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Foreign Speculators and Emerging Equity Markets

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The Issues

The liberalization process in emerging markets remains incomplete.

Considerable debate about the role of foreign portfolio investors in local markets:

- Impact on local volatility
- Impact on the cost of capital
- Impact on the correlation with world markets

Unfortunately, there is little guidance from theory.

Empirical Challenges

1. Liberalization process is gradual

2. Need cross-sectional information to increase power

3. Volatility, correlation and the cost of capital vary as a function of the integration process.

4. Other factors may affect volatility, correlation and the cost of capital.

Standard methods are inappropriate:

- Pure event study

- Country-by-country estimation with dummies

Our approach

Our model pools time-series and cross-sectional information:

$$\begin{aligned} Z_t^i =& \alpha^{i\prime}\mathbf{V}_t^i + \beta'\mathbf{W}_t^i + \gamma Y_t^{x_t^i} + \epsilon_t^i \\ \epsilon_t^i =& \rho^i \epsilon_{t-1}^i + u_t^i \end{aligned} \tag{14}$$

Where:

$\mathbf{V}_t^i$ are fixed effect control variables

$\mathbf{W}_t^i$ are other control variables

$Y_t^{x_t^i}$ represents the liberalization variable

Our specification allows for a gradual integration process.

Plan

1. Volatility/correlation measurement
    - Digression: update Bekaert-Harvey (1997)
2. Cost of capital measurement
3. Liberalization variables
4. Control variables
5. Cross-sectional empirical results
6. Conclusions and future work

World volatility model:

$$r_{w,t} = \delta'_w \mathbf{X}_{t-1} + \epsilon_{w,t}$$
$$\sigma^2_{w,t} = c_w + \alpha_w \sigma^2_{w,t-1} + \beta_w \epsilon^2_{w,t-1} + \gamma_w S_{w,t} \epsilon^2_{w,t-1},$$

where

$$S_{w,t} = \begin{cases} 1, & \text{if } \epsilon_{w,t-1} < 0 \\ 0, & \text{if } \epsilon_{w,t-1} \geq 0 \end{cases}$$

and $\mathbf{X}_{t-1}$ represent world information variables:

- a constant,
- lagged world market dividend yield in excess of the 30-day Eurodollar rate,
- lagged default spread (Moody's Baa minus Aaa bond yields),
- lagged change in the term structure spread (U.S. 10-year bond yield minus 3-month U.S. bill),
- lagged change in the 30-day Eurodollar rate.

Note: Standardized Residual=$z_{w,t} = \frac{\epsilon_{w,t}}{\sigma_{w,t}}$.

Two different distributional assumptions in the general model:

$$\text{Model I}: \quad z_{w,t}|\mathbf{I}_{t-1} \sim N(0,1)$$

$$\text{Model II}: \quad z_{w,t}|\mathbf{I}_{t-1} \sim \begin{cases} N(\mu_1, \sigma_1), & \text{w.p. } p; \\ N(\mu_2, \sigma_2), & \text{w.p. } (1-p). \end{cases}$$

where $\mathbf{I}_{t-1}$ is the information set available to investors.

I. The standard normal formulation.

II. Captures both fat tails and skewness. Parsimonious version of semi-parametric ARCH (SPARCH) [see Engle and Gonzalez-Rivera (1991) and Gray (1995)]. It is a three parameter extension of model I.

Specification Tests:

With standardized residuals:

$$\begin{array}{ll} (a) & E[\hat{z}_t] = 0 \\ (b) & E[\hat{z}_t^2 - 1] = 0 \\ (c) & E[\hat{z}_t \hat{z}_{t-j}] = 0 \quad j = 1, \ldots, k \\ (d) & E[\hat{z}_t^3 - sk] = 0 \\ (e) & E[\hat{z}_t^4 - ku] = 0 \\ (f) & E[(\hat{z}_t^2 - 1)(\hat{z}_{t-j}^2 - 1)] = 0 \quad j = 1, \ldots, k \end{array} \tag{7}$$

- Means test: (c).
- Variance test: (f).
- Moments test: (a),(b),(d),(e).
- Joint test: (a)–(f).

