk in portfolio strategies
▷ Bull and bear markets and their implications
Global Financial Management

0. The Plan

- Business cycle impact on world returns
- Country risk
- Project evaluation

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1. Why invest internationally?

For many years, the U.S. market was effectively the world market -- commanding 75% of world market capitalization.

U.S. now represents less than 40%.

Does it make any sense to ignore the other 60%?
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1. Why invest internationally?

World Market Equity Capitalizations - Developed Markets

Source: MSCI (3/31/95)
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1. Why invest internationally?

Just because these markets exist is not a sufficient reason to invest.

Some have underperformed the U.S.
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1. Why invest internationally?

In addition, volatility of these markets could be higher than U.S. investments.
1. Why invest internationally?

**S&P 500 Monthly Equity Returns: January 1976 - February 1995**

**MSCI France Monthly Equity Returns: January 1970 - March 1995**
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1. Why invest internationally?

MSCI France & USA Monthly Equity Returns

Key is how these securities move together.

Less than perfect correlation implies gains from diversification.
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1. Why invest internationally?

Example:

Stock X and Stock Y are available for investment.

- Each has expected return of 15%.
- Each has volatility of 25%.
- The correlation between the two is 0%.

Do you have a preference for one, the other or both?

Let's solve for the variance of the portfolio of X and Y where equal investment is placed in each security.

\[
Var(\text{portfolio}) = \text{weight}_x^2 \sigma_x^2 + \text{weight}_y^2 \sigma_y^2 + 2 \text{weight}_x \text{weight}_y \sigma_x \sigma_y Corr_{x,y}
\]
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1. Why invest internationally?

Though these securities look similar, by investing in both, our portfolio volatility is cut in half.

Portfolio variance will be reduced if correlation is less than one.

Correlation is very important.

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1. Why invest internationally?

Correlation with MSCI U.S. Equity Returns (Unhedged) MSCI Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>0.88</td>
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<tr>
<td>EAFE</td>
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<tr>
<td>Switzerland</td>
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</tbody>
</table>

Sample Ends September 1994
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1. Why invest internationally?

What does low correlation mean for the investor?

The ability to obtain an offsetting cash flow (hedge).

When the U.S. market is down, how often are international markets up?

![Hedging Direction: U.S. Market Down/Foreign Market Up](image)

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1. Why invest internationally?

A more difficult hurdle:

When the U.S. return is negative, how often does the international return more than offset the U.S. loss?
Quantitative asset management programs simultaneously maximize performance and minimize risk (volatility).
1. Why invest internationally?

Diversified international portfolio offers

- higher expected return and
- lower risk

compared to just holding U.S. assets.

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Implication:

You can beat the S&P 500, on average, by holding a diversified global portfolio.

Explains why many fund managers are aggressively moving into international markets.
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2. FX Risk

With international equity investments, you:

- invest in the local market
- invest in the FX rate vs. the U.S. dollar

Consider the example of investing in a German equity portfolio which includes the DAX stocks.

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2. FX Risk

1. To initiate purchase, change dollars to DM.

2. Liquidate German position after one month.

3. Record a profit in DM.

4. Sell your DM for dollars.
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2. FX Risk

Your final return (in U.S. dollars) is composed of:

\[% \text{change in DAX} + \% \text{change in } \$ / \text{DM rate.} \]

The FX component could be a very important part of the return on the German investment.

Example:

Suppose the spot exchange rate is $0.50=1\text{DM}$. You invest $1$ million in the DAX. Over the year, the DAX rises 20%.

- What is your return if the FX rate goes to $0.60=1\text{DM}$?
- What is your return if the FX rate goes to $0.40=1\text{DM}$?
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2. FX Risk

**Scenario 1:** Rate to $0.60 [dollar depreciates]

Investment of DM2 million rises to DM2.4 million.

Translate DM2.4 million back to dollars (x $0.60).

Receive $1.44 million.

Return = 44%.

