

The Center and the Periphery:  
The Globalization of Financial Turmoil

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# Outline

- Big Picture
- Data (too short?)
- Conditioning Biases in Measuring Distributions (“weak-form globalization”)
- Comments on the Logit Model (“strong-form globalization”)
- Further Suggestions
- Conclusions

# Big Picture

- When a calamitous event happens in the US, is Brazil more likely to have low returns than when the US does not experience any financial turmoil?
- What about if Argentina experiences a large negative shock? Are there differences for Brazil's returns than for the US case?

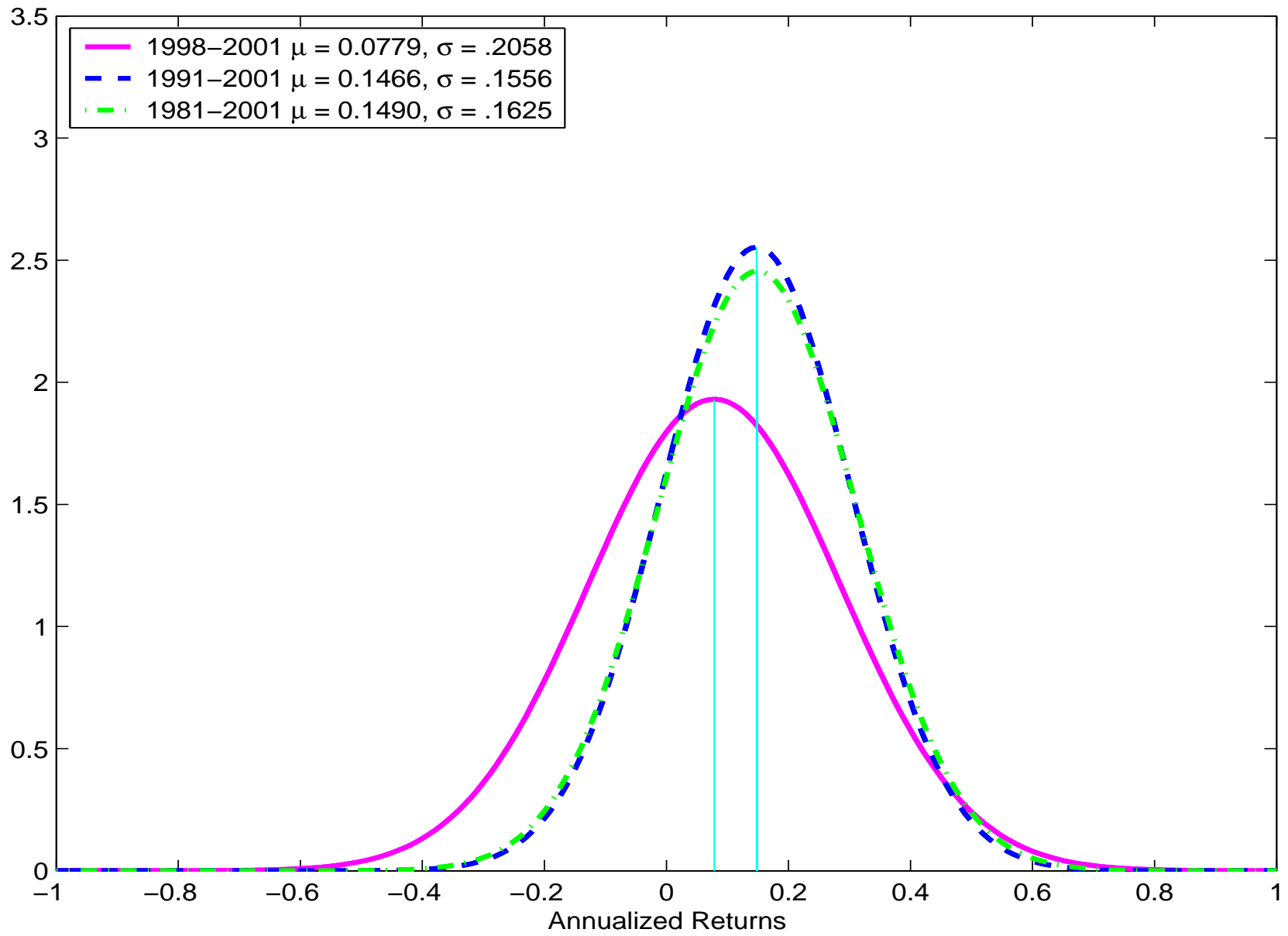
⇒ Need to quantify and measure spill-over and contagion effects

# Comments on the Data

- The sample period is Jan 1997 to Aug 1999. This is not even three years of data!
- The authors want to examine “extreme returns,” in the 5th and 95th percentile of the distribution. We can’t even pin down a mean in 3 years of data, how are we going to pin down an entire distribution?

