CROATIAN NATIONAL BANK

Forensic Analysis of Credit Activity in Croatia

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Motivation

- ☐ Mixed evidence about the relationship between credit activity and economic growth / recovery
  - ◼ Episodes of creditless recoveries (Phoenix miralcles)

- ☐ In Croatia
  - ◼ First - growthless credit growth...
  - ◼ ...after that - creditless recession...
  - ◼ ...and now - stagnating credit and economic activity...
  - ◼ ...despite expansive and accommodative monetary policy – record banking system liquidity and lowest MM interest rates

# Supply or demand – that is the question

- Which side should be blamed for sluggish credit activity?
- Maybe both?
- What are their determinants?
- What can monetary policy do about it?
- What about other policies?
- Or debtors themselves?

- Identification the determinants of credit demand and supply for households and corporates - important for understanding the role of monetary policy in boosting credit recovery
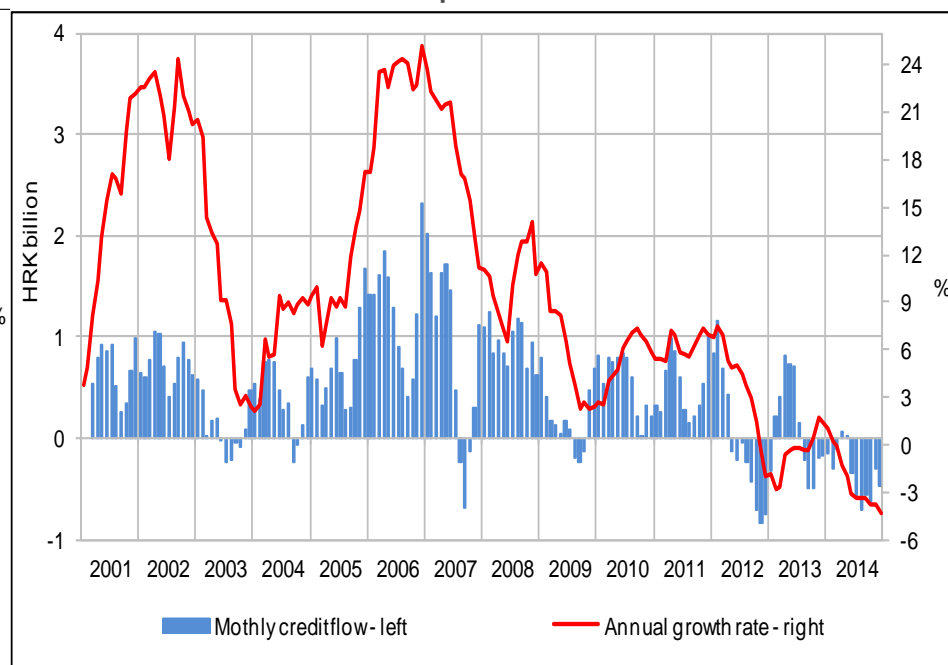
Credit activity in Croatia – households and corporates

