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Outline

I. Potential Systemic Risks Unique to Korea

II. Macroprudential Measures Deployed
   1) Main reasons we advanced these measures
   2) Impacts of these measures

III. Possible Obstacles to Implementation
   - Asymmetric impacts in addressing procyclicality
I. Potential Systemic Risks Unique to Korea

1. Capital Flow Volatility

2. Household Debt

Both factors affect systemic risk in terms of procyclicality. 

Implies Korean economy exposed more to systemic risk in the time-varying dimension, than in the cross-sectional dimension.

In particular, strong procyclicality of capital flows amplifying business cycle fluctuation is a systemic risk factor common to emerging Asian countries.

(conjecture) Emerging Asian Economies may have high reliance for credit supply on capital inflows in the form of external liabilities, rather than on funding by domestic bank deposits.
High Capital Flow Volatility

Capital Flows

Financial Market Volatilities (std. dev*)

Source: BOK staff calculation

* 3-month moving averages
Rapid Increase in Household Debt

- High Level ⇒ Household leverage at historic peak
- Floating Rates ⇒ Almost 90% of mortgage loans

Household Debt-to-Disposable Income

Mortgage Loans, by Interest Rate Type

Sources: Bank of Korea, 9 major domestic banks
Note: 1) As of end-2011
II. Macroprudential Measures Deployed

Responses to Capital Flow Volatility

- **Capital Inflows**
  - Ceilings on FX Derivative Positions (October, 2010)
  - Macroprudential Stability Levy (August, 2011)
  - Reimposed Taxation on Foreigners’ Bond Investment (November, 2011)

- **Capital Outflows**
  - 1. Currency Swaps with Major Central Banks
    - FRB ($30bil., Aug. 08)
    - BOJ and Jpn MOF ($70bil., Oct. 11)
    - PBC ($56bil., Oct. 11)
  - 2. Global/Regional Financial Safety Nets
    - e.g. CMIM

⇒ Aimed at **stabilizing short-term capital flows and establishing backstop (safeguard) against sudden capital outflows**
1) Main reasons we advanced these measures

- In open emerging markets, non-core liabilities take form of short-term FX liabilities, increasing vulnerability to outbreak of crisis.
- High capital flow volatility also causes interest and FX rate deviation from economic fundamentals, thereby weakening monetary policy transmission channel.

![Graph showing Non-core Liabilities of Korean Banks, Net FX Liabilities, and Foreign Portfolio Investment and Term Spread.](source: Shin & Shin (2010), updated by BOK staff)
2) Impacts of these measures (in response to capital inflows)

**Effective so far**
- Short-term External Debt Decreased
- Arbitrage Incentive Reduced
- Terms of Foreigners’ Bond Investment Lengthened

**Changes in External Debt, before and after ceilings**

- Before Ceiling (Apr. 09~Dec. 10)
  - Short-term external debt: 67.1 (billion dollars)
  - Long-term external debt: 60.4

- After Ceiling (Jan. 11~Nov. 11)
  - Short-term external debt: 171.8
  - Long-term external debt: -156.6

**Macroprudential Stability Levy** (August, 2011)

**Foreign Bank Branches’ Arbitrage Incentive**

**Reimposed Taxation on Foreigners’ Bond Investment** (November, 2011)

**Source:** Bank of Korea
Responses to Household Debt

Caveat: more work needed to establish how much of changes in house price and loan growth attributable to macroprudential policy tightening

Housing indicators (Seoul area) before and after loan regulation tightening¹)

- Mortgage loans²)
- House prices³)
- Housing transactions⁴)

¹) Comparison between six-month periods before and after strengthening of loan regulations
²) In trillions of won
³) Apartment basis
⁴) In units of 10,000

* Source: Bank of Korea
III. Possible Obstacles to Implementation

✓ Asymmetric impacts in addressing procyclicality

1. Countercyclical Buffers/ Dynamic Provisioning
2. Ceilings on LTD/DTI
3. Adjustments of Risk Weights on Specific Exposures

More effective during Boom

Less effective during Bust

Countercyclical policy

Credit cycle before MAPP

Actual credit cycle after MAPP
✓ **Boom: $E↑+w↓⇒A↓?$**

- Doubts about effectiveness in credit control
- Despite regulators’ deployment of CCB, banks still have incentive to increase more profitable loans.
- Impacts may be offset by time lag, or less effective in periods of rapid credit expansion, since banks given transition period up to 12 months to meet CCB targets.

✓ **Bust: $E↓+w↑⇒A?$**

- Doubts about effectiveness in mitigating deleveraging (slowing decrease in $A$)
- Under uncertainties about duration of financial crisis, banks likely to opt to maintain their capital buffer targets set during boom, out of concerns that declines in their capital ratios might be interpreted as aggravated financial soundness

\[
K = \frac{E}{w \cdot A}
\]

$K$: capital ratio  
$E$: equity  
$w$: risk weight  
$A$: asset value
## Ceilings on DTI/LTV

<table>
<thead>
<tr>
<th>BOOM</th>
<th>BUST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective in limiting excessive credit provision by banks during economic upturns</td>
<td>May be less effective in improving liquidity conditions or supply of credit ⇔ Despite eased LTV/DTI limits, banks likely to focus on cash hoarding rather than lending</td>
</tr>
</tbody>
</table>