Local market returns:

Following Bekaert and Harvey (1995), we allow the local returns to be functions of both world and local information:

$$r_{it} = \mu_{i,t-1} + \epsilon_{i,t}$$
$$\epsilon_{i,t} = v_{i,t-1}\epsilon_{w,t} + e_{i,t}$$

We impose:

$$E[e_{i,t}e_{j,t}|\mathbf{I}_{t-1}] = 0 \quad \forall i \neq j$$
$$E[e_{i,t}\epsilon_{w,t}|\mathbf{I}_{t-1}] = 0 \quad \forall i$$
$$E[e_{i,t}^2|\mathbf{I}_{t-1}] = (\sigma_{i,t}^{\ell})^2$$

where

$$(\sigma_{i,t}^{\ell})^2 = c_i + d_i(\sigma_{i,t-1}^{\ell})^2 + \beta_i e_{i,t-1}^2 + \gamma_i S_{i,t} e_{i,t-1}^2$$

where

$$S_{i,t} = \begin{cases} 1, & \text{if } e_{i,t-1} < 0 \\ 0, & \text{if } e_{i,t-1} \geq 0 \end{cases}$$

Note that the asymmetry is defined over the idiosyncratic shock.

Local Market Parameterization:

$$\mu_{i,t-1} = \delta_i' \mathbf{X}_{i,t-1} + \delta_{iw}' \mathbf{X}_{t-1}$$
$$v_{i,t-1} = \xi_{0,i} + \xi_{1,i}' \mathbf{X}^*_{i,t-1}$$

where:

$\mathbf{X}_{i,t-1}$ represents the local information variables:

- a constant,
- lagged local equity return,
- lagged exchange rate change,
- lagged dividend yield.

$\mathbf{X}^*_{i,t-1}$ variables correlated with degree of integration

- Size: lagged market capitalization to GDP,
- Trade: lagged exports plus imports divided by GDP.

This model implies:

$$E[\epsilon_{i,t}^2|\mathbf{I}_{t-1}] = \sigma_{i,t}^2 = v_{i,t-1}^2\sigma_{w,t}^2 + (\sigma_{i,t}^{\ell})^2$$

and

$$E[\epsilon_{i,t}\epsilon_{w,t}|\mathbf{I}_{t-1}] = v_{i,t-1}\sigma_{w,t}^2 = \sigma_{iw,t}. \tag{15}$$

- The covariance with the world return is positively related to the degree of market integration.
- Covariances increase in times of high world market volatility.

Implications for correlations:

- It is well known that cross correlations between emerging markets are small.
- Our model may help us understand why the correlations are small.
- The correlations between markets are directly linked to their degree of integration in world capital markets.

The correlation coefficient with the world market:

$$\rho_{iw,t} = v_{i,t-1} \frac{\sigma_{w,t}}{\sigma_{i,t}}.$$

The correlation coefficient with other emerging markets:

$$\rho_{ij,t} = \frac{v_{i,t-1} v_{j,t-1} \sigma^2_{w,t}}{\sigma^2_{i,t} \sigma^2_{j,t}}.$$

We consider both excess returns and dividend yields for Cost of Capital proxies

Why Dividend Yields?

- Closely linked to cost of capital in most pricing models, e.g. Gordon model (also see Campbell, Lo and MacKinlay, 1997)

- Market integration has the most dramatic implications for prices and may be gradual:

  $\Rightarrow$ Returns hard to interpret during transition process.

  $\Rightarrow$ Price level tests likely to be more powerful.

Illustration:

Model:

$$P_t = E_t \left[\sum_{i=1}^{\infty} \delta_{t+i}^{i} D_{t+i} \right]$$

where

$P_t =$ Stock price,

$D_t =$ Aggregate dividend,

$\delta_t =$ Discount factor.

$$\text{Let :} \qquad Y_t^x = \begin{cases} 0, & \text{before liberalization} \\ 1, & \text{after liberalization} \end{cases}$$

The x superscript will depend on our proxy for integration.

Assumptions

- Liberalization one-time, unexpected event
- Constant required rate of return, r, drops to $\overline{r}$ when the market opens up, that is:

$$\delta_t = \frac{1}{1 + r - \eta Y_t^x}$$

  where η represents the change in the cost of capital.

- expected dividends grow at constant rate (Gordon model).

Implication:

$$\frac{\partial D_t / P_t}{\partial Y_t^x} = \frac{-\eta}{1+g},$$

with g being the growth rate in expected dividends.

Is this intuition general?

1. Unrealistic dividend process
2. No time-variation in expected returns
3. Dividend process assumed constant
4. No expectational/announcement effects

$\Rightarrow$ Change in div. yield $\geq$ Change in cost of capital.