☐ Considerable slowdown

☐ Household loans declining since mid-2009

☐ Corporate loans declining since end 2012

Households
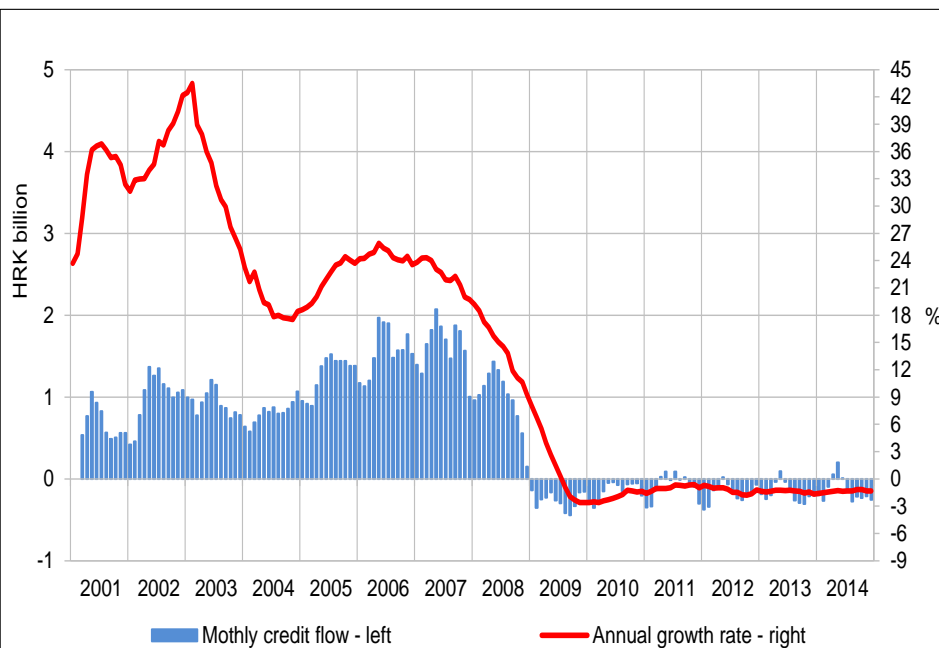
Corporates

# Credit activity in Croatia - government

- Government loans continuously increasing – lack of fiscal consolidation
- Risky macro-environment and inherent weaknesses of private sector balance sheets make government an attractive debtor
- Potential symptom of restricted loan supply to the private sector

Government

Placements to government, end of month stocks
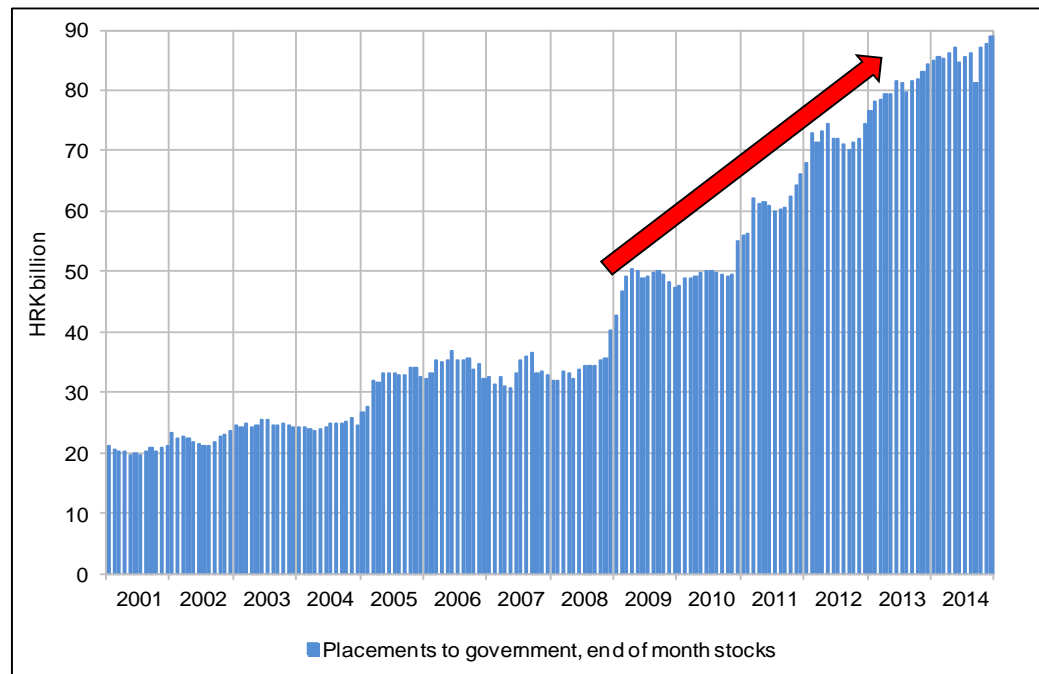
Methodology
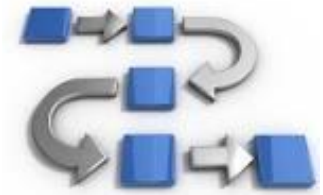
- The switching regression framework - q1 2000 – q2 2014