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2. FX Risk

**Scenario 1:** Rate to $0.60 [dollar depreciates]

Note: 44% = 1.20 x 1.20 - 1

Total return is the product of the:
  - local equity return (20%)
  - times
  - the currency change (20%).

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2. FX Risk

Scenario 1: Rate to $0.60 [dollar depreciates]

Intuition --
when dollar depreciates, the DM appreciates.

Since you are invested in DM, you benefit from the currency appreciation.

Scenario 2: Rate to $0.40 [dollar appreciates]

Investment of DM2 million rises to DM2.4 million.

Translate DM2.4 million back to dollars (x $0.40).

Receive $0.96 million.

Return = -4%.
2. FX Risk

Scenario 2: Rate to $0.40 [dollar appreciates]

Note: -4% = 1.20 x 0.80 -1

Total return is the product of the:
local equity return (20%)
times
the currency change (-20%).

---

2. FX Risk

Scenario 2: Rate to $0.40 [dollar appreciates]

Intuition --
when dollar appreciates, the DM depreciates.

Since you are invested in DM, you lose from the currency depreciation.
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2. FX Risk

Protection:

Many investors would like to participate in overseas markets but they do not want to bear the currency risk.

However, the currency risk can be hedged.

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2. FX Risk

Protection:

- Sell DM2 million forward when DAX bought
- Purchase put options on DM2 million
- Buy special product (let your investment banker take care of the hedging).

- • □ • ◯ • △ • ▶.
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2. FX Risk

Protection in action:

Suppose you purchased put, agreeing to sell DM2 million at $0.50 at the end of the month.

Dollar appreciates/DM depreciates to $0.40=1DM (scenario 2).

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2. FX Risk

Protection in action:

You have DM2.4 million.
- Sell DM2 million at $0.50, collect $1 million (exercising your put option).
- Sell DM0.4 million, in spot market, at $0.40, collect $0.16 million.

Total value $1.16 million. Return 16%.
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2. FX Risk

Lessons:

Did not completely lock in local return because:

- We only hedged the principal portion (DM2 million); it is difficult to know what the return is going to be.

- We have ignored the costs of initiating the option protection.

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2. FX Risk

Other Insights:

1. Treat your FX position as an asset. That is, the change in the currency value plus the rate of return on a local CD, makes currencies assets.

2. Could use portfolio selection methods to determine the best mix of equities & currencies.
Managing in Bull and Bear Markets

Much evidence that returns' distributions are different in bull and bear markets.

Volatility is not symmetric because of the leverage effect.

When the market goes down, equities become riskier because the debt-to-equity ratio has increased.

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Managing in Bull and Bear Markets

Correlation is also affected by market performance.

A number of papers noted that international equity correlations increased after the October 1987 crash.

However, is increased correlation due to the crash or is it a more general phenomenon?

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Managing in Bull and Bear Markets

When U.S. returns are negative, almost all developed markets are also negative on average.

Country Equity Returns in U.S. Up and Down Markets

MSCI U.S. Positive  MSCI U.S. Negative

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Managing in Bull and Bear Markets

When U.S. returns are negative, volatility is higher in international markets.

Country Volatility in U.S. Up and Down Markets

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Managing in Bull and Bear Markets

When U.S. returns are negative, both correlation and covariance are higher.

Country Correlation With U.S. Equity Returns in U.S. Up and Down Markets

Data from 1970
Unfortunately, for U.S. investors, asymmetry works against them.

With negative U.S. returns, one would hope for offsetting foreign returns.

If correlation is not symmetric, portfolio performance will deviate from expectations.
This effect is not due to currency fluctuations.

Up-down asymmetry evident in both hedged and unhedged returns.
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Managing in Bull and Bear Markets

Unhedged U.S. Dollar Returns from 1979

Important lesson:

- Portfolio strategy must take the asymmetries into account.

- Cannot allocate on the basis of average returns (average mixes positives and negatives)
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Managing in Low and High Volatility Markets

The direction and the dispersion of U.S. returns impacts foreign returns:

- Portfolio strategy must take the asymmetries of high low volatility states into account.
- Allocation based on average volatility is problematic.