Robustness to dividend process

Assume

$$\Delta d_t = \rho \Delta d_{t-1} + \epsilon_t$$

where $d_t = \ell n(D_t)$ and $\epsilon \sim N(0, \sigma^2)$.

We calibrate such that the model matches:

- first two moments of $[\Delta d_t, D_t/P_t]$ in U.S. data.
- U.S. stock market volatility.

Implications:

$$\frac{\partial D_t/P_t}{\partial Y_t^x} = -x, \qquad x \in [.92, .99]$$

- Returns too noisy to detect η.

Our liberalization variable is specified:

1. Country Funds:
    * Y^{CF}: Launching

2. ADRs:
    * Y^{ADR}: Announcements (Miller, 1996)

We let

$$Y_t^x = \frac{1 - \lambda^{x_t}}{1 - \lambda},$$

where x is the number of ADRs, Country Funds.

Here, $0 < \lambda < 1$, and:

- The size of λ determines how fast the additional impact of further liberalizations declines.

3. Capital market liberalizations:

   * Dummy variables reflect dates in Bekaert (1995).

4. Break point in capital flows:

   * The dollar position of U.S. investors in emerging market i is:

$$\text{Own}_{i,t} = \text{Flow}_{i,t} + \text{Own}_{i,t-1}(1 + R_{i,t})$$

where

$\text{Flow}_{i,t}$ is the net capital flow in period t,

$R_{i,t}$ is the market i return in U.S. dollars from IFC.

We divide by current market capitalization to determine the approximate percentage ownership.

We use the technique of Bai, Lumsdaine and Stock (1996) to determine the break point in the cumulative capital flows.

[Table 3]

Impact of Liberalizations

We examine impact of liberalizations using:

1. ADRs,
2. CFs,
3. combined ADRs and CFs,
4. official liberalization dates as dummy variables,
5. minimum of ADRs, CFs and official dates, and
6. net capital flow break points.

Examine $\lambda = 0.1, 0.5$ and 0.9.

Table IV

The Impact of Liberalizations on Dividend Yields Allowing for Control Variables

Group-wise heteroskedasticity and autocorrelation-consistent t-statistics are reported below the coefficients. In Panels A-C, we estimate a time-series cross-sectional model with the dividend yields as the dependent variable. λ represents how fast the additional impact of further liberalizations declines. We perform a grid search of the λ parameter and find that 0.9 provides the best fit. With high λs, additional issues generate large additional effects, i.e. gradual liberalization. The Intro variable is defined in the panel title. In Panels D-F, we estimate a model with dummy variables around the liberalization definition. In the regressions labeled 'weighted', we weight the dummy variables by a function of the correlation with the world market return before the liberalization (see, also, Table III). The Wald test is whether the dividend yield declines from Pre to Post liberalization.

