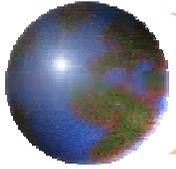


*Daily Cross-Border Equity
Flows: Pushed or Pulled?*

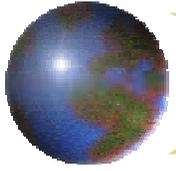
John M. Griffin, Federico Nardari, René Stulz

April 2002



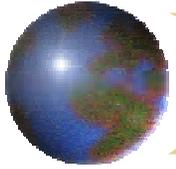
Outline of the Talk

- ⊕ Introduction / Motivations
- ⊕ Related Literature
- ⊕ Theoretical Underpinnings
- ⊕ Data Description
- ⊕ Empirical Methodology
- ⊕ Results
- ⊕ Conclusions



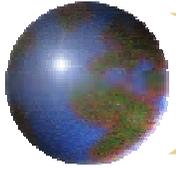
Motivations

- Analysis of cross-border flow/return dynamics are relevant given
 - Increased capital mobility
 - especially to/from developing markets
 - Concerns about capital flight
 - destabilizing behavior of foreign flows
 - Can't infer capital flows from prices



Motivations

- ❖ Empirical evidence is quite limited
 - ❑ Typically uses annual/monthly flow data and report strong contemporaneous correlations: cannot disentangle lead-lag dynamic relationships
 - ❑ Very few studies using higher frequencies (daily, intradaily) do not analyze cross-country dynamics and/or do not provide theoretical rationale for stylized facts



Related Literature

⊕ Monthly/Quarterly Flows

- Brennan – Cao (JF, 1997)
- Bohn – Tesar (AER, 1996)

⊕ Daily Aggregate Flows

- ⊞ Froot, O'Connell, Seasholes (JFE, 2001)

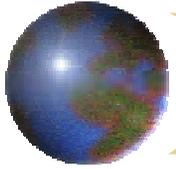
⊕ Who is informed in foreign markets?

⊞ Individual stocks

- Seasholes (2000), Cho, Kho, and Stulz (2001)

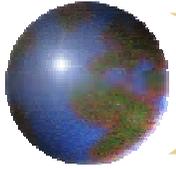
⊞ Closed-end country funds

- Froot – Ramadorai (2001)



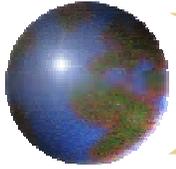
Contribution of the Paper

- ✚ New model for flows
 - ▣ Better understanding of Equilibrium flow dynamics with home-bias and extrapolative expectations.
- ✚ New Data
 - ▣ Daily—can disentangle hypothesis
 - ▣ Market-wide flows
 - All flows in an out of a market
- ✚ New findings
 - ▣ World factors affect flows
 - ▣ What's good for US is good for flows



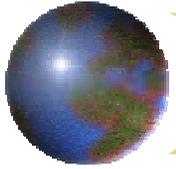
The Model

- Two countries, D and F
 - one stock in each country
 - uncorrelated returns
 - fixed amount of shares outstanding
 - Investors have log-utility functions
- Domestic Investors are less informed than Foreign Investors (about the foreign stock).
- Domestic Investors pay more attention to past foreign returns. (extrapolative expectations)



The Model

- ⊗ For country i ($i=D, F$):
 - ⊗ N_i^s : # of outstanding shares
 - ⊗ P_i : per share price
 - ⊗ W^i : wealth
 - ⊗ μ_i : expected excess return on stock
 - ⊗ σ_i : stock volatility
 - ⊗ $\Omega = W^D/W^W$
- ⊗ With perfect markets equilibrium holdings are in proportion of own country's wealth relative to world's wealth



The Model

- ✚ Barrier, δ^D

- ✚ reduces domestic investors' return in the foreign market

- ✚ With barriers, Domestic Investors' demand curve for foreign stock is

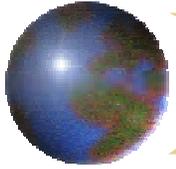
$$N_F^D = \frac{\mu_F - \delta^D}{\sigma_F^2} \frac{W^D}{P_F}$$

- ✚ Without extrapolative expectations,

- ✚ δ^D does not depend on past foreign prices

- ✚ With extrapolative expectations,

- ✚ δ^D is decreasing in past foreign prices

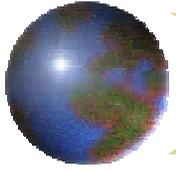


The Model

- ✿ In equilibrium equity holdings are:

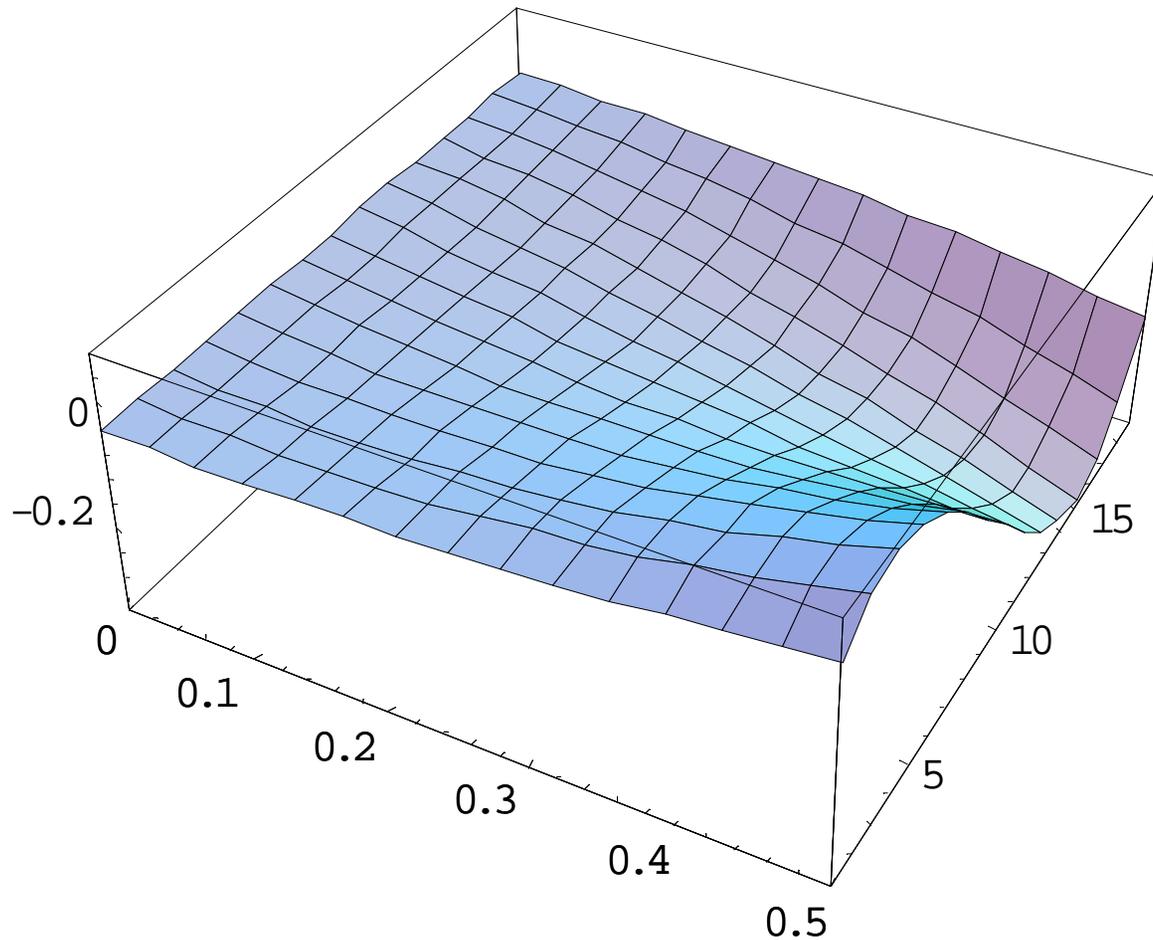
$$N_F^D = N_F^S \Omega + \frac{\delta^D}{\sigma_F^2} [\Omega - 1] \frac{W^D}{P^F}$$

$$N_F^F = N_F^S [1 - \Omega] + \frac{\delta^D}{\sigma_F^2} \Omega \frac{W^F}{P^F}$$



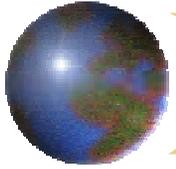
Doubling of foreign stock price

Net equity flow



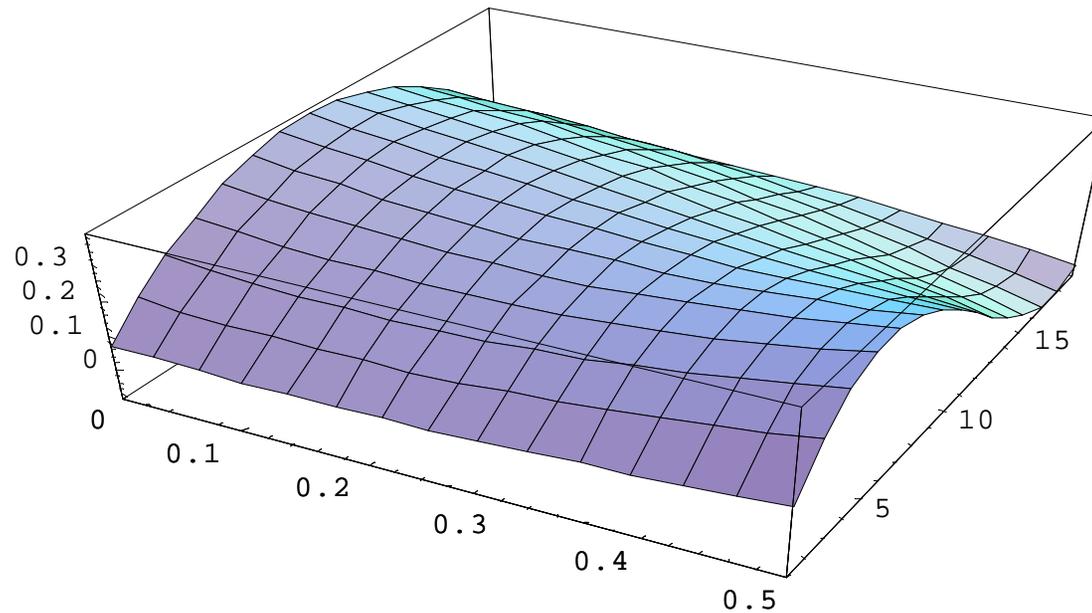
Barrier to international investment

Domestic wealth



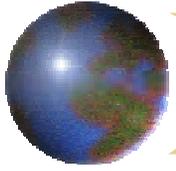
Same with extrapolative expectations

Net equity flows



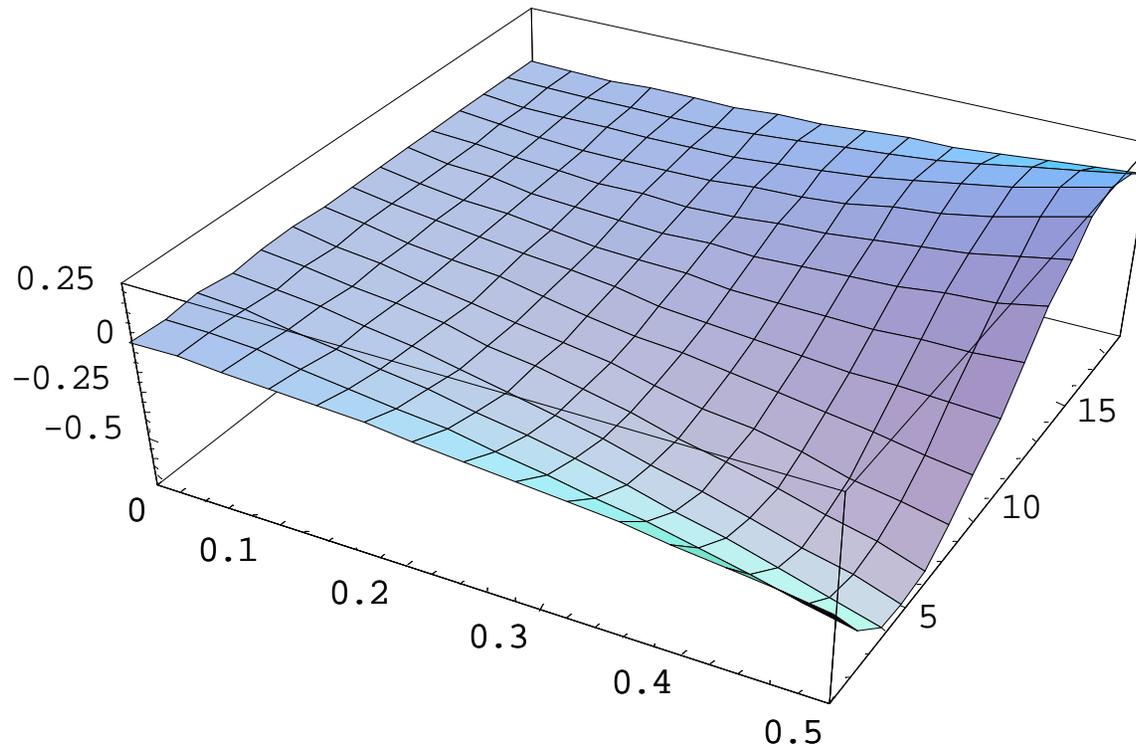
Barrier

Domestic
wealth



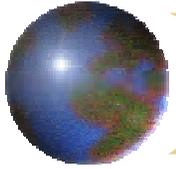
Doubling of domestic stock price with extrapolative expectations

Net equity
flow



Barrier

Domestic
wealth



The Model

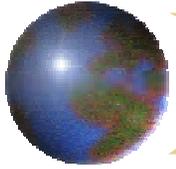
⊕ Main Predictions:

1: Unexpectedly high returns on the *foreign* stock = net equity inflows

- as long as domestic wealth is not too small compared to foreign wealth.

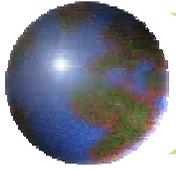
2: Unexpectedly high returns on the *domestic* stock = net equity inflows into the foreign country

- but only when domestic wealth is large relative to foreign wealth.



Data

- ⊕ Need “high frequency” data to examine lead-lag in flow/return dynamics
 - ⊞ Do flows lead, follow, or move with returns?
- ⊕ Contacted over 60 Exchanges and Vendors
- ⊕ Data for 9 emerging markets, 1996 – 2001
 - ⊞ All foreign originated transactions recorded
- ⊕ Returns, FX rates, and Market caps from Datastream

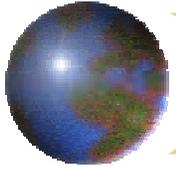


Empirical Methods

- ✚ Use Vector Autoregression (VAR) to uncover lead-lag dynamics
 - ▣ Granger Causality Tests
 - ▣ Impulse Response Functions

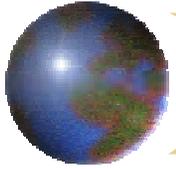
$$f_t = \alpha_f + \sum_{i=1}^k \lambda_i^{(r)} f_{t-i} + \sum_{j=1}^k \beta_i^{(r)} r_{t-j} + \varepsilon_{t,f}$$

$$r_t = \alpha_r + \sum_{i=1}^k \lambda_i^{(f)} f_{t-i} + \sum_{j=1}^k \beta_i^{(f)} r_{t-j} + \varepsilon_{t,r}$$



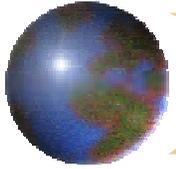
Empirical Results: Local Analysis

- ⊕ Flows are much more persistent than returns
 - ⊠ even after controlling for past returns
- ⊕ Variation explained by VAR's in Flow equations >> than explained variation in return equations
- ⊕ Lagged Flows are predictors of current returns
 - ⊠ Mixed "weak" effect after controlling for contemporaneous flows
 - foreign investors do not appear to be better informed



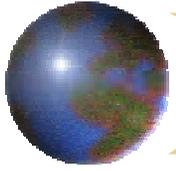
Empirical Results: Local Analysis

- Flows follow Local Market Returns
 - in East Asian countries + Slovenia
- Impact of lagged returns is robust to contemporaneous effects
- Contemporaneous effects are important
 - Intradaily forecasting, price pressure, intradaily trend chasing



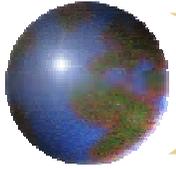
Empirical Results: Cross-country analysis

- ⊕ Including regional returns does not alter previous local flows/returns relationships
- ⊕ Lagged regional returns positively and significantly affect flows
 - ⊕ in East Asian countries + India
- ⊕ North American flows have the greatest effect
 - ⊕ Impact is robust to contemporaneous and lagged local returns



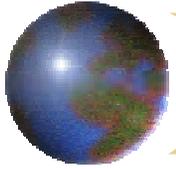
Economic Importance of Cross-country analysis

- ⊕ Past flows only 0.24
- ⊕ 16.8 % increase to 0.285 with the addition of local returns
- ⊕ 12.7 % additional increase to 0.325 with the addition of regional indices
- ⊕ For East Asian countries regional effects are as large as local returns effect
 - ▣ bigger for Korea and Taiwan



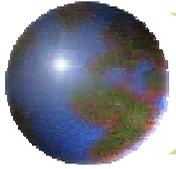
Empirical Results: Robustness Checks

- ❖ FX Rates impact flows weakly and in 2 countries only
- ❖ Flows/returns relationships essentially unchanged
- ❖ Flows to other countries do not significantly affect relationships
- ❖ Major findings are confirmed with US\$ returns



Conclusions

- ❊ Proposed simple model of equilibrium cross-border flows
 - ❑ barriers and extrapolative expectations
- ❊ Model generally predicts
 - ❑ Flows increasing in local market performance
 - ❑ Flows increasing in large market performance
- ❊ Empirical Analysis convincingly supports model predictions for East Asian countries
- ❊ North American market Returns are economically important factor in Asian equity flows.



Conclusions

- ✚ Capital can flow into or out of a country for reasons other than local fundamentals
- ✚ Capital flows can be pushed or pulled without irrational behavior