- Bank lending survey – from October 2012

- Available evidence on the efficiency of legal framework

Credit market disequilibrium model

- ❑ The switching regression framework
- ❑ Maximum likelihood method
- ❑ System of simultaneous equations - function of credit supply and credit demand
- ❑ Dependent variables – loans to corporate / household sector
- ❑ Independent variables – theory, literature, country characteristics
- ❑ Model identified:
    - ■ the main determinants and evolution of real credit supply and demand
    - ■ periods of surplus supply or demand - difference between the estimated credit demand and credit supply

$$C_t = \min(C_t^d, C_t^s)$$

$$C_t^d = \mathbf{X}_{1t}^{'}\boldsymbol{\beta}_1 + \varepsilon_{1t}$$

$$f_1(C_t) = \frac{1}{\sqrt{2\pi\sigma_1^2}}\exp[-\frac{1}{2\sigma_1^2}(C_t - \mathbf{X}_{1t}^{'}\boldsymbol{\beta}_1)^2]$$

$$C_t^s = \mathbf{X}_{2t}^{'}\boldsymbol{\beta}_2 + \varepsilon_{2t}$$

$$f_2(C_t) = \frac{1}{\sqrt{2\pi\sigma_2^2}}\exp[-\frac{1}{2\sigma_2^2}(C_t - \mathbf{X}_{2t}^{'}\boldsymbol{\beta}_2)^2]$$

$$F_1(C_t) = \frac{1}{\sqrt{2\pi\sigma_1^2}}\int_{C_t}^{\infty}\exp[-\frac{1}{2\sigma_1^2}(C_t - \mathbf{X}_{1t}^{'}\boldsymbol{\beta}_1)^2]dC_t^d$$

$$F_2(C_t) = \frac{1}{\sqrt{2\pi\sigma_2^2}}\int_{C_t}^{\infty}\exp[-\frac{1}{2\sigma_2^2}(C_t - \mathbf{X}_{2t}^{'}\boldsymbol{\beta}_2)^2]dC_t^s$$

$$f(C_t^d, C_t^s) = f_1(C_t^d)f_2(C_t^s) = \frac{1}{2\pi\sigma_1\sigma_2}\exp\left(\frac{-\left(C_t^d - \mathbf{X}_{1t}^{'}\boldsymbol{\beta}_1\right)^2}{2\sigma_1^2}\right)\exp\left(\frac{-\left(C_t^s - \mathbf{X}_{2t}^{'}\boldsymbol{\beta}_2\right)^2}{2\sigma_2^2}\right)$$

$$f(C_t|C_t = C_t^d < C_t^s) = \frac{\int_{C_t}^{\infty}f(C_t, C_t^s)dC_t^s}{\mathrm{Pr}ob(C_t^d < C_t^s)} = \frac{f_1(C_t)\int_{C_t}^{\infty}f_2(C_t^s)dC_t^s}{\mathrm{Pr}ob(C_t^d < C_t^s)} = \frac{f_1(C_t)\cdot F_2(C_t)}{\mathrm{Pr}ob(C_t^d < C_t^s)}$$

$$f(C_t|C_t = C_t^s < C_t^d) = \frac{\int_{C_t}^{\infty}f(C_t, C_t^d)dC_t^d}{1 - \mathrm{Pr}ob(C_t^d < C_t^s)} = \frac{f_2(C_t)\int_{C_t}^{\infty}f_1(C_t^d)dC_t^d}{1 - \mathrm{Pr}ob(C_t^d < C_t^s)} = \frac{f_2(C_t)\cdot F_1(C_t)}{1 - \mathrm{Pr}ob(C_t^d < C_t^s)}$$

$$f(C_t | \mathbf{X}_{1t}, \mathbf{X}_{2t}) = \mathrm{Pr}ob(C_t^d < C_t^s)f(C_t|C_t = C_t^d) + (1 - \mathrm{Pr}ob(C_t^d < C_t^s))f(C_t|C_t = C_t^s)$$

$$= f_1(C_t)\cdot F_2(C_t) + f_2(C_t)\cdot F_1(C_t)$$

$$L(\boldsymbol{\beta}_1, \boldsymbol{\beta}_2 | \mathbf{X}_{1t}, \mathbf{X}_{2t}) = \sum_{t=1}^{n}\log[f_1(C_t)\cdot F_2(C_t) + f_2(C_t)\cdot F_1(C_t)]$$

Bank Lending Survey

- **Information on:**
  - price and non-price related lending terms and conditions
  - factors that impact credit demand

- **Questions grouped for households and corporates:**
  - factors affecting credit standards
  - factors affecting demand for loans to enterprises and houeseholds (housing and consumer loans)

Legal environment

- **Bank Surveys**
  - the bureaucratization and inefficiency of courts - long court proceedings
  - perception that debtors are favoured against creditors - social element prevails over legal facts
  - inadequate regulation or inadequaltely implemented good regulation
  - frequent changes of regulation contribute to legal uncertainty.