λ	NUMC	CONCR	STDL2	INFL	FXV	XMGDP	CCR	Intro	PRE	DURING	POST	AFTER	WaldTest
Panel A: Gradual Liberalization Model: Intro=ADRs													
0.9	-0.248	-0.944	-0.751	0.138	-3.088	-1.437	-0.057	-0.050					
Announc.	-2.19	-1.41	-6.46	1.77	-3.06	-3.53	-0.15	-1.42					
0.9	-0.296	-0.844	-0.750	0.150	-3.027	-1.410	-0.032	-0.012					
Effective	-2.61	-1.26	-6.42	1.94	-3.06	-3.34	-0.08	-0.51					
Panel B: Gradual Liberalization Model: Intro=Country Funds													
0.9	-0.204	-0.858	-0.746	0.173	-3.026	-1.326	-0.050	-0.156					
	-1.76	-1.24	-6.37	2.21	-2.97	-2.76	-0.12	-3.70					
Panel C: Gradual Liberalization Model: Intro=ADRs and Country Funds													
0.9	-0.201	-1.003	-0.749	0.149	-3.100	-1.291	-0.005	-0.089					
	-1.76	-1.48	-6.45	1.91	-2.94	-2.89	-0.01	-2.89					
Panel D: With Regulatory Liberalization Indicators													
	-0.286	-1.093	-0.729	0.150	-2.902	-1.544	-0.134		-0.421	-0.573	-0.641	-0.655	2.840
	-2.46	-1.55	-6.15	1.79	-2.57	-3.27	-0.30		-3.86	-4.07	-3.91	-3.55	*0.092*
Correlation	-0.269	-1.069	-0.727	0.148	-2.862	-1.486	-0.196		-0.756	-1.027	-1.208	-1.300	3.620
Weighted	-2.33	-1.54	-6.16	1.78	-2.50	-3.35	-0.44		-3.82	-4.02	-4.08	-3.89	*0.057*
Panel E: With ADR, Country Fund and Regulatory Liberalization Indicators													
	-0.237	-1.101	-0.733	0.161	-2.820	-1.336	-0.076		-0.166	-0.347	-0.711	-0.940	9.200
	-2.13	-1.62	-6.34	1.98	-2.52	-3.09	-0.18		-0.98	-1.65	-3.06	-3.89	*0.002*
Correlation	-0.238	-1.112	-0.733	0.160	-2.820	-1.347	-0.080		-0.259	-0.537	-1.192	-1.596	9.090
Weighted	-2.14	-1.64	-6.33	1.96	-2.49	-3.21	-0.18		-0.91	-1.52	-3.01	-3.85	*0.003*
Panel F: With Cumulative Net Capital Flow Break Points													
	-0.404	-1.022	-0.773	0.161	-3.198	-1.918	-0.129		0.047	-0.019	-0.030	-0.160	0.380
	-3.52	-1.45	-6.37	1.96	-3.05	-4.11	-0.33		0.50	-0.16	-0.21	-0.80	*0.537*
Correlation	-0.445	-0.938	-0.797	0.190	-3.969	-2.392	-0.058		0.050	-0.102	-0.122	-0.405	0.530
Weighted	-3.70	-1.26	-6.22	2.06	-3.46	-4.59	-0.14		0.28	-0.47	-0.46	-0.94	*0.468*

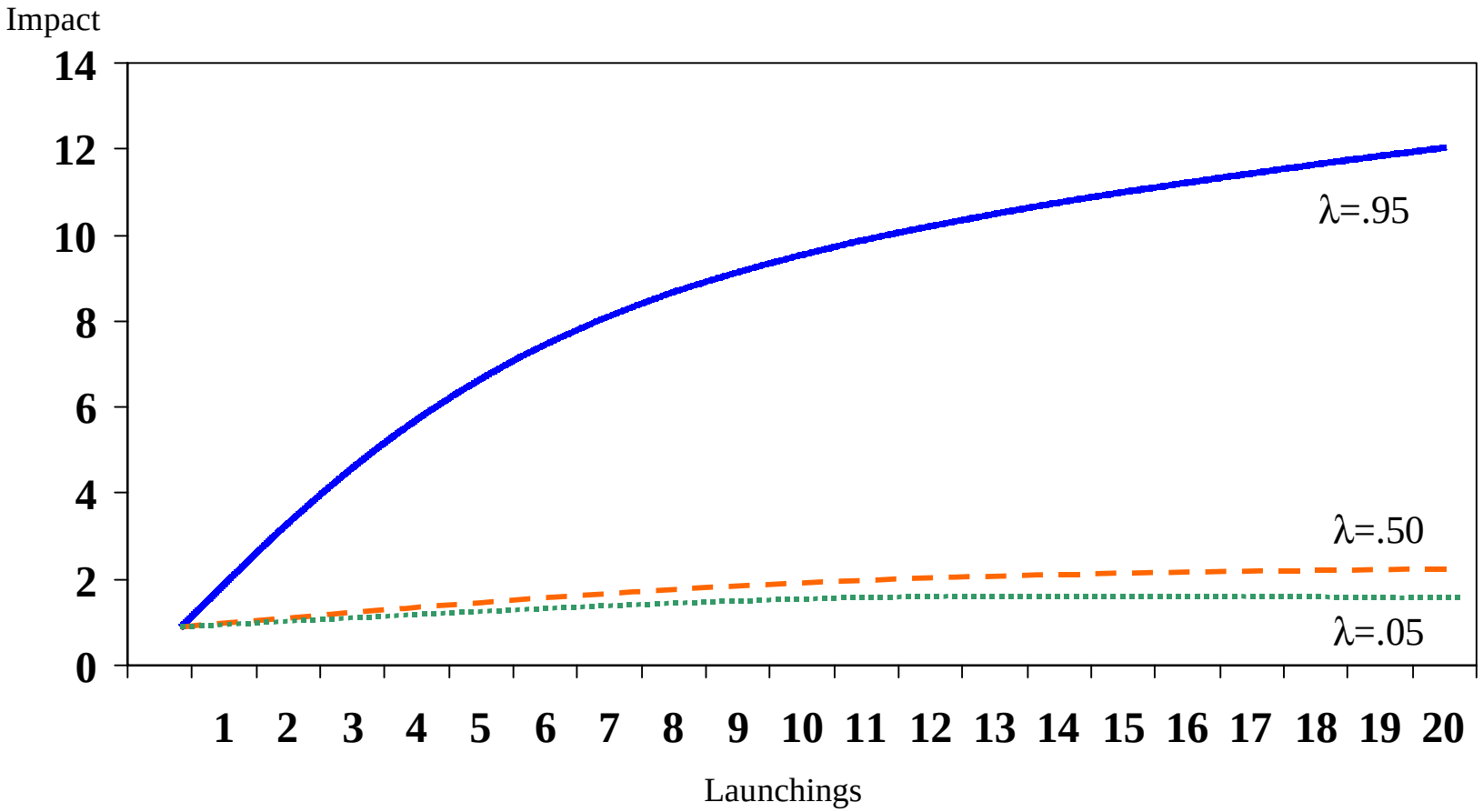


Figure 1. The decreasing impact of ADR and Country Fund launchings. The impact function is $(1-\lambda^x)/(1-\lambda)$ where x goes from 1 to 20. The size of λ determines how fast the additional impact of further launchings decline. For low λs, there is little effect of additional launchings.

Economic Significance

- When capital market opens up:
  - cost of capital decreases
  - correlation with world increases
- Effects are economically small compared to effects of economic integration.
- Capital market liberalizations may be part of a broader policy program.
  - $\Rightarrow$ Some of our independent variables may be correlated with the Y_t variable.

Economic Significance

Consider the following experiment.

Examine the effect of change from closed economy with poorly developed stock market to open economy with reasonably developed stock market.

- Measure the change in the cost of capital, volatility and correlation when a country moves from the 25th percentile to the 75th percentile of the cross-sectional distribution of the independent variables and experiences a liberalization.

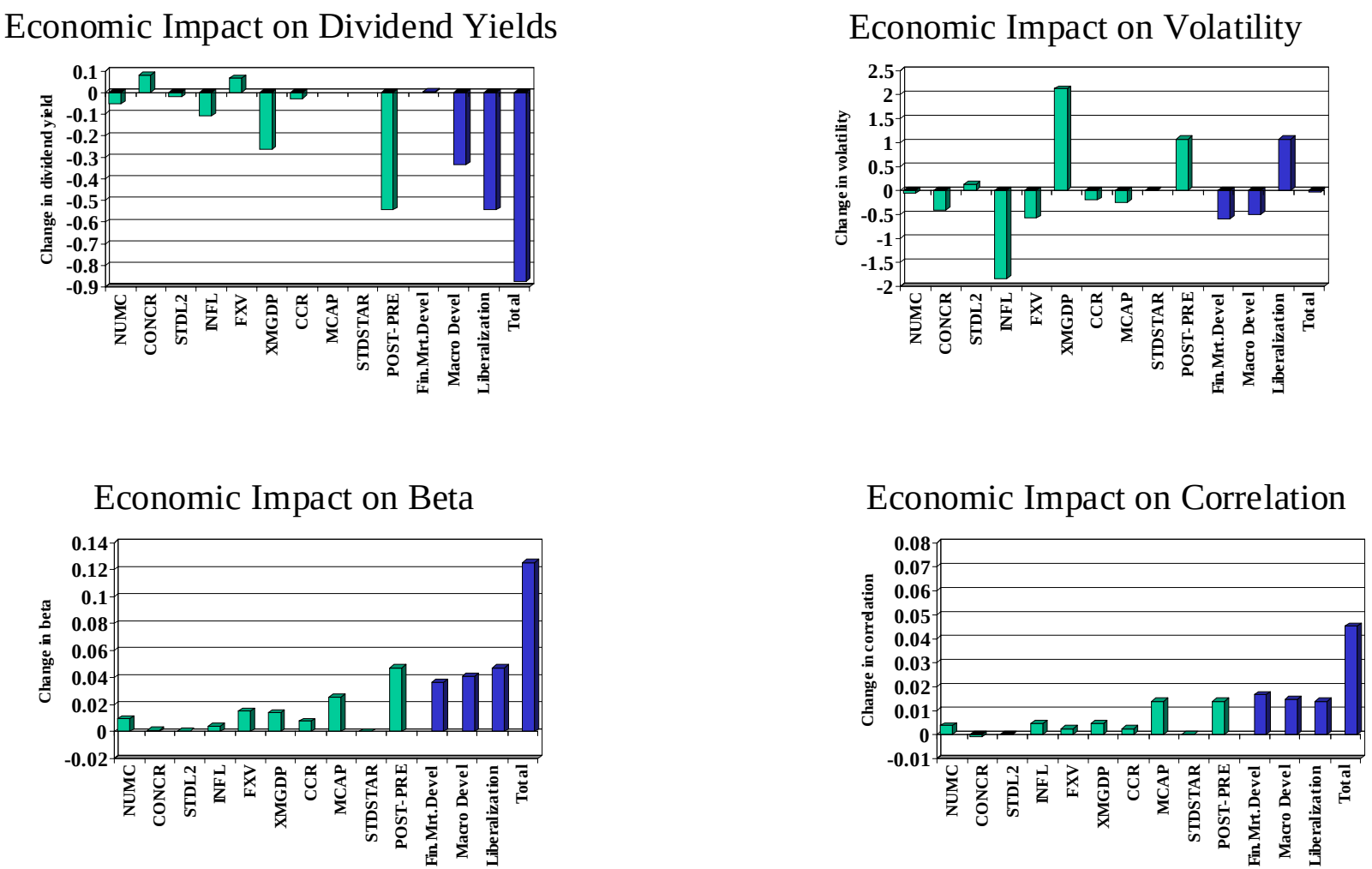


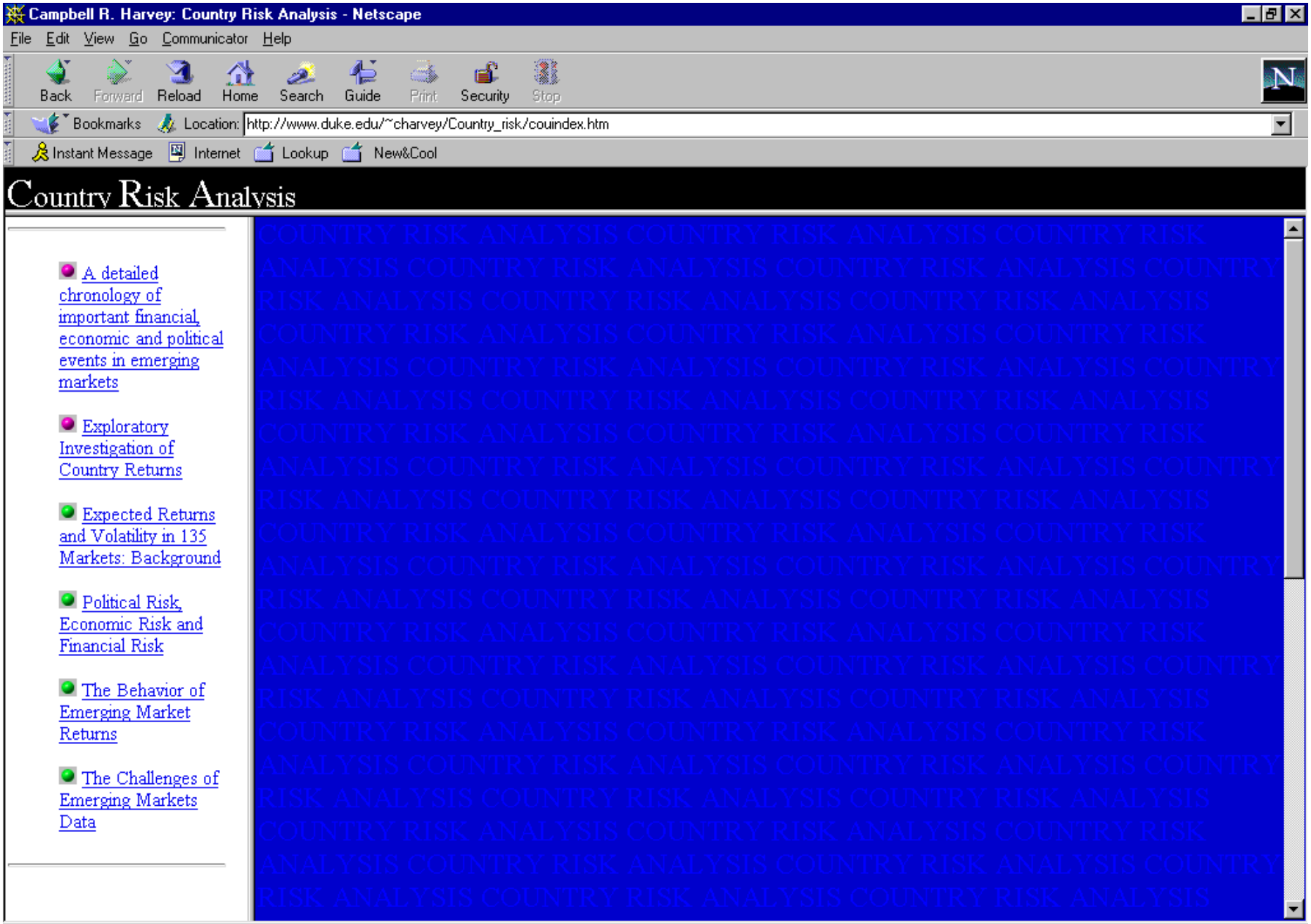
Figure 2. Country moving from 25th percentile to median after First Sign liberalization. Financial Development represents the sum of the number of companies (NUMC), the concentration ratio (CONCR), the cross-sectional standard deviation of stock returns within the local index (STDL2), the market capitalization (MCAP) and the interactive variable STDL2 and the mean adjusted MCAP. Macroeconomic development is the sum of past inflation (INFL), foreign exchange volatility (FXV), the size of the trade sector (XMGDP) and Institutional Investor's country credit rating (CCR). Financial Liberalization is the difference between the coefficients on the dummy variables for the POST and PRE liberalization periods.

Robustness of Results

- Dummy variable for 1995
- Country fund announcements
- Country-specific policy responses

- Impact of "liberalizations" on cost of capital, volatility and correlation:
  - Policy debate
  - Asset allocation
- Remaining problems:
  - Response may be country specific
  - Measuring ("dating") capital market liberalizations remains challenging.

  $\Rightarrow$ Bekaert, Harvey and Lumsdaine (1998).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Country Risk Analysis
A detailed chronology of important financial, economic and political events in emerging markets
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Country Risk Analysis

A Chronology of Important Financial, Economic and Political Events in Emerging Markets

Compiled by Geert Bekaert and Campbell R. Harvey

Last Updated: July 22, 1998

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Geert Bekaert and Campbell R. Harvey's

Chronology of Economic, Political and Financial Events in Emerging Markets

Thailand

Major Political and Economic Events

Date	
770429	Foreign Promotion Act, guarantees that no private business will be nationalized. Tax exemptions are granted for three to eight years, as are tariff exemptions and reduction in income taxes. Free repatriation of profits and dividends.[a]
8000	Interest rate ceilings for financial institutions from 15 percent limit imposed by usury law.[s]
8300	Board of Investment criteria are changed to facilitate export-oriented investment. While new criteria require majority local ownership for firms producing in the domestic market, they permit majority foreign ownership of export-oriented firms; plants whose output is wholly exported are permitted to be owned 100 percent by foreigners.[s] Banking crisis.[y]
8400	Thailand abandons fixed exchange rate vis-à-vis the dollar. General credit restrictions abolished but restrictions on bank lending rates reimposed. Ceilings for loans to priority sectors lowered.[s]
8500	IMF standby credit.[a]
8507	Bangkok Fund Ltd launched on the London Stock Exchange with net asset value of $163.5 million (in December 1991).[aa]
8612	Morgan Stanley launches $30 million Thailand Fund.[r]
8701	General Yongchaiyut called for reforms.
8707	ASEAN free trade agreement extended.
8709	Inauguration of the Alien Board on Thailand's Stock Exchange. The Alien Board allows foreigners to trade stocks of those companies which have reached their foreign investment limits. Thais continue to trade stocks on the Main Board.[o,q] [Park and Van Agtmael claim early 1988 but two other sources establish the date as September 1987.][e]
8709	*Bekaert/Harvey Official Liberalization date. [Final version].*
8806	Chartchai Choonhavan takes office.