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Managing in Low and High Volatility Markets

Methodology. Subset returns based on whether U.S. equity return is 1.6 standard deviations from the mean U.S. return.

- U.S. equity volatility affects returns in other countries

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Managing in Low and High Volatility Markets

Country Equity Returns US Low and High Volatility

Country Equity Volatility US Low and High Volatility
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Managing in Low and High Volatility Markets

Cannot even escape the impact of U.S. volatility in emerging markets.

High U.S. volatility is associated with larger correlations.

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Country Equity Correlation US Low and High Volatility

- **US Volatility Low**
- **US Volatility High**

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Managing in Low and High Volatility Markets

Correlation effect is not diminished by currency hedging.

Correlation of currency hedged returns is higher during high U.S. volatility months.
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**Portfolio Strategy and the Business Cycle**

Harvey (1991, JFI) shows that the U.S. business cycle is 80% correlated with a value-weighted world business cycle.

Some evidence [Schwert (1989)] that volatility is different during different phases of the business cycle.

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**Portfolio Strategy and the Business Cycle**

Erb, Harvey and Viskanta (1994) show that all the inputs into the portfolio problem depend on the stage of the business cycle.
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Portfolio Strategy and the Business Cycle

Method:

Divide data by NBER definitions of turning points.

Divide data by CIBCR business cycle definitions for each country.

International returns are affected by the stage of the U.S. business cycle.
International volatility is less affected by the stage of the U.S. business cycle (although higher during U.S. recessions).
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Portfolio Strategy and the Business Cycle

Country Volatility Based On U.S. Economic State

[Bar chart showing annualized volatility for various countries and economic states (Expansion and Recession)]

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Portfolio Strategy and the Business Cycle

Correlations are much higher during U.S. recessions.

[Diagram showing correlation results]
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Portfolio Strategy and the Business Cycle

Country Correlation With U.S. Equity Returns Based On U.S. Economic State

Higher correlations and higher volatilities imply that covariances must be sharply higher during U.S. recessions.
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Portfolio Strategy and the Business Cycle

Country Covariance With U.S. Equity Returns On U.S. Economic State

- NBER Expansion
- NBER Recession

Similar results obtained when recessions are matched across countries.

- In joint U.S.-German expansions, the equity correlation is 4%.
- In joint U.S.-German recessions, the equity correlation is 50%.
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Portfolio Strategy and the Business Cycle

If asset returns move with the business cycle, this implies some degree of predictability.

- To some degree the business cycle is predictable.
- To a large extent, we know the phase of the cycle that we are currently in.

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Portfolio Strategy and the Business Cycle

Doesn't make any sense to use historical average of returns, volatility or correlation if we are finishing a recession and entering a recovery.
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Sources of Risk

There are many types of risk:
- Credit risk
- Liquidity risk
- Default risk
- Economic risk
- Market risk
- Exchange rate risk
- Systematic risk
- Country risk

Global Financial Management
Sources of Risk

Some of these risks can be hedged -- others are more difficult to manage.
Important to view corporation as a portfolio of investments.

As such, it is important not to view each project as stand-alone.

- Certain risks are naturally hedged in the context of the corporation's portfolio.

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I will concentrate my presentation on one of the most difficult to manage sources of risk -- Country Risk.

- Country risk is very difficult to deal with if the corporation has an undiversified investment portfolio. That is, if the corporation's only foreign investment is in Mexico, this presents special difficulties.
Country risk encompasses:
- Political risk
- Exchange risk
- Valuation risk
- Systematic risk
- Economic risk

Begin with analysis of comparables. Establish benchmarks.

- What are the returns to passive equity investments internationally?
The distribution of possible returns is important for project evaluation (in developing scenario analyses).

- The tale of four distributions.
Emerging markets are different!
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Country Risk

IFC Argentina Monthly Equity Returns

But we cannot afford to ignore the highly volatile markets.