- Efficient legal system inevitably positively affects the demand for loans - prerequisite for successful corporate sector and consequently, better financial position of households through positive developments in labour market (Croatian Employers' Association, Doing business indicators)
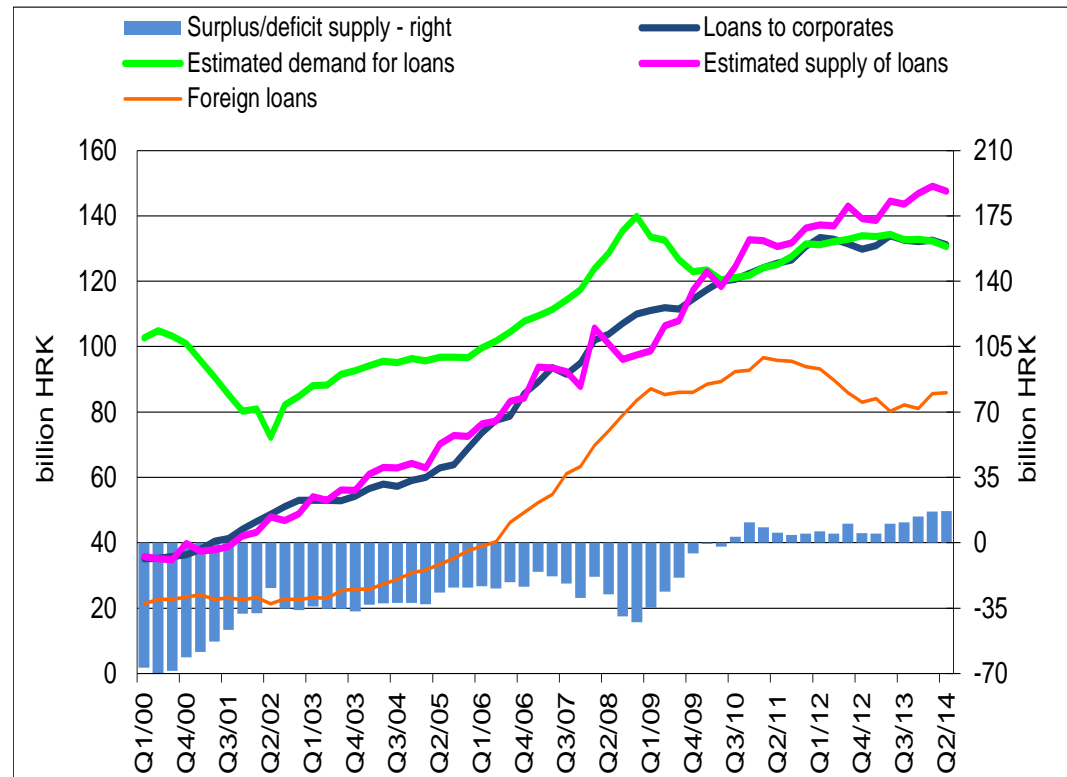
Model results – corporates

Demand	
Independent variable	
Constant	3,58**
Lending interest rate	-0,03*
GDP	1,29***
GDP gap	-0,41*
Profitability of corporate assets	0,76***
EMBI spread	0,04*
Business confidence	0,35***
Standard deviation	0,10
Supply	
Independent variable	
Constant	-3,63
Lending and deposit interest rate spread	0,01*
GDP	2,35***
Credit potential	0,21**
Non-performing corporate loans	0,47***
Loan loss provisions on corporate loans	-0,19***
EMBI spread for RC	-0,01**
Parent bank CDS	-0,10***
Standard deviation	0,04