### Mortgage Loan Fluctuations

- **Introduction of DTI** (Aug. 05)
- **Tightening of DTI** (Feb. 07)
- **Loosening of DTI** (Nov. 09)
- **Tightening of DTI** (Sep. 09)
- **Loosening of DTI** (Aug. 10)
- **Tightening of LTV** (Oct. 03)

Source: Bank of Korea
Empirical Test on Determinants of Loan Size

$L_l = \alpha_l F_l + \beta_l N_l + \gamma_l R_l + \epsilon_l$

$F_l$: financial variables, $N_l$: non-financial variables
$R_l$: regulatory variables ($i$: household, $\epsilon_i$: residual)

<table>
<thead>
<tr>
<th>Dependent Variable: Household Loans (with income information)</th>
<th>2006 (Tighter DTI)</th>
<th>2007 (Tighter DTI)</th>
<th>2008 (Eased DTI)</th>
<th>2009 (Tighter DTI)</th>
<th>2010 (Eased DTI)</th>
<th>2011 (Tighter DTI)</th>
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</thead>
<tbody>
<tr>
<td>Financial Variables</td>
<td></td>
<td></td>
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<tr>
<td>Log (collateral value)</td>
<td>0.705***</td>
<td>0.622***</td>
<td>0.653***</td>
<td>0.782***</td>
<td>0.687***</td>
<td>0.621***</td>
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<tr>
<td>Income of Borrower</td>
<td>0.009**</td>
<td>0.022***</td>
<td>-0.003</td>
<td>0.010**</td>
<td>0.014***</td>
<td>0.011**</td>
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<tr>
<td>Interest Rate (CD yield)</td>
<td>-0.072***</td>
<td>-0.029*</td>
<td>-0.095***</td>
<td>-0.136***</td>
<td>-0.043**</td>
<td>0.072***</td>
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<tr>
<td>High Credit dummy</td>
<td>0.082***</td>
<td>0.038***</td>
<td>-0.059***</td>
<td>0.089***</td>
<td>0.046***</td>
<td>0.048***</td>
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<tr>
<td>Gangnam dummy</td>
<td>0.045***</td>
<td>0.075***</td>
<td>0.171***</td>
<td>0.003</td>
<td>0.088***</td>
<td>0.111***</td>
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<td>Non-financial Variables</td>
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<tr>
<td>Interest Only Payment dummy</td>
<td>-0.164***</td>
<td>-0.043***</td>
<td>0.059***</td>
<td>0.118***</td>
<td>0.101***</td>
<td>0.006</td>
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<td>Group Loan dummy</td>
<td>-0.019*</td>
<td>0.017</td>
<td>0.035***</td>
<td>0.089***</td>
<td>0.083***</td>
<td>-0.007</td>
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<td>Business Owner dummy</td>
<td>0.023**</td>
<td>0.024**</td>
<td>0.026***</td>
<td>0.042***</td>
<td>0.034***</td>
<td>0.029***</td>
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<td>Maturity</td>
<td>0.025***</td>
<td>0.021***</td>
<td>0.015***</td>
<td>0.015***</td>
<td>0.020***</td>
<td>0.023***</td>
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<td>Regulatory Variables</td>
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<tr>
<td>LTV dummy</td>
<td>-0.093***</td>
<td>-0.046*</td>
<td>0.004</td>
<td>-0.102***</td>
<td>-0.031</td>
<td>-0.116***</td>
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<tr>
<td>DTI dummy</td>
<td>-0.051***</td>
<td>-0.096***</td>
<td>-0.066***</td>
<td>-0.046**</td>
<td>-0.008</td>
<td>-0.019**</td>
</tr>
<tr>
<td>Constant</td>
<td>2.431***</td>
<td>2.858***</td>
<td>3.110***</td>
<td>1.230***</td>
<td>1.963***</td>
<td>2.583***</td>
</tr>
</tbody>
</table>

Analysis shows LTV/DTI to have asymmetric policy impacts: regulation tightening more effective than regulation easing
Adjustment of Risk Weights on Specific Exposures (ARW)

<Operating Mechanism of ARW>

Increase in credit risk in a particular asset, \( A_i \uparrow \)

Upward adjustment of risk weights for loans to the asset (\( w_i \uparrow \))

Increase in capital requirements (\( K \uparrow \))

Incentive to reduce exposure to the asset (\( A_i \downarrow \))
**Banks’ Responses in Unintended Direction**

\[
\bar{K} = \frac{E \uparrow}{w_i \uparrow A_i \downarrow + w_j A_j \downarrow} \\
\Rightarrow: \text{Regulator’s action and intended direction of banks’ response} \\
\Rightarrow: \text{Banks’ responses in reality}
\]

- Excessive concentration on a particular asset, \(A_i \uparrow\)
- Upward adjustment of risk weights for loans to the asset (\(w_i \uparrow\)), and resultant tightened capital requirement (\(K \uparrow\))

**Banks’ Responses**

1. Recapitalizing (\(E \uparrow\))
2. Reducing other assets (\(A_j \downarrow\)) with lower risk weights and returns

According to UK FSA (2009),
ARW (\(w_i \uparrow\)) \(\Rightarrow E \uparrow 50\%\), exposure to other assets \(\downarrow 25\%\)
exposure to targeted asset \(\downarrow 25\%\)
Thank You for Your Attention