Nice paper. Very pedagogical. Good starting point to think about the issue.

What is it about?

Highlights the role of leveraged financial institutions in propagating a negative shock on the wealth of leveraged institutions across borders.

Investigates the various international transmission channels. Quantify them.

Answer: their role is likely to be small
**Motivation**

US subprime losses: small losses but large fall in asset prices in the US and worldwide. How can that be?

‘International Financial Multiplier’ (Krugman (2008))

Losses in the US force leveraged US investors to sell assets domestically and globally. Generate losses for leveraged Foreign investors. Foreign investors do the same and so on...

This paper investigates the theoretical relevance of the argument. Clarify the mechanisms in a simple enough framework (closed-form).

What I am gonna do?

- Sketch the main intuitions of the model and the main findings
- Confront to some empirical facts
- What are the potential missing ingredients?

The model

Two countries, say US and ROW.

Two investors in each country: leveraged financial institutions (risk takers, issue bonds to finance risky investment) and savers (risk sellers).

Portfolio of risky assets of both countries. Portfolio home bias (exogenous friction)
The model

Starting point: exogenous losses on the loan portfolio of leveraged financial institutions = subprime losses

Implications for asset prices in the US and abroad under two cases:

- frictionless domestic financial markets
- binding credit constraints for financial institutions/margin constraints.

Loan losses imply a fall of asset prices in the US.

Channels of international transmission (frictionless financial markets)

1. Direct exposure of foreign institution on loan (subprime) losses: wealth losses lead to fall in Foreign asset prices.

2. International portfolio exposure channel: Foreign institutions hold US risky assets and US institutions hold Foreign risky assets.

   Further losses for Foreign institutions as US asset prices are falling due to the losses incurred by US financial institutions (as well as further losses for US institutions due the fall in Foreign asset prices)....= ‘International Financial Multiplier’ (Krugmann)

3. Portfolio allocation channel: US asset prices have fallen more ⇒ portfolio rebalancing away from Foreign assets. Further decline in Foreign asset prices.
Channels of international transmission (frictionless financial markets)

- Direct exposure: Small impact because small foreign exposure on loan losses. US asset prices fall more but not so much either.

- International portfolio exposure channel: small to start with since small fall in asset prices driven by the loan losses. Even smaller impact because of portfolio home bias. And even smaller since leveraged financial institutions small share of aggregate portfolio holdings.

- Portfolio allocation channel: very small for the same reasons as above.

At the end of the day, reasonable calibration leads to: small fall in US asset prices and only 1/3 of the fall transmitted abroad.

Channels of transmission (credit constraints)

Fall in net worth of financial institutions make credit constraints binding in the US: portfolio reallocation channel becomes larger

- US financial institutions have to reduce further their balance sheet (higher borrowing costs due the constraint). Further fall of US and Foreign asset prices.

Amplification mechanism. Larger fall of asset prices across the board especially if constraint become binding for Foreign institutions too. Then, almost 40% of the fall in US asset prices transmitted abroad.
Potential missing ingredients

- Prices: Larger time variation in expected excess returns

  Time varying moments

  Time varying risk aversion

- Quantities: Portfolio reallocation

Prices: Larger time variation in expected excess returns

Expected excess returns proportional to $\gamma \sigma^2$

Time-varying expected excess returns due to:

Changes in the quantity of risk: Here second-moments remain constant.

Changes in the price of risk: Here risk aversion of each investor remains constant. Some time variation in expected return coming from the fall in the share of wealth of leveraged institutions (low risk aversion) compared to savers (high risk aversion). Effects are small. Likely not to be a good model of time varying expected returns.
Second-moments remain constant?

During financial crisis,

- large rise in asset risk worldwide
- large rise in cross-country covariance of returns

Figure 1: Volatility indices Eurostoxx and S&P500
Cross-country covariance of returns

Rise in the correlation of asset returns during financial crisis. Foreign market become more sensitive to shock in the US market.

Significant rise in the $\beta$ of Foreign stock market $i$ on US stock market (Bekaert et al. (2011))

$$R_{i,t} = \alpha_i + \beta_i R_{US,t} + \varepsilon_{i,t}$$

$\beta_i$ post crisis rise by roughly 30% on average (rise more for the countries less exposed before the crisis = less dispersion of the $\beta$ across countries)

⇒ Potential large fall in diversification benefits in time of crisis.

Risk aversion of each investor remains constant?

Market price of risk varies countercyclically.

Well, easy to fix, just fix the preferences (Campbell and Cochrane (1999))

Evidence?


Large increase in risk aversion: average risk aversion has increased by a factor of 2 (3.5 for the median investor)

Confirmed by lab experiments.
Quantities: Portfolio reallocation

Small effects in the model (portfolio reallocation channel) but does not match data on portfolio reallocation.

In the model: away from Foreign assets towards US assets to keep portfolio shares constant. Small impact.

Leverage does not fall. Constant if leverage constraint. Increase in other cases as expected excess returns are increasing

Frictionless case:

\[ Lev \# \frac{Excess \text{ expected returns}}{\gamma \sigma^2} \]

In the data during the financial crisis:

- Deleveraging of financial institutions (Adrian and Shin 2008)

- Big retrenchment in capital flows for stocks/bank loans - massive sell of foreign stocks/foreign loans by investors (primarily banks) of each country. see Milesi-Ferretti and Tille (2010).

If initial loan losses bigger in the US, larger sales of Foreign stocks. Combined with deleveraging ⇒ larger international transmission

Deleveraging of financial institutions fell primarily on Foreign assets (country reallocation) to buy (riskless) bonds (asset class reallocation = deleveraging)
Prices and quantities: hints for further work

1) Need to account for time varying moments driven by (ideally endogeneous) changes in second moments: global spike in volatility and cross-country correlation. And/or time-varying price of risk.

2) Could account for portfolio reallocation: Deleveraging for sure. Cross-country reallocation?
Prices and quantities: hints for further work

Potential caveats: big retrenchment in capital flows seems puzzling at first

In simple portfolio models with transaction costs, portfolio bias driven by for symmetric countries:

$$Bias \# \frac{\tau}{\sigma^2(1 - \eta)}$$

where $\eta =$cross-country correlation

Global shift in risk aversion or in asset risk only might be inconsistent with cross-country portfolio reallocation [larger needs for diversification for a given $\tau$]

Will need big shift in $\eta$ to get the retrenchment without additional ingredients.

Prices and quantities: hints for a future work

Uncertainty shocks?

Time varying disaster risk: ↑ in disaster risk generates asset price drops, spikes in market volatility (Gabaix (2007), Gourio (2010), Wachter (20009)) and if ↑ in disaster risk in a large market, then spikes in correlation across markets (Martin (2009))

Endogenous risk panic (Bachetta, Tille and van Wincoop (2010))?

Endogenous default risk (potentially biased against foreigners)?

Looking forward to reading future work on the topic.