Legend:
- Surplus/deficit supply - right
- Estimated demand for loans
- Foreign loans
- Loans to corporates
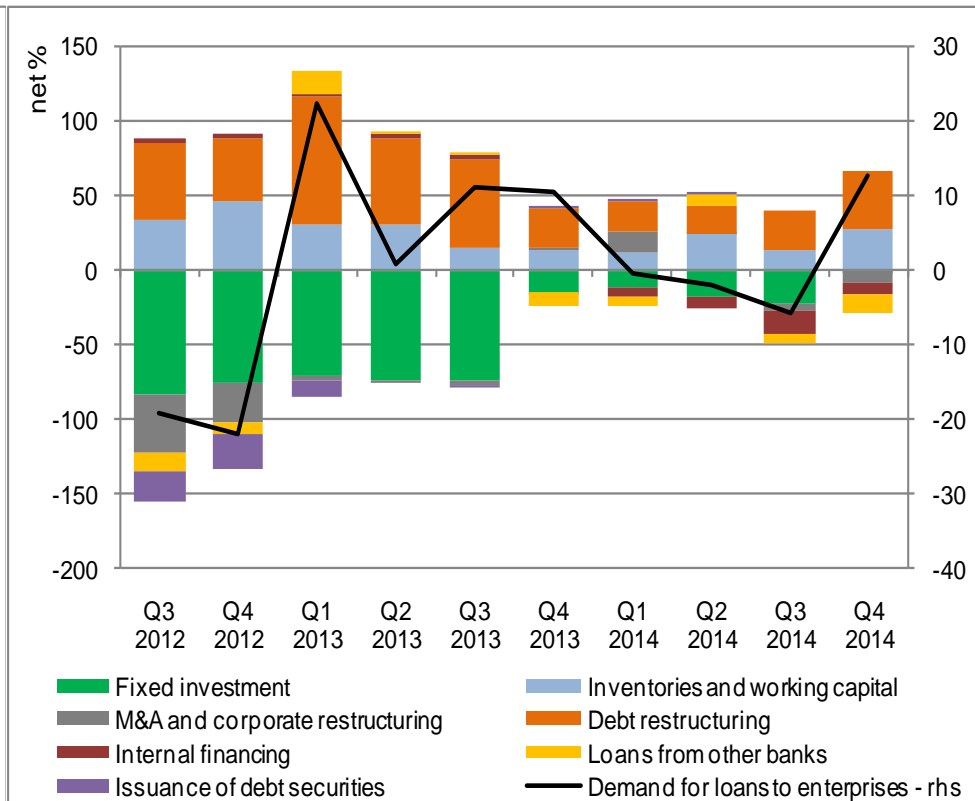- Estimated supply of loans

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BLS information - corporates