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Country Risk

Market Capitalization

Gross Domestic Product

Emerging Countries
Developed Countries

Share of World Population

Emerging Markets 85.0%

Developed Markets 15.0%

Based on 1992 data.
Inflation is another important variable which impacts international asset returns.

Much is known about the interaction between inflation and asset returns in the U.S.

Relatively little is known about the interaction between inflation and asset returns in other countries.
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Country Risk

Average Inflation: Developed and Emerging Markets

Some countries' inflation rates truncated at 25%.
From Inclusion Date

Inflation and Country Credit Risk

Inflation rates are calculated using annualized non-overlapping six-month inflation rates. Country credit rating data is from Institutional Investors semi-annual sovereign risk survey.
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Country Risk

Average Country Credit Ratings and Currency Changes (U.S. $/Foreign)
March 1980 to December 1993

Average Country Credit Rating

Average Annual Return

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Country Risk

Average Country Credit Ratings and Stock Market Volatility (U.S. dollar)
March 1980 to December 1993

Average Country Credit Rating

Average Annual Return

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Each aspect of country risk important.

Comprehensive framework for dealing with country risk presented in Ferson and Harvey (1994) and Bekaert and Harvey (1995).
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**Country Risk**

**Key insights:**

1) Cost of Capital depends on the market you are dealing in.

2) Cost of Capital should depend on:
   - Systematic risk
   - Degree of integration
   - Exchange rate risk
   - Political risk
   - Economic risk

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**Global Financial Management**  
**Project Evaluation**

Usual model based on Capital Asset Pricing Model

Hurdle rate = risk free + beta x [Expected world market risk premium]

Beta measures the sensitivity of the firm's cash flows to changes in world economic conditions.
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Project Evaluation

However, in emerging markets, the betas are often close to zero.

Does this mean the project should have a rate of return equal to the Treasury bill rate?!

A number of ad hoc model are used in practice:

McKinsey:

Hurdle rate = risk free + beta x [Expected U.S. market risk premium']
+ difference between country's U.S. bond yield and U.S. Treasury bond yield of same maturity
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Project Evaluation

A number of ad hoc model are used in practice:

Ibbotson Associates:

Hurdle rate = risk free + beta x [Expected world market risk premium'] + one half the "alpha" from regressing country return on world market return

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Project Evaluation

None of these models is very satisfactory in practice.

• Limited to countries with equity markets.

• Limited to countries with bonds trading in U.S. dollars.
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Project Evaluation

Will propose a simple model based on country credit risk.

\[ \text{Hurdle Rate}_t = a + B[\text{CCR}_{t-1}] \]

We estimate "a" and "B" using 47 countries. We obtain forecasted hurdle rates based on most recent credit rating.

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Global Financial Management
Country Hurdle Rates

**Hurdle Rate Models:**

- **Linear:** Semi-Annual Return = \( a + B \cdot \text{CCR} \)
- **Log:** Semi-Annual Return = \( a + B \cdot \ln(\text{CCR}) \)
- **Risk:** Semi-Annual Return = \( a + B \cdot (100 - \text{CCR})/\text{CCR} \)

**Split Sample (Log Model):**
Semi-Annual Return = \( a + B1 \cdot \ln(\text{CCR}:\text{Developed}) + B2 \cdot (\ln(\text{CCR}:\text{Emerging}) \)

**Data Items:**

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## Credit Risk Return Models

### Full Sample

<table>
<thead>
<tr>
<th>Model</th>
<th>Intercept T-Stat</th>
<th>Slope T-Stat</th>
<th>R-Square</th>
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<tr>
<td>Linear</td>
<td>22.93</td>
<td>-0.19</td>
<td>1.41%</td>
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<td>7.51</td>
<td>-4.13</td>
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<td>Log</td>
<td>52.32</td>
<td>-10.14</td>
<td>1.61%</td>
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<td>5.54</td>
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<td>Risk</td>
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<td>1.67%</td>
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<td>5.04</td>
<td>4.47</td>
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</tbody>
</table>

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### Example: Using Log model

\[
\text{Mexico} = 52.32 - 10.14 \times \ln(46.9)
\]

(Semi-annual)

\[
= 13.301
\]

\[
\text{Mexico} = 26.602\%
\]

(Annual)

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### Global Financial Management
#### Country Hurdle Rates

<table>
<thead>
<tr>
<th>Split Sample</th>
<th>Intercept</th>
<th>E Slope</th>
<th>D Slope</th>
<th>R-Square</th>
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<td><strong>Model</strong></td>
<td><strong>T-Stat</strong></td>
<td><strong>T-Stat</strong></td>
<td><strong>T-Stat</strong></td>
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<tr>
<td>Log</td>
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<td>-12.04</td>
<td>1.58%</td>
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<td></td>
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<td>Risk</td>
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<td></td>
<td>3.31</td>
<td>0.87</td>
<td>4.13</td>
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</table>

---

**Example: Using Log model split sample**

Mexico = 61.18 - 12.71*Ln(46.9)  
(Semi-annual)  
= 12.271  
Mexico = 24.543%  
(Annual)
## Global Financial Management

### Country Hurdle Rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Credit Risk Mid-95</th>
<th>LN Model Time to Hit</th>
<th>Risk Model Time to Hit</th>
<th>Average Time to Hit</th>
<th>Breakeven Doubling</th>
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<table>
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## Global Financial Management

### Country Hurdle Rates

(Time in Years)  | Credit Risk | LN Model Time to Hit 0% | 100% | Risk Model Time to Hit 0% | 100% | Average Time to Hit | Time to Hit Breakeven Doubling
---|---|---|---|---|---|---|---
Haiti | 9.1 | 1.82 | 4.90 | 1.69 | 3.72 | 1.75 | 4.31
Honduras | 15.5 | 1.89 | 5.51 | 1.72 | 4.70 | 1.81 | 5.10
Hong Kong | 67.0 | 3.03 | 11.26 | 3.20 | 11.85 | 3.12 | 11.56
Hungary | 46.4 | 2.44 | 8.54 | 2.58 | 9.28 | 2.51 | 9.91
Iceland | 56.9 | 2.71 | 9.81 | 2.90 | 10.64 | 2.80 | 10.22
India | 44.2 | 2.39 | 8.29 | 2.51 | 8.98 | 2.45 | 8.53
Indonesia | 51.9 | 2.57 | 9.18 | 2.75 | 10.00 | 2.66 | 9.59
Iran | 25.5 | 2.04 | 5.43 | 1.96 | 6.27 | 2.00 | 6.35
Iraq | 7.9 | 1.81 | 4.77 | 1.71 | 5.36 | 1.76 | 4.16
Ireland | 72.3 | 3.24 | 12.13 | 3.35 | 12.46 | 3.30 | 12.30
Israel | 47.9 | 2.47 | 8.71 | 2.63 | 9.48 | 2.55 | 9.09
Italy | 72.4 | 3.24 | 12.15 | 3.36 | 12.47 | 3.30 | 12.31
Jamaica | 25.2 | 2.03 | 6.40 | 1.95 | 6.62 | 1.99 | 6.31
Japan | 91.5 | 4.33 | 16.40 | 3.90 | 14.53 | 4.11 | 15.47
Jordan | 26.3 | 2.05 | 6.50 | 1.98 | 6.39 | 2.02 | 6.45
Kazakhstan | 18.7 | 1.94 | 5.81 | 1.79 | 5.21 | 1.86 | 5.51
Kenya | 24.9 | 2.03 | 6.37 | 1.94 | 6.17 | 1.99 | 6.27
Kuwait | 52.7 | 2.59 | 9.28 | 2.77 | 10.10 | 2.68 | 9.69
Latvia | 22.6 | 1.99 | 6.16 | 1.88 | 5.82 | 1.94 | 5.99
Lebanon | 24.9 | 2.03 | 6.37 | 1.94 | 6.17 | 1.99 | 6.27
Liberia | 6.2 | 1.79 | 4.58 | 1.80 | 3.37 | 1.80 | 3.98
Libya | 30.5 | 2.12 | 6.90 | 2.10 | 7.02 | 2.11 | 6.96
Lithuania | 21.7 | 1.98 | 6.08 | 1.96 | 5.68 | 1.92 | 5.88
Luxembourg | 85.4 | 3.90 | 14.76 | 3.72 | 13.88 | 3.81 | 14.32
Malawi | 18.8 | 1.94 | 5.82 | 1.79 | 5.22 | 1.86 | 5.52

