Polish Experience in Managing Systemic Risk in the Financial System

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Agenda

• Dimensions of systemic risk management
• Crisis management
• Crisis prevention
• Identification of risks
Managing Systemic Risk

• Two dimensions of managing systemic risk

Normal times

Crisis times

Crisis prevention

Crisis management
• Dimensions of systemic risk management
• **Crisis management**
• Crisis prevention
• Identification of risks
„Confidence Package”

- 2008 – true test
- CP introduced in response to global market turmoil following Lehman Brothers collapse
- Two main goals:
  - enabling banks to obtain funds in foreign currencies
  - enabling banks to obtain funds in PLN for periods longer than one day
Instruments of the „Confidence Package”

- **FX swap transactions** (USD, EUR, CHF)
- **Liquidity-providing fine-tuning repo operations with a 3 and 6-month maturity**
- Introducing so-called netting of eligible collateral used in subsequent repo operations
- Earlier redemption of the NBP’s 10-year bonds issued in 2002
- Lowering the required reserve rate from 3.5% to 3.0%
Effects of the „Confidence Package”

- WIBOR 3M rates movements in line with policy rate

The reference rate was reduced by 250 bp

WIBOR 3M declined by 264 bp

Lehman Brothers default 15.09.2008
Effects of the „Confidence Package”

- Higher confidence of banks due to NBP’s FX swap window
- Reappearance of bilateral quotations on the interbank depo market for transactions longer than O/N
- Redistribution of liquidity in the banking sector
What else could be done?

- Division of functions in the Safety Net

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Financial Stability Committee

National Bank of Poland
Agenda

• Dimensions of systemic risk management
• Crisis management
• Crisis prevention
• Identification of risks
Main risk prior to the crisis

- Strong growth of FX mortgage loans for households
- Most borrowers were not hedged against exchange rate fluctuations
- Potential risks for financial stability:
  - Increased credit risk due to households sensitivity to depreciation
  - Volatility of collateral value (LtV)
  - Funding and liquidity risk for banks
  - Volatility of capital requirements
  - Distorted transmission of monetary policy impulses
  - Contribution to credit booms and price bubbles
Risk minimization towards FX Lending

• Recommendations for banks introduced by the Polish Financial Supervision Authority
  • Recommendation T – introduced in 2010

• Increased risk weights for FX mortgages (2012)

• NBP’s stance that FX housing loans should be a niche product, offered only to hedged borrowers
  • Recommendations issued in Financial Stability Reports (form of moral suasion)
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<td>All retail exposures</td>
<td>All types of exposures financing real estate</td>
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| Measures         | **Higher creditworthiness requirement in case of unhedged borrowers** – creditworthiness calculates under assumption that foreign interest rate is at least equal to the domestic interest rate and the loan value is 20% higher than the contractual one.  
**Stress-testing the FX exposures** – at least once a year banks should assess the credit risk posed by unhedged borrowers under assumption of 30% depreciation of domestic currency within a 12 months horizon.  
**Stress-testing for changes in interest rates** – in case of floating interest rate loans, at least once a year banks should assess the credit risk stemming from interest rate changes under assumption of 400 bps interest rate increase within a 12 months horizon.  
**LtV limitations** – banks are required to set maximum LtV ratios for different mortgage exposures. | **All measures set by Recommendation S have been confirmed.**  
**Repayment of FX loans in foreign currency** – banks should enable their borrowers to change the FX loan contracts in a way that allows repayment of installments direct in foreign currency. | **Assessment of the borrowers’ creditworthiness on the basis of stress-test results** – banks should calculate the maximum ratio of borrowers’ debt-repayment burden to income by taking into account 400 bps increase of interest rates (floating interest rate loans) and 30% domestic currency depreciation (FX loans).  
**Maximum debt-repayment burden** – the debt-repayment burden cannot exceed 50% of borrowers’ average net income (net income below the level of average salary) and 65% (other borrowers).  
**Additional buffer in case of FX loans to unhedged borrowers** – calculating the maximum debt-repayment burden requires increasing the outcome of the value obtained in the FX stress-test by an additional safety buffer of minimum 10% of the loan repayment value in case of loans with maturity up to 5 years and 20% otherwise. | **Unless otherwise stated, the credit risk assessment in case of retail exposures financing real estate should follow guidelines set by Recommendation T.**  
**Maximum maturity for assessment of creditworthiness** – in case of exposures with maturity over 25 years, calculation of borrowers’ creditworthiness should be based on maturity of 25 years.  
**Maximum debt-repayment burden for FX loans** – in case of FX exposures, the debt-repayment burden cannot exceed 42% of borrowers’ average net income. |
Effects of the mitigating actions

- FX mortgages do not generate excessive credit risk despite significant PLN fluctuations
- NPL ratios for FX mortgages low and comparable to PLN loans

![NPL ratio for housing loans graph]

0% 1% 2% 3% 4% 5% 6% 7%


PLN FX TOTAL

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Effects of the mitigating actions

- Dynamic growth of FX loans came to a halt
- Bulk of new loans denominated in PLN

![Graph of Annual growth of housing loans](image)

![Graph of Currency structure of new housing loans](image)

Source: NBP
Risks ahead: potential for a new credit boom?