Factors affecting credit standards as applied to the approval of loans to corporate sector
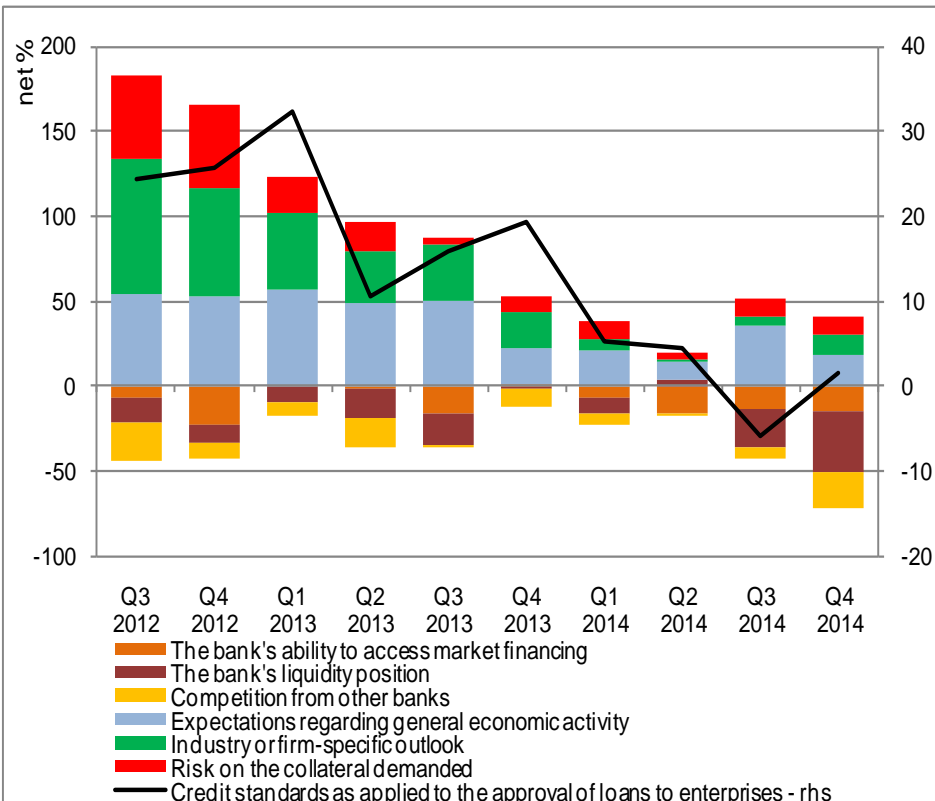
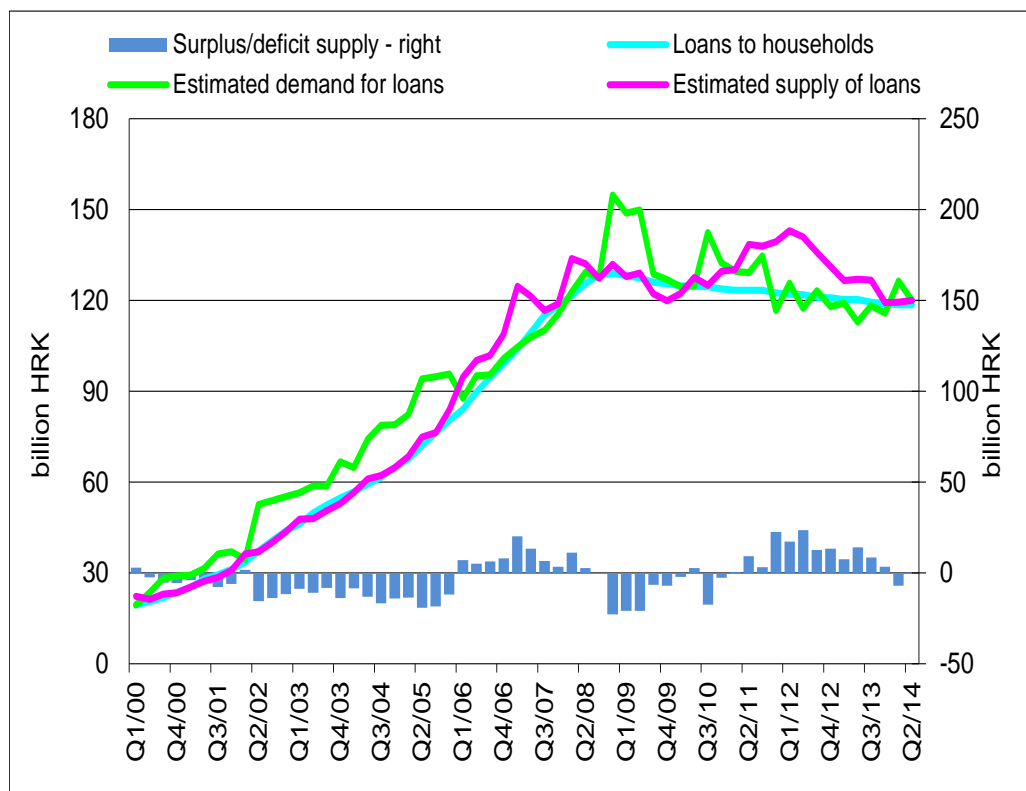**Factors affecting demand for loans to corporates**

Model results – households

Demand	
Independent variable	
Constant	-7,92**
Lending interest rate	-0,07***
GDP	1,47***
Consumer confidence	0,01***
Gross wage bill	1,32***
HREPI	-0,03
Standard deviation	0,06
Supply	
Independent variable	
Constant	-4,00***
Lending and deposit interest rate spread	0,02***
GDP	2,97***
Credit potential	0,34***
Non-performing household loans	0,31**
Loan loss provisions on household loans	- 0,21**
HREPI	- 0,05
Mother banks CDS	-0,5**
Standard deviation	0,04

BLS information – households (1)

Factors affecting credit standards as applied to the approval of loans to

Loans for house purchase

Consumer credit and other lending

Loans for house purchase legend:
- Cost of funds and balance sheet constraints
- Competition from other banks
- Competition from non - banks
- Expectations regarding general economic activity
- Housing market prospects
- Credit standards for loans for house purchase - rhs

Consumer credit and other lending legend:
- Cost of funds and balance sheet constraints
- Competition from other banks
- Competition from non - banks
- Expectations regarding general economic activity
- Creditworthiness of consumers
- Risk on the collateral demanded
- Credit standards for consumer credit and other lending - rhs

BLS information – households (2)

Factors affecting demand for loans to households

Loans for house purchase (net %)

Legend:
- Housing market prospects
- Consumer confidence
- Households savings
- Non - household related consumption expenditure
- Loans from other banks
- Demand for loