Predictable Returns in Developed and Emerging Markets

by

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1. Introduction

- The most important components in any asset allocation strategy are the forecasts of the asset returns.

- That is, mistakes in the expected returns inputs will have a much larger impact that mistakes in the risk inputs.

- Hence, it is critical to get the best possible forecasting methodology for the asset returns.
1. Introduction

Goals of Presentation:

1. To assess the predictability of U.S. and international equity and fixed income returns.

2. Contrast the predictability of developed and emerging markets.

3. To explore how this predictability can be translated into a simple conditional asset allocation strategy.

4. To compare the performance of conditional strategies with traditional ones.
2. Predictability

- For many years, it was believed that stock prices followed random walks.

- With the random walk model, the best prediction of the next period’s stock price is today’s price plus a “drift” term.

- The “drift” is just the average return over the history.

- This model implies that stock returns are completely unpredictable.

- Recent research has shown that stock and bond returns are indeed predictable. However, the degree of predictability is limited.
The Intuition Behind Predictability

If you were asked to forecast next year’s real GDP growth, it unlikely that you would give the average GDP growth over the past 20 years – or even the average growth over the past 5 years.

Your forecast of real GDP growth would be conditioned on important economic information that is available today.

Similarly, if you were asked to forecast next year’s stock return, why use the average return over 5 years?

Your forecast of the stock return for next year should be conditioned on the key economic and financial information available today.
When a fund manager allocates on the basis of average returns over the past, say five years, I refer to this as unconditional asset allocation.

This type of forecasting is consistent with the random walk model.

The forecasts are unconditional because they ignore the important information available today. That is, the forecasts are just an average of past returns – they are not conditioned on the information that investors are using today to set prices.

By ignoring important information today (or not using the information in an optimal way), the manager fails to achieve the best conditionally expected return-risk profile.
2. Predictability

_The Economics of Predictability_

Consider the fundamental valuation model:

\[ P_t = \frac{E_t[\text{div}_{t+1}]}{E_t[k_{t:t+1}]} + \frac{E_t[\text{div}_{t+2}]}{E_t[k_{t:t+2}]} + \ldots \]

Our goal is to forecast the change in price: \( P_t \) to \( P_{t+1} \).

To take the stand that the return is unpredictable implies:

1. No ability to forecast the economy and how it influences a particular security’s cash flows.

2. No ability to forecast the economy’s impact on the risk of the security.

3. No ability to forecast economy-wide rewards for risk.

Most now agree that at least one of these items is predictable.

\[ \implies \text{The key is translating this potentially small degree of predictability into successful asset allocation.} \]
2. Predictability

A Simple Example:

Consider a U.S. fund manager that chooses to allocate into two portfolios: the S&P 500 and money market instruments (T-bill).

We will examine three strategies:

1. Unconditional asset allocation with average risk aversion.

2. Unconditional asset allocation with higher than average risk aversion.

3. Conditional asset allocation with average risk aversion.

Each of these strategies will produce a different allocation. They will be tracked over the January 1970–September 1991 period.

This is a ‘simple’ example because only two asset classes are considered.
2. Predictability

*Strategy 1:* (Buy-hold)

This strategy implies a buy and hold equities portfolio. Unconditionally, the average equity return is much higher than the average money market return. Hence, a manager with average risk aversion will hold 100% equities.

*Strategy 2:* (90/10)

This strategy also implies a buy and hold portfolio. However, to lower the risk of the portfolio, the manager holds a combination of money market and equities. For our example, we will assume a 90% equity and 10% money market composition.

*Strategy 3:* (Conditional)

This strategy will likely produce a portfolio that switches among the two asset classes depending upon the forecasts of the equity returns.
If the forecasted equity returns are always above the money market rate, the Strategy 3 will be identical to Strategy 1.

*It is in this sense that the Unconditional Asset Allocation is a special case of the Conditional Asset Allocation. The strategies will be identical when it is impossible to accurately forecast the equity returns.*
2. Predictability

The Details of Strategy 3:

A linear regression is used to forecast the S&P 500 return.

