Does currency diversification affect procyclicality of bank leverage?

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Procyclical leverage

Euro Area
(MFIs : 1997-2013 : ECB data)

Leverage = Asset / Equity

Adrian and Shin (2013):

A contracting model between a bank and its creditor. The state of nature, θ, is known publicly and it defines the distribution of asset return (following the GEV theory).

<u>An incentive constraint from the creditor</u>: reimbursement should be large enough to convince creditor.

<u>An incentive constraint from the bank</u>: reimbursement should satisfy the VaR rule to be consistent with bank solvency.

State of nature $\theta \Rightarrow$ Distribution of asset $r \Rightarrow$ Reimbursement $\bar{d} \Rightarrow$ Debt raised $d \Rightarrow$ bank's leverage λ

<u>Limit</u>: a one currency framework.

Currency diversification

Currency Diversification of Reporting Banks
Non-residents - BIS data
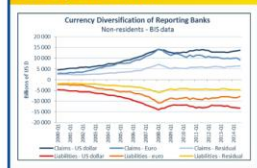
Currency diversification has to be covered.

Contributions

- Currency diversification in **both** sides of the balance sheet with d^* and d^* for the liabilities.

- **Exchange rate channel:** S

- **Two assets:**
  - <u>Domestic asset</u> denominated in domestic currency with return indexed by H and determined by θ
  - <u>Foreign asset</u> denominated in foreign currency with return indexed by H^* and determined by θ^*

$\Rightarrow$ **A mixture distribution weighted by the share of assets a and $(1-a)$:**

$$F_{H,H^*}(\theta, \theta^*) = a.F_H(\theta) + (1-a)F_{H^*}(\theta^*)$$

Where a is the share of asset denominated in domestic currency.

References

Tobias Adrian & Hyun Song Shin, 2013. "Procyclical Leverage and Value-at-Risk," NBER Working Papers 18943

RESULTS 1: The VaR rule

VaR rule $\Leftrightarrow$ Constant probability of default α :

$$\alpha = F_{H,H^*}((\bar{d} + \bar{d}^*), \theta, \theta^*) = Constant$$

$$\alpha = a.F_H((\bar{d} + \bar{d}^*), \theta) + (1-a)F_{H^*}((\bar{d} + \bar{d}^*), \theta^*) = Constant$$

Adjustment from the bank to satisfy the VaR rule:

$$(\bar{d} + \bar{d}^*) = g(\overset{+}{\theta}, \overset{+}{\theta^*}, \overset{+}{S})$$
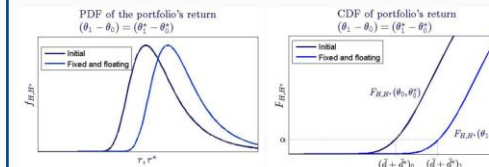
Leverage adjustment:

$$(\bar{d} + \bar{d}^*) \Rightarrow (d + d^*) \Rightarrow \lambda$$

RESULTS 2: Implication

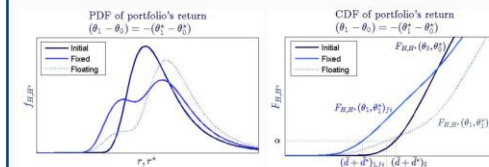Exchange rate : $S = 1 - \dfrac{r - r^*}{1 + r}$ Where : $r = v(\overset{+}{\theta})$ and $r^* = v(\overset{+}{\theta^*})$ and $a = 0.6$

A global and positive shock:
Both returns increase.

PDF of the portfolio's return
$(\theta_1 - \theta_0) = (\theta_1^* - \theta_0^*)$

CDF of portfolio's return
$(\theta_1 - \theta_0) = (\theta_1^* - \theta_0^*)$

An anti-asymmetric shock:
There is positive shock domestically and a negative shock abroad. The portfolio is riskier.

PDF of portfolio's return
$(\theta_1 - \theta_0) = -(\theta_1^* - \theta_0^*)$

CDF of portfolio's return
$(\theta_1 - \theta_0) = -(\theta_1^* - \theta_0^*)$

As the domestic currency appreciates, the share of assets denominated in domestic currency increases. Risks in portfolio decrease.

Propositions

1) Global shock $\Rightarrow$ Similar procyclicality regardless of the exchange rate regime.

2) Anti-asymmetric shock with diversification $\Rightarrow$ Counter-cyclical leverage.

3) Floating exchange rate increases the risk-taking capacity of banks.

Policy recommendations

1) As currency diversification is not neutral, regulators should follow the degree of diversification.

2) To reduce the procyclicality, regulators could encourage diversification with assets less correlated to global financial cycle, especially when exchange rate is floating.

Empirical Analysis

- **Ongoing empirical research:** *ACPR - CI located in France - 1998-2014*

  Does currency diversification affect the leverage procyclicality?

- **Further empirical investigation:** *SSM - Major banks in Euro area*

  Extend the analysis to banking union

- **Additional empirical investigation:** *SSM - Major banks in Euro area*

  Currency internationalization through bank balance sheet