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### Global Financial Management

### Country Hurdle Rates

(Time in Years)  | Credit Risk | LN Model Time to Hit 0% | 100% | Risk Model Time to Hit 0% | 100% | Average Time to Hit | Time to Hit Breakeven Doubling
---|---|---|---|---|---|---|---
Malaysia | 68.6 | 3.09 | 11.51 | 3.25 | 12.04 | 3.17 | 11.78
Malta | 17.3 | 1.92 | 5.68 | 1.76 | 4.98 | 1.84 | 5.33
Mauritius | 61.0 | 2.63 | 10.37 | 3.02 | 11.14 | 2.93 | 10.75
Mexico | 45.4 | 2.41 | 8.42 | 2.55 | 9.14 | 2.48 | 8.78
Morocco | 46.9 | 2.45 | 8.59 | 2.60 | 9.34 | 2.52 | 8.97
Mozambique | 39.0 | 2.28 | 7.74 | 2.36 | 8.26 | 2.32 | 8.00
Myanmar | 126.0 | 1.85 | 5.24 | 1.68 | 4.24 | 1.77 | 4.74
Nepal | 16.5 | 1.91 | 5.60 | 1.74 | 4.86 | 1.82 | 5.23
Netherlands | 24.4 | 2.02 | 6.33 | 1.93 | 6.10 | 1.98 | 6.21
Nigeria | 89.0 | 4.12 | 15.64 | 3.82 | 14.24 | 3.97 | 14.94
New Zealand | 68.2 | 3.08 | 11.45 | 3.23 | 11.99 | 3.16 | 11.72
Nicaragua | 10.2 | 1.83 | 5.01 | 1.68 | 3.88 | 1.75 | 4.44
Nigeria | 17.5 | 1.92 | 5.70 | 1.76 | 5.02 | 1.84 | 5.35
North Korea | 7.0 | 1.80 | 4.67 | 1.75 | 3.45 | 1.77 | 4.05
Norway | 80.3 | 3.61 | 13.65 | 3.58 | 13.34 | 3.60 | 13.49
Oman | 52.0 | 2.57 | 9.19 | 2.75 | 10.01 | 2.66 | 9.60
Pakistan | 30.1 | 2.11 | 6.86 | 2.09 | 6.96 | 2.10 | 6.91
Panama | 27.7 | 2.04 | 6.45 | 1.97 | 6.30 | 2.00 | 6.37
Papua New Guinea | 32.4 | 2.15 | 7.08 | 2.16 | 7.31 | 2.16 | 7.19
Paraguay | 30.6 | 2.12 | 6.91 | 2.11 | 7.04 | 2.11 | 6.97
Peru | 23.7 | 2.01 | 6.26 | 1.91 | 5.99 | 1.96 | 6.13
Philippines | 53.4 | 2.21 | 7.37 | 2.25 | 7.74 | 2.23 | 7.55
Poland | 35.7 | 2.21 | 7.40 | 2.26 | 7.79 | 2.23 | 7.60
Portugal | 67.3 | 3.05 | 11.31 | 3.21 | 11.89 | 3.13 | 11.60
Qatar | 53.9 | 2.62 | 9.43 | 2.81 | 10.26 | 2.72 | 9.84

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49-50
### Global Financial Management

#### Country Hurdle Rates

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- Business Environment Risk Intelligence (BERI) S.A.
- Control Risk Information Services
- Economist Intelligence Unit (EIU)
- Euromoney
- Institutional Investor
- Moody's Investor Service
- Political Risk Services
- S.J. Rundt & Associates
- Standard and Poors