Financial Frictions, Foreign Currency Borrowing, and Systemic Risk

Giovanni Dell’Ariccia
International Monetary Fund

Luc Laeven
International Monetary Fund

Robert Marquez
Boston University

Presentation presented at the 12th Jacques Polak Annual Research Conference
Hosted by the International Monetary Fund
Washington, DC—November 10–11, 2011

The views expressed in this presentation are those of the author(s) only, and the presence of them, or of links to them, on the IMF website does not imply that the IMF, its Executive Board, or its management endorses or shares the views expressed in the paper.
Financial Frictions, Foreign Currency Borrowing, and Systemic Risk

Giovanni Dell’Ariccia
IMF

Luc Laeven
IMF

Robert Marquez
Boston University
Background

- Growing literature on relationship between idiosyncratic and systemic risk

- Several channels
  - Things good for a bank/firm, not good for system (Shin)
  - Strategic complementarities (Farhi-Tirole)

- Systemic risk and foreign currency borrowing
  - FX solves agency problem, but generate systemic risk (Rancierre-Tornell-Westermann)
  - Liability “dollarization” and government behavior (Jeanne, Chang and Velasco)
What do we know?

- Liability dollarization associated with faster credit and economic growth
  - Evidence from emerging markets, Eastern Europe

- Link between liability dollarization and banking crises

- Foreign currency borrowing is more prevalent in more rigid exchange rate regimes
Our Model’s Contribution

- Limited liability and asymmetric information induce MH:
  - Excessive risk taking
  - Credit rationing

- FX borrowing:
  - May reduce MH by lowering borrowing rate
  - Increases output
  - Exposes economy to systemic risk

- Trade-off: Average performance vs systemic risk
  - Contagion risk complicates the picture

- Room for policies limiting FX exposures/mismatches
Basics of Model - Firms

- Firms are protected by limited liability and need to borrow to realize a project.
- Probability of success depends on the entrepreneur’s (unobservable) costly effort.

\[ \Pi = q(y - rL) - \frac{c}{2}q^2 \]
Basics of Model - Firms

- This generates a classic MH problem: *too little effort*

- Problem more severe with higher interest rates

- Lenders will charge a risk-adjusted interest rate:

\[ \hat{r}_L = \frac{r^*}{\bar{q}} \]
FX borrowing

- Firms can borrow in either domestic or foreign currency
- Risk-free rates linked by a parity condition: \( r^* = r^{*f} + \hat{e} \)
- A “peso Problem”

\[
\begin{align*}
\alpha & \quad e \\
\quad e & \quad (1 - \alpha) \\
& \quad e + \Delta e
\end{align*}
\]

- If firms borrows FX, lower risk-free rate, but if devaluation occurs, it will not be able to pay back

\[
\Pi^f = q(y - r^{fL})\alpha - \frac{c}{2}q^2
\]
FX borrowing

- A more complicated payoff tree

- Tradeoff: exposure to ER risk / lower rate
Debt denomination choice

- If risk of devaluation is sufficiently low, and $\Delta e$ large FX borrowing

- Domestic currency debt is like an insurance against a very unlikely risk
  - Lower rate effects dominates ER risk effect

- Systemic consequences
  - Higher $q$, lower idiosyncratic risk
  - But with prob. $1-\alpha$, large number of defaults

- Can tell similar story with variable versus fixed rates
Risk and currency denomination

- Who borrows in fx?

- **Result:** When the probability of a devaluation is sufficiently low:
  - Firms with higher agency problems borrow in the foreign currency
  - Firms with lower agency problems borrow in domestic currency

- Goes back to intuition that borrowing in fx acts as a bonding mechanism

- This is most important for high agency cost firms
Extension: Contagion risk

- Suppose that there are many firms
- If enough of them fail (or default), firms with successful projects become at risk of failure as well
  - Even if they borrowed domestically and are not exposed directly to devaluation risk
Extension: Contagion risk

- Suppose that there are many firms
- If enough of them fail (or default), firms with successful projects become at risk of failure as well
  - Even if they borrowed domestically and are not exposed directly to devaluation risk

- **Result:** Under some conditions, firms that would otherwise have borrowed domestically find it optimal to borrow in fx when subject to possible contagion

  - **Why?** Profits when borrowing in fx are unaffected by contagion risk, while profits when borrowing in domestic currency go down
Extension: Contagion risk

- Suppose that there are many firms
- If enough of them fail (or default), firms with successful projects become at risk of failure as well
  - Even if they borrowed domestically and are not exposed directly to devaluation risk

- **Result:** Under some conditions, firms that would otherwise have borrowed domestically find it optimal to borrow in fx when subject to possible contagion
  - **Why?** Profits when borrowing in fx are unaffected by contagion risk, while profits when borrowing in domestic currency go down

- **Corollary:** Economy becomes more exposed to systemic devaluation risk
Systemic risk?

- We assume risk neutrality throughout.

- Other than for contagion case, there are no substantial externalities.

- Therefore, firms’ borrowing choices are efficient:
  - Fx borrowing, when optimal for firms, also implies superior average performance.
  - Systemic risk arising from devaluation risk is irrelevant.
Systemic risk?

- But it is easy to see that a social planner may have other concerns
  - In particular, may assign a significant negative cost if a large number of firms fail

- This generates a tradeoff of (average) firm performance versus systemic crisis
  - Policy solution may be to put limits on fx borrowing for unhedged firms
  - This may be particularly important when the risk of contagion is a real concern
Conclusion

- Simple model where firms can choose between domestic and foreign currency denominated debt
  - Limited liability problem leads to risk-shifting
  - This can be partly alleviated by “bonding” oneself through fx borrowing

- Cost: Increased probability of a systemic crisis
  - Particularly if one firm’s failure can spill over to other firms

- Model applies more generally to situations where there is a lower cost alternative that introduces systemic risk
  - E.g., Short term versus long term borrowing and rollover risk