## US Daily Data from CRSP

Length	Time Period	Normal		Annualized	
		Lower	Upper	$\mu$	$\sigma$
3 yrs	1998-2001	-0.0212	0.0218	0.078	0.206
10 yrs	1991-2001	-0.0157	0.0168	0.147	0.156
20 yrs	1981-2001	-0.0163	0.0175	0.149	0.163

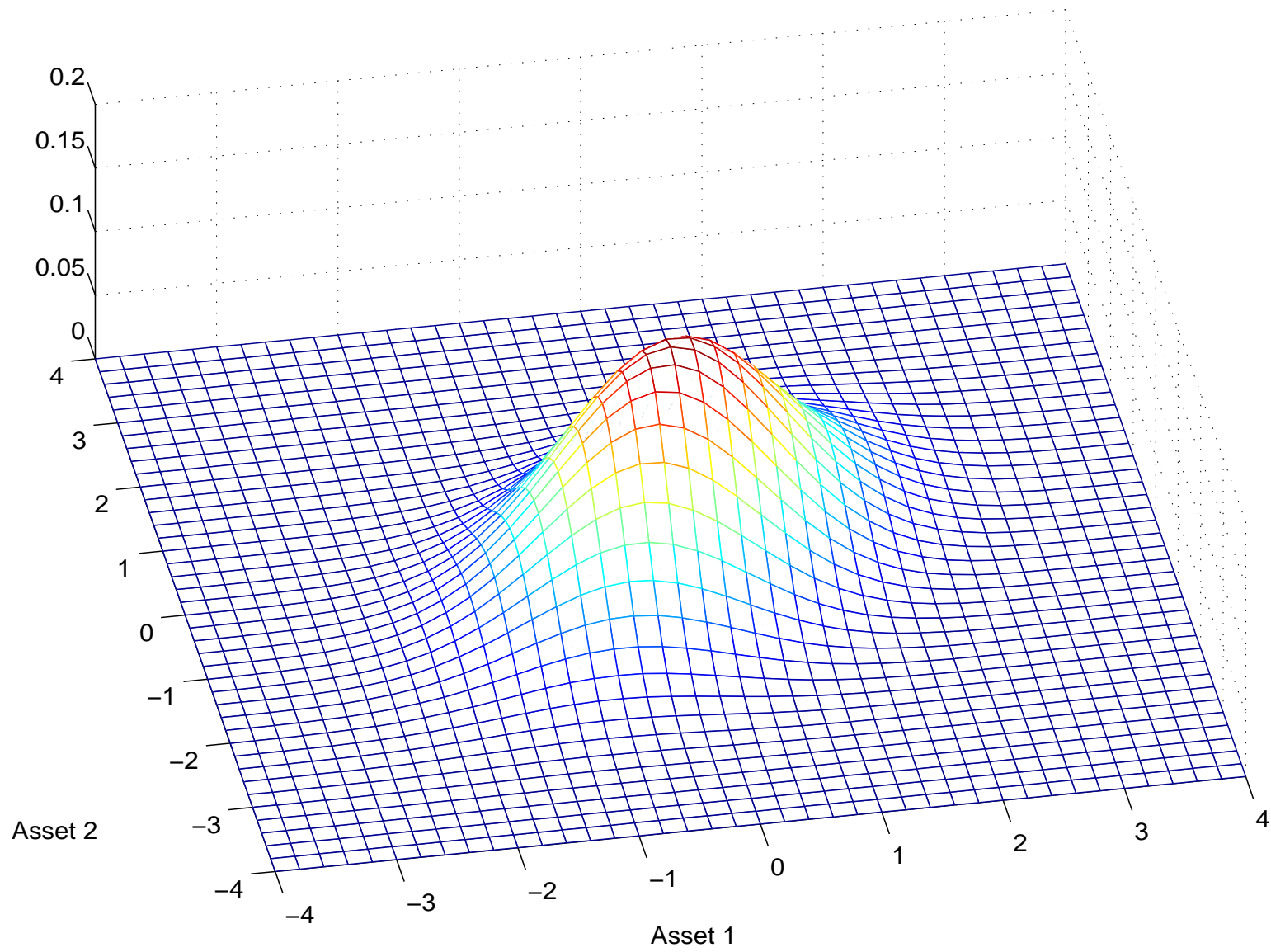


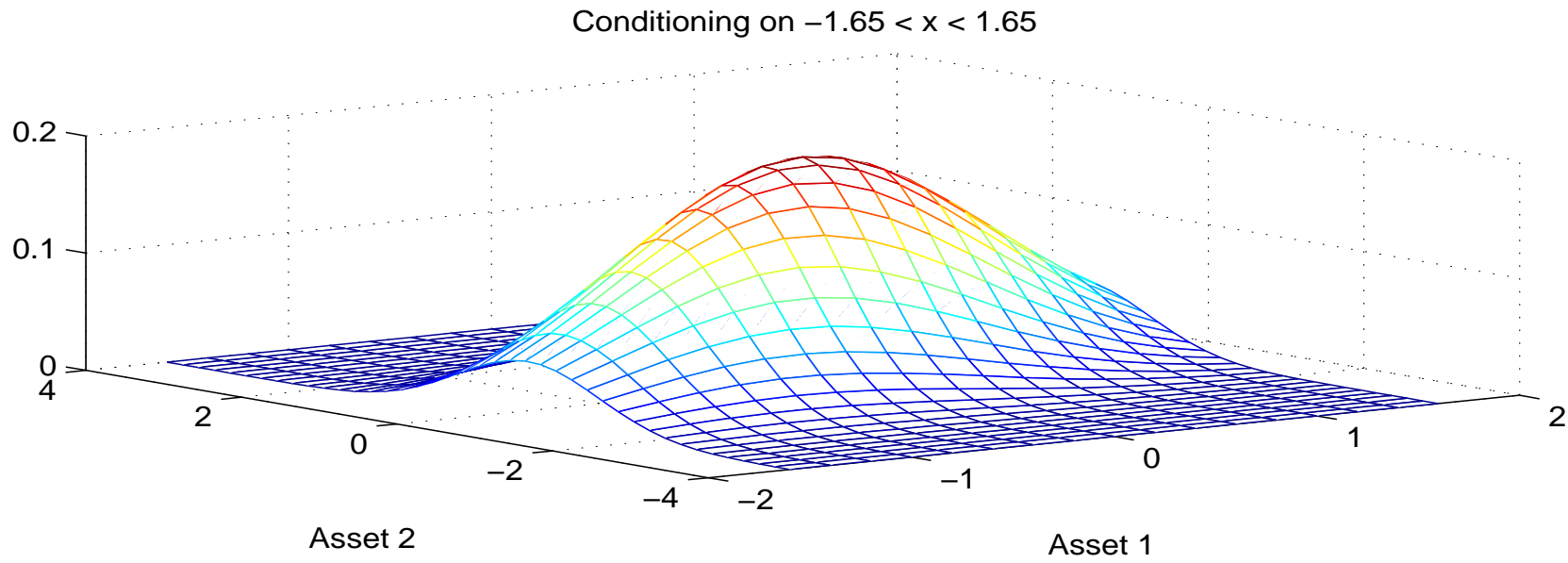
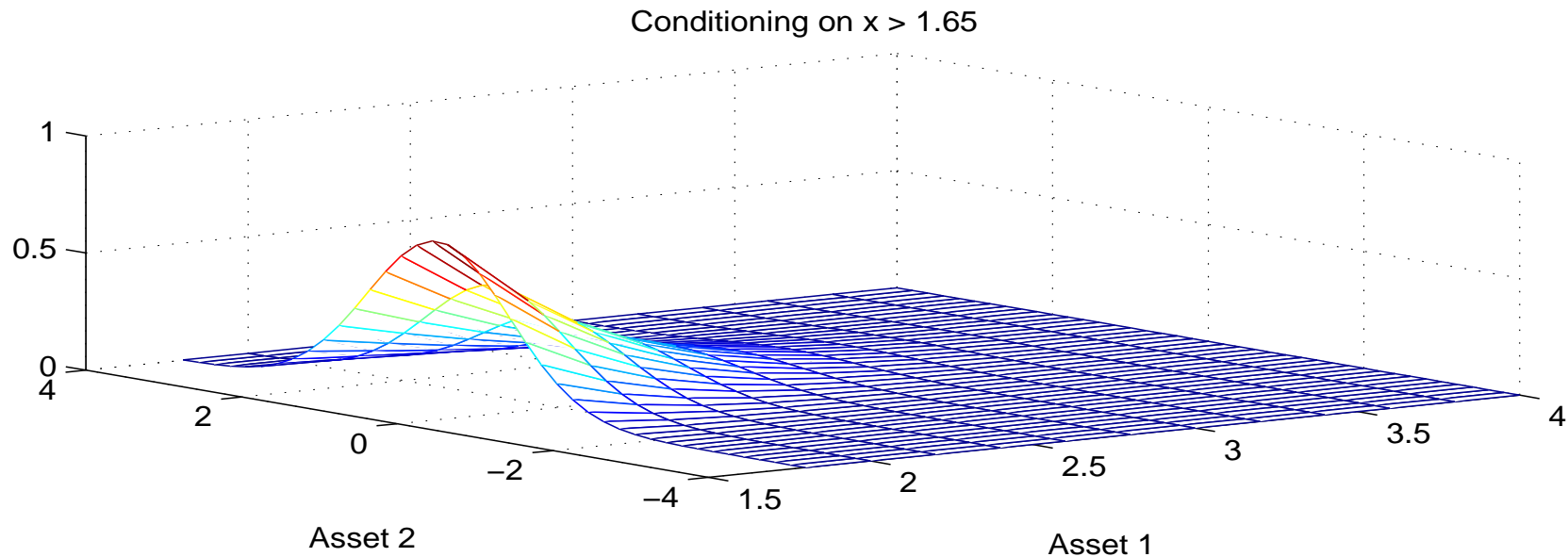
- Daily data also contains a lot of bid-ask bounce and non-synchronous trading effects (eg see Karolyi and Stulz, 1996).
- ⇒ Use a much longer, at least a 10 year sample period  
IFC emerging market returns go back to 1988
- ⇒ Also look at weekly data for robustness. If something event is truly calamitous, its effects will not just be felt at a daily frequency.

# Conditioning Biases

- Question: Is the distribution of returns in Brazil the same when the US has an extreme draw as when the US has a regular draw?
- The authors use a Kolmogorov-Smirnov test to show that the distribution of Brazilian returns is NOT the same when the US return is large, compared to when the US return is small.
- However, the answer to this question is always YES, by construction, as long as the US and Brazil are correlated

Plot of Normal Density with  $\rho = 0.4$





- Conditioning on “large” (extreme) moves induces conditioning biases in the distribution. We expect the marginal distribution of  $y$  conditional on large absolute moves of  $x$  to be different from the distribution conditional on small absolute moves of  $x$ . [see Boyer, Gibson and Loretan (1999), Ang and Chen (2002), Forbes and Rigobon (2002)]
- Testing for differences in *distributions* with conditioning biases is tricky, maybe impossible without a parametric framework:
  1. Suppose the joint distribution of  $(x, y)$  is normal. Then, using points  $\{(x, y) | x > h_1\}$ , we estimate  $f(y | x > c)$  and infer the implied distribution  $\hat{f}(y | x < c)$ .
  2. Compare this with  $f(y | x < c)$  directly estimated from the points  $\{(x, y) | x < c\}$ .
- However, asset returns overwhelmingly reject simple parametric distributions like normals!

# Logit Model

- Question: Is the likelihood of the number of countries simultaneously experiencing extreme returns (LHS) dependent on whether a particular country, say the US, is experiencing turmoil? (RHS dummy variable)
  - Problem: Conditioning biases always means the answer to this question is YES!
  - Illustration: two assets  $(x, y)$  drawn from a standard normal with correlation  $\rho = .4$ . Suppose we condition on  $x > 1.65 = c$ . Then  $E(y) = 0.8269$  and  $\text{var}(y) = 0.8620$ .  
[see Ang and Chen (2002) for full characterization of  $E(x^i y^j | h_1 < x < h_2, k_1 < y < k_2)$ ]
- ⇒ By construction, we expect  $y$  is more likely to also have an extreme draw!

- For any reasonable empirical model (GARCH, regime-switching, copulas etc), the conditioning biases are even more severe
  - We need to know that standard DGP's cannot account for these results.
- ⇒ Run Monte Carlo's for various DGP's to ensure that (i) common DGP's do not account for your results “by construction” and (ii) that there are contagion effects *in excess* of those implied by the DGP's.

# Additional Comments

- There is a lot of evidence that downside returns are different from upside returns
  - ⇒ Examine the downside exceedances separately from the upside exceedances. Is contagion only reflected in the downside periods?
- The definition of “weak-form globalization” is “when country  $j$  experiences returns *following* an extreme event in country  $i$ .
  - ⇒ This is a statement about predictability, not contemporaneous returns. However, the testing of distributions of weak-form globalization tests exceedance moves, not necessarily simultaneous, but *contemporaneous* in time.

- The logit exercise is very similar to Bae, Karolyi and Stulz (2002), except:
  - BKS use *economic* explanatory variables, eg conditional volatility, exchange rates, interest rates, etc. (rather than dummy variables indicating large moves in particular countries)
  - The detailed chronology of events should complement these statistical studies, but we need to rely on formal analysis to make inference, particularly for policy

# Conclusion

- The tests of whether distributions of a country  $y$  are the same conditioning on high or low absolute returns of country  $x$ . By conditioning biases, we always expect these distributions to be different!
- Conditioning biases also lead to difficulties inferring results from the logit model.
- We need to examine contagion effects relative to interesting empirical models and account for conditioning effects.