Global Asset Allocation and Stock Selection

Quantitative Stock Selection

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Quantitative Stock Selection
1. Introduction

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Quantitative Stock Selection
1. Introduction

Issue
Two decisions are important:
• Asset Allocation (country picks)
• Asset Selection (equity picks)

• Considerable research on the asset allocation side
• Research has paid off in that many models avoided “overvalued” Asian markets in mid-1990s
• Many models began overweighing after the onset of the Asia Crisis
Quantitative Stock Selection
1. Introduction

Issue
• Little research on the stock selection side. Why?
  – Sparse data on individual stocks
  – Information asymmetries among local and global investors
  – Extremely high transactions costs

Quantitative Stock Selection
1. Introduction

With recent plummet in emerging markets, stock selection is important.

If market is deemed “cheap,” (as many asset allocation models would now suggest), which stocks do we select?
Ingredients for success:

- Identify stable relationships
- Attempt to model unstable relationships
- Use predictor variables that reflect the future, not necessarily the past
- Do not overfit
- Validate in up-markets as well as down
- Tailor to country characteristics in emerging markets

Methodologies:

- Cross-sectional regression
- Sorting
- Hybrids
Quantitative Stock Selection
2. Stock Selection Metrics

Cross-sectional regression:
For country $j$, estimate:

$$R_{i,t} = \gamma_0 + \gamma_1 A_{i,t-1} + \epsilon_{i,t}$$

where

- $i$ denotes firm $i$;
- $A$ is a firm specific attribute (could be multiple);
- $\gamma$ are common regression coefficients.

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2. Stock Selection Metrics

Cross-sectional regression:
- Used in developed market stock selection
- Problem with unstable coefficients
- Bigger problem given noisy emerging market returns
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2. Stock Selection Metrics

Sorting:
• Used in developed market stock selection
• Potentially similar in stability problems
• Can be cast in regression framework
  – (a regression on ranks, or a multinomial probit regression)
• Rank regression may have advantages given the high variance (high noise) in emerging equity returns
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2. Stock Selection Metrics

Hybrid:
• Create portfolios based on stocks sorted by attributes
• Use regression or optimization to weight portfolios
• Produces a flexible, highly nonlinear way to select stocks

Quantitative Stock Selection
3. Our methodology

Focus on three emerging markets:
• Malaysia (representative of Asia)
• Mexico (indicative of Latin America)
• South Africa (unique situation)
Quantitative Stock Selection
3. Our methodology

Specify exhaustive list of firm specific factors
• Includes many traditional factors
• Extra emphasis on expectations factors

Specific a number of diagnostic variables
• Includes factors that reflect the type of firm we are selecting

Quantitative Stock Selection
3. Our methodology

Identify the best stocks and the worst stocks
• Do not impose the constraints of a tracking error methodology
  [Tracking error can be dealt with at a later stage of the analysis]
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3. Our methodology

Steps:

1. Specify list of factors
2. Univariate screens (in sample)
3. Bivariate diagnostic screens
4. Battery of additional diagnostics emphasizing performance through time
5. Bivariate selection screens

6. Optimize to form “scoring screen” (in sample)
7. Run scoring screen on out-of-sample period
8. Diagnostics on scoring screen
9. Form “buy list” and “sell lists”
10. Purge “buy list” of stocks that are identified by predetermined set of “knock out criteria”
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3. Our methodology

Steps:

11. Investigate turnover of portfolio
   – various holding periods analyzed

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4. Past research

Very few papers:
• Rouwenhorst (JF) looks at IFC data
• Claessens, Dasgupta and Glen (EMQ) look at IFC data
• Fama and French (JF) look at IFC data
Quantitative Stock Selection
4. Past research

What we offer:
• No one has merged IFC, MSCI, Worldscope, and IBES data
• First paper to look at comprehensive list of firm attributes
• First paper to look at expectational attributes

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4. Factors

Fundamental factors
• Dividend yield
• Earnings yield
• Book to price ratio
• Cash earnings to price yield
• Change in return on equity
• Revenue growth
• Rate of re-investment
• Return on equity
Quantitative Stock Selection
4. Factors