The regression equation is:

\[ SPRET_t = \alpha_0 + \alpha_1 1BIL_{t-1} + \alpha_2 SPDIV_{t-1} + \alpha_3 3-1BIL_{t-1} + \alpha_4 Baa-Aaa_{t-1} + \epsilon_t \]

where

1BIL\(\) = Yield on one month U.S. Treasury Bill,
SPDIV\(\) = Annual dividend yield on S&P 500 stock index,
3-1BIL\(\) = Return spread on 3 and 1 month U.S. T-bills,
Baa-Aaa\(\) = Yield spread on U.S. Baa and Aaa rated bonds,
\(\epsilon\) = Regression error (unexpected part of the return).

Notice that this is a forecasting equation. The conditioning information (1BIL, SPDIV, 3-1BIL and Baa-Aaa) are available at time \(t - 1\).

These variables are used to forecast the next period returns for time \(t\).
Implementing Strategy 3:

If this equation is estimated with monthly data over the 1947:2–1991:9 period, the $R^2$ is 6.9%.

The R-square measures the precision of our predictions.

- An $R^2=100\%$ means our predictions are perfect.
- An $R^2=0\%$ implies our predictions are equal to $\alpha_0$ — which is just the average equity return.

An $R^2$ of zero, implies that the unconditional strategy (Strategy 1 – buy and hold) is the best.

Hence, the worst case scenario for our forecasting model implies the unconditional asset allocation strategy.
2. Predictability

Evaluating Strategy 3:

Although the $R^2$ is low, it is best to evaluate our forecasting model using dollars rather than statistical measures.

It is important to produce out-of-sample forecasts.

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Strategy 1 Buy-Hold</th>
<th>Strategy 2 90/10</th>
<th>Strategy 3 Conditional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total profit</td>
<td>233.87%</td>
<td>226.40%</td>
<td>346.58%</td>
</tr>
<tr>
<td>Monthly profit</td>
<td>0.90%</td>
<td>0.86%</td>
<td>1.33%</td>
</tr>
<tr>
<td>Monthly std. dev.</td>
<td>4.68%</td>
<td>4.21%</td>
<td>4.10%</td>
</tr>
<tr>
<td>Annual profit</td>
<td>10.76%</td>
<td>10.41%</td>
<td>15.94%</td>
</tr>
<tr>
<td>Annual std. dev.</td>
<td>16.22%</td>
<td>14.59%</td>
<td>14.21%</td>
</tr>
</tbody>
</table>
2. Predictability

- Conditional strategy greatly enhances returns and lowers overall risk.

- The benefits are impressive given the fairly low $R^2$.

⇒ The benefits also impressive given the simple form of the forecasting model. Other nonlinear methods hold promise:

  (a) Nonparametric regression (with adaptive kernels).

  (b) Neural Nets and Genetic Algorithms.

  (c) Entropy encoding based on the theory of Data Compression.
2. Predictability

Figure 1
2. Predictability

Figure 2
Figure 3
2. Predictability

Figure 4
Why does this allocation strategy work?

- When new assets are added to a mean-variance optimizer, the frontier shifts to the left.

- Traditional mean-variance analysis gives us portfolio weights that will put us on the efficient frontier.
  
  - However, weights based on knowledge of returns over, say five years.
  
  - Weights are fixed throughout the sample.
  
  - Unlikely a portfolio manager will hold fixed weights.

- Traditional analysis delivers a set of efficient portfolios among all fixed weight strategies.
Predictability implies portfolio strategies with time-varying weights.

- Information available at time $t - 1$ may cause managers to change allocation weights.

- "Trading strategies" based on the information variables are like "new assets."

- When the trading strategies are added to the allocation, the frontier shifts to the left.
4. Why focus on emerging markets?

- International assets enhance reward to risk profiles.

- However, benefits are limited by the fairly high correlation between developed countries' returns.

- Recent interest in "emerging" equity markets.

- Large upside opportunities for investing in "growth" stocks in these new markets.
4. Why focus on emerging markets?

- There are **three** attractive features to emerging equities.

The first two of which are:

1. High expected returns.
2. Low correlations with other markets.

- In a diversified asset allocation strategy, these features will increase expected performance and decrease overall volatility.
4. Why focus on emerging markets?

- I will focus on third feature: **Predictability**.
  
  → Evidence will be presented that many of the emerging market returns are predictable.
  
  → Emerging market returns are more predictable than developed market returns.

Predictability has critical implications for asset management.

- *Evidence will show that ignoring predictability could have disastrous consequences in a dynamic asset allocation strategy.*
Figure 5
Figure 6
Asset Allocation

Developed

Emerging (20%-Cap) +

Global

Target Vol

Min Vol

Hold 16%

Developed

Emerging +

Global

Target Vol

Min Vol

Hold 16%

Only Developed

(Uncorrelated)

(No Forecasting)

(Conditional)

(Regressions Forecasts)
Traditional (unconditional) strategy, 1980.12–1992.06:

- Use 60-month average returns, variances and covariances.

<table>
<thead>
<tr>
<th>Universe</th>
<th>Cumulative return</th>
<th>Mean return (annual)</th>
<th>Standard deviation (annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed Countries</td>
<td>185.13</td>
<td>16.09</td>
<td>15.39</td>
</tr>
<tr>
<td>Developed/Emerging</td>
<td>188.02</td>
<td>16.35</td>
<td>11.63</td>
</tr>
<tr>
<td>Developed/Emerging 20% cap</td>
<td>195.83</td>
<td>17.02</td>
<td>14.02</td>
</tr>
</tbody>
</table>

Strategy: Choose minimum volatility portfolio

Strategy: Choose 16% target volatility

<table>
<thead>
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<th>Standard deviation (annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed Countries</td>
<td>151.65</td>
<td>13.19</td>
<td>19.55</td>
</tr>
<tr>
<td>Developed/Emerging</td>
<td>155.03</td>
<td>13.48</td>
<td>19.92</td>
</tr>
<tr>
<td>Developed/Emerging 20% cap</td>
<td>139.04</td>
<td>12.09</td>
<td>20.62</td>
</tr>
</tbody>
</table>
Conditional strategy, 1980.12–1992.06:

- Use regression forecasts of returns, average conditional variances and average conditional covariances.

<table>
<thead>
<tr>
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<th>Standard deviation (annual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed Countries</td>
<td>195.42</td>
<td>16.99</td>
<td>15.14</td>
</tr>
<tr>
<td>Developed/Emerging</td>
<td>206.63</td>
<td>17.97</td>
<td>11.66</td>
</tr>
<tr>
<td>Developed/Emerging 20% cap</td>
<td>215.47</td>
<td>18.87</td>
<td>14.05</td>
</tr>
</tbody>
</table>

Strategy: Choose minimum volatility portfolio

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Developed Countries</td>
<td>344.36</td>
<td>29.94</td>
<td>18.33</td>
</tr>
<tr>
<td>Developed/Emerging</td>
<td>632.04</td>
<td>54.96</td>
<td>24.40</td>
</tr>
<tr>
<td>Developed/Emerging 20% cap</td>
<td>488.67</td>
<td>39.30</td>
<td>19.89</td>
</tr>
</tbody>
</table>
We could view emerging markets in the context of the life-cycle of a firm.

⇒ Some are past the start-up phase

What about the new emerging markets?

- Bangladesh, Barbados, China, Costa Rica, Côte d’Ivoire, Egypt, Hungary, Jamaica, Kenya, Mauritius, Morocco, Peru, Poland, Sri Lanka, Trinidad and Tobago, Uruguay.

⇒ These markets are currently being reported on a supplementary basis by the International Finance Corporation and will probably be included in the IFC composite in the near future.

⇒ Key is to get in early.

⇒ Important to invest in the context of a portfolio strategy rather than any single country strategy.
7. Issues

1. 1993 returns were outstanding – will they continue?

2. Transactions costs and holding period horizon are important?

3. View lack of liquidity as an opportunity rather than a constraint.

4. How much emerging markets should we place in our portfolio?

5. Currency risk – to hedge or not to hedge?

6. Indexing versus active management?

7. Top-down versus bottom-up management?
References


