Leverage Cycles and the Anxious Economy
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July 2008
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Summary and Bottom Line

- The paper presents some stylized facts about *emerging assets*, and a theory based explanation.
- Significant contribution: clean modeling, a theory of asset pricing with collateral constraints.
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Significant contribution: clean modeling, a theory of asset pricing with collateral constraints.

Less clear: empirical applicability of the model for the questions at hand.
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2. Around market closures, sub grade emerging markets bonds fall more than investment grade ones (*differential contagion*).
3. During closures, the issuance of investment grade EM bonds falls by more than the issuance of sub grade bonds (*issuance rationing*).
Average Spreads around Closures

Emerging Markets

US High Yield Spreads
Average Spread Volatility around Closures

Emerging Markets

US High Yield

s.d.

Closure  days

0  5  10  15  20  25  30  35  40  45  50  55

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What the Data Suggests (to FG)

- FG’s conjecture: "Periodic problems faced by emerging asset classes are sometimes symptoms of what we call a global *anxious economy* rather than of their own fundamental weakness".
- That is, much of the volatility of emerging markets bonds is a result of the behavior of *international investors* reacting, in particular, to news *about US risky bonds*. 
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Radical idea, potentially strong policy implications, certainly worth exploring.
FG emphasize that they do not focus on *crises driven* behavior. But for at least some cases, such behavior may be the dominant one.
Two trees, $H$ and $E$. 
Theory: A Basic Situation

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- $E$ yields 1 unit of fruit with prob. $q$, or $e < 1$ with prob. $1 - q$, independently of what happens with $H$. 
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Normally, $H$ yields 1 unit of fruit. But there is the possibility of bad news, in whose case $H$ yields either 1 with prob. $q$ or $h < 1$ with prob. $(1 - q)$. 

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2. If so, why?
3. If there are different kinds of $E$ trees, whose price falls by more when bad news arrive?
With a representative agent, no contagion can occur.

With heterogenous agents but complete markets, "only a tiny degree of contagion" (?)..

$$\implies$$ Need to allow for heterogenous agents and incomplete markets.
Agent $i$ has utility

$$U^i = \sum_s \bar{q}_s^i \delta_t^{(s)-1} u^i(x_s)$$

Note the subscripts, especially on $\bar{q}_s^i$. For computed examples, $i = \text{optimist or pessimist}$. 
Model: Preferences and beliefs

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For computed examples, $i =$ optimist or pessimist.
At each $t$, agent $i$’s budget constraint is:

$$x_t, y_{tj} \geq 0$$

$$x_t - e_t^i + \sum_j p_{tj}(y_{tj} - y_{t-1,j}) \leq \frac{1}{1 + r_t} \phi_t - \phi_{t-1} + \sum_j y_{t-1,j} D_{tj}$$

$$\phi_t \leq \sum_{j \in J^c} y_{tj} \gamma_{tj}$$

where $\gamma_{tj}$ is asset $j$’s collateral capacity:

$$\gamma_{tj} = \min_{\sigma} [p_{t\sigma,j} + D_{t\sigma,j}]$$

and the min is over the possible states of nature ($\sigma$) at next stage.
Most of my intuition came from looking at these!

Let $\lambda_{it} = u'(x_{it})$ and $\mu_{it}$ denote nonnegative Lagrange multipliers:

1. For each tree $j$ (defining $\gamma_{tj} = 0$ if $j \notin J^C$):

   $$\lambda_{it} p_{tj} = \delta^i \left[ \sum_{\sigma} q^i_{t\sigma} \lambda_{i,t\sigma} (p_{j,t\sigma} + D_{j,t\sigma}) \right] + \mu_{it} \gamma_{tj}$$

   i.e.

   $$p_{tj} = \delta^i \left[ \sum_{\sigma} q^i_{t\sigma} \frac{\lambda_{i,t\sigma}}{\lambda_{it}} (p_{j,t\sigma} + D_{j,t\sigma}) \right] + \frac{\mu_{it}}{\lambda_{it}} \gamma_{tj}$$
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2. FOC for borrowing:

$$\frac{1}{1 + r_t} \lambda_{it} = \delta^i \sum_{\sigma} q_{t\sigma}^i \lambda_{i,t\sigma} + \mu_{it}$$
Implications

\[ p_{tj} = \delta^i \left[ \sum_{\sigma} q^i_{t\sigma} \frac{\lambda_{i,t\sigma}}{\lambda_{it}} (p_{j,t\sigma} + D_{j,t\sigma}) \right] + \frac{\mu_{it}}{\lambda_{it}} \gamma_{tj} \]

- If the term \( \frac{\mu_{it}}{\lambda_{it}} \gamma_{tj} \) is zero, we have a conventional asset pricing formula: the price of asset \( j \) is equal to its payoff value.
- The term \( \frac{\mu_{it}}{\lambda_{it}} \gamma_{tj} \) is a new source of value (\( j \)'s collateral value)
- Since \( \gamma_{tj} = \min_{\sigma} [p_{t\sigma,j} + D_{t\sigma,j}] \), \( j \)'s collateral capacity and its collateral value are endogenous and forward looking.
- But collateral value is zero unless \( \mu_{it} > 0 \).
\[
\frac{\mu_{it}}{\lambda_{it}} = \frac{1}{1 + r_t} - \delta^i \sum_{\sigma} q_{t\sigma} \frac{\lambda_{i,t\sigma}}{\lambda_{it}}
\]

- \(\mu_{it} > 0\) only if agent \(i\)'s wants to borrow more than he can at the market interest rate (i.e. there is a *liquidity wedge*).
- For given \(r_t\), changes in \(\mu_{it}\) (the *liquidity wedge cycle*) must be necessarily accommodated by changes in the \(\lambda_{it}'\)s. (This would affect the \(p_{tj}'\)s even in the absence of leverage.)
- When leverage is possible, the impact of the liquidity wedge cycle on prices can be amplified through the term \(\frac{\mu_{it}}{\lambda_{it}} \gamma_{tj}\) (*leverage cycle*).
- Very complex interactions, resulting in new and unexpected behavior, appear possible.
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- The general equilibrium interactions are not discussed as clearly as I would have liked.

It is unclear (at least to me) how informative this exercise can be. Example economies are too stylized (only three periods, only two types of agents, a very particular information structure...) to argue that the outcomes are robust. Parameters are postulated with only a minimal attempt at linking them to observable data.

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- What do we learn for policy and welfare?
- Next versions of this model should be much more user friendly.
Final Thoughts

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- The model, however, is a useful step towards the understanding of the role of financial frictions and incomplete markets in asset pricing.
- Developing more potentially realistic versions of this model is, hence, a promising endeavor.