Expectational
• Change in consensus FY1 estimate - last 3 or 6 months
• Consensus FY2 to FY1 estimate change
• Consensus forecast earnings estimate revision ratio
• 12 months prospective earnings growth rate
• 3 year prospective earnings growth rate
• 12 month prospective earnings yield

Momentum
• One month/ 1 year price momentum
• One year historical earnings growth/momentum
• Three year historical earnings growth rate
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4. Factors

Diagnostic
- Market capitalization
- Debt to common equity ratio

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5. Diagnostics

- Average return
- Average excess return
- Standard deviation
- T-stat (hypothesis that excess return=0)
- Beta (against benchmark index)
- Alpha
- $R^2$
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5. Diagnostics

• Average capitalization
• % periods > market index (hit rate)
• % periods > market index in up markets
• % periods > market index in down markets
• Max number of consecutive benchmark outperformances

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5. Diagnostics

• Max observed excess return
• Min observed excess return
• Max number of consecutive negative returns
• Max number of consecutive positive returns
• Year by year returns
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5. Diagnostics

- Factor average for constructed portfolio
- Factor median
- Factor standard deviation

Data through January 2001
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6. Summary Statistics: Mexico Benchmark

Data through January 2001

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6. Summary Statistics: South Africa Benchmark

Data through January 2001
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6. Malaysia: Factor returns

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6. Mexico: Factor returns
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6. South Africa: Factor returns

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6. Malaysia: % Periods Benchmark Outperformance
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6. Mexico: % Periods Benchmark Outperformance

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6. South Africa: % Periods Benchmark Outperformance
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6. Malaysia: Dividend Yield Screen: Index=100 each year

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6. Mexico: Historical Earnings Momentum Screen: Index=100 each year
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6. South Africa: Change in Consensus FY1-3 mo. Screen:
Index=100 each year

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6. Book to Price: Low-High Spread
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6. IBES Revision Ratio: Low-High Spread

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6. IBES 12-month Prospective Earnings Yield: L-H Spread
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6. One-year Momentum: Low-High Spread

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6. Size Effect: Low-High Spread
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6. Malaysia: Scoring Screen Various Holding Periods

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6. Mexico: Scoring Screen Various Holding Periods
Quantitative Stock Selection
6. South Africa: Scoring Screen Various Holding Periods

Quantitative Stock Selection
6. Malaysia: Scoring Screen
% Periods Benchmark Outperformance
Quantitative Stock Selection
6. Mexico: Scoring Screen
% Periods Benchmark Outperformance

Quantitative Stock Selection
6. South Africa: Scoring Screen
% Periods Benchmark Outperformance
Quantitative Stock Selection
6. Malaysia: Scoring Screen: Index=100 each year

Quantitative Stock Selection
6. Mexico: Scoring Screen: Index=100 each year
Quantitative Stock Selection

6. South Africa: Scoring Screen: Index=100 each year

Quantitative Stock Selection

6. Malaysia: Scoring Screen
Quantitative Stock Selection

6. Mexico: Scoring Screen

Quantitative Stock Selection

6. South Africa: Scoring Screen
Quantitative Stock Selection
7. Research Directions

1) Comparison of regression method and multivariate screening process
   – Panel multinomial probit models
   – How do we reduce the noise in emerging market equity returns?

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7. Research Directions

2) What are the characteristics of countries that make some factors work and other not work?
   – Stage of market integration process
   – Industrial mix
   – Openness of economy
   – Microstructure factors
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7. Research Directions

3) What causes the shifting importance of factors through time, e.g. value versus growth?
   – Can the cross-section of many stock returns help us identify when a factor is likely to work?

Quantitative Stock Selection
7. Research Directions

4) Can the country selection process be merged with the stock selection exercise?
   – Should “buy” portfolios be used in top-down optimizations?
   – Does country-specific tracking error really matter in global asset allocation?
Quantitative Stock Selection
7. Research Directions

5) Should we expand our view of risk in both the stock selection and country selection exercises?
   – Mean, variance, skewness?
   – What are the driving forces of changing variance?
   – What are the determinants of skewness?