- **Convergence process:**
  - lower interest rates, more stable FX rates, capital inflow and increasing demand

- **Structural and demographic factors:**
  - increasing number of new households, poor quality of housing

- **Financial innovation and liberalization**

- **Economic recovery after the financial crisis**
How to tackle the risk of a credit boom?

• Recommended instrument:
  • Debt Service-to-Income limits

• Other potential instruments:
  • Loan to Value (LtV) limits
  • Countercyclical buffer
Institutional arrangements

• As of now no formalized body responsible for macroprudential policy
• Systemic Risk Committee operating within the NBP
• Advanced work to introduce **Systemic Risk Board (SRB)** as the authority responsible for macroprudential supervision
• Introduction of SRB in line with ESRB recommendation on macroprudential mandates of national authorities
• NBP to play a leading role in the SRB
• Dimensions of systemic risk management
• Crisis management
• Crisis prevention
• Identification of risks
How to identify risks???

- In order to fulfill its functions the SRB has to timely identify risks and vulnerabilities
- Crucial need for economic research and analyses
- Emphasis on forward looking analyses
- Preparatory research: under-way

- Example: model identifying credit booms
Motivation

• How various macroeconomic factors affect the equilibrium value of loans to households?
• Is credit growing to rapidly given the actual state of economy?

• Lending booms – good predictors of financial crises
• Household loans often initiate consumption, investment and production booms
Identifying credit booms

- Standard approaches:
  - credit growth above some threshold value
  - deviations of credit from the long-run trend (Hodrick-Prescott filter)
  - error correction models
  - regime switching of credit growth

- Our approach
  - threshold (regime switching) error correction model
Our regime-switching model

• Modeling credit growth:

\[
\Delta c_{i,t} = \begin{cases} 
\alpha_i + \beta^{(1)} \cdot ECT_{i,t-1} + \sum_{k=1}^{m} \gamma_k^{(1)} \cdot x_{k,i,t} + \varepsilon_{i,t} & \text{when } z_{t-1} \leq \phi^{(1)} \\
\alpha_i + \beta^{(2)} \cdot ECT_{i,t-1} + \sum_{k=1}^{m} \gamma_k^{(2)} \cdot x_{k,i,t} + \delta^{(1)} + \varepsilon_{i,t} & \text{when } \phi^{(1)} < z_{t-1} \leq \phi^{(2)} \\
\vdots & \vdots \\
\alpha_i + \beta^{(r)} \cdot ECT_{i,t-1} + \sum_{k=1}^{m} \gamma_k^{(r)} \cdot x_{k,i,t} + \delta^{(r-1)} + \varepsilon_{i,t} & \text{when } \phi^{(r-1)} < z_{t-1} 
\end{cases}
\]

• Long-run equilibrium
• Short-run dynamics may change regimes
Credit regimes

Level of Credit in Equilibrium
Credit regimes

- Credit Boom (and Bust)
- Level of Credit in Equilibrium
Credit regimes

Credit Boom (and Bust)  Level of Credit in Equilibrium
Modeling approach

- Build and simulate a general equilibrium life-cycle model of credit to households
- Estimate long-run relationship between credit and income, interest rate spread, housing prices
- Estimate our model:
  - Data from OECD and EU countries
  - Selection of threshold variables
  - Testing the number of regimes
  - Novel estimation techniques for dynamic panel data models
Results

• Three regimes – possible to identify normal and boom regimes

• Best threshold variable: lagged credit growth

• Credit boom when:
  ▪ real credit grows slightly more rapidly than GDP
  ▪ credit is above equilibrium
Our regime-switching model

- Advantages of our method
  - Controls for economic fundamentals
  - Distinguishes catching-up periods from credit booms
  - No technical problems related to filtering (ad hoc parameters, end of sample bias)
  - Avoiding biases of one-regime models (returns to equilibrium, prolonged booms, imprecise estimates)
  - It performs better in practice
Related problem: how booms affect quality of loans

- NPL ratio – popular measure of credit quality in banks
  - assess quality of loan portfolios
  - analyze lending policies and efficiency of banks
  - price bank equity
  - predict bank failures
  - construct early warning systems

- Drawbacks: difficult to compare ratios across banks and in different times
How credit boom affects NPL ratio

- 5 years of 30% credit growth (housing loans)
- Low credit risk (NPL = 1%)
Controlling for credit booms

• Construct an artificial NPL ratio reacting only to credit dynamics
  ▪ Calibrating the term structure of loans
  ▪ Using growth dynamics of the true portfolio
  ▪ Keep PD of each loan constant in time

• NPL index robust to credit booms
Impaired housing loans in Poland

- Income growth, falling unemployment rate, rapid growth of housing loans up to the year 2008
- Economic conditions changed during the crisis
Thank you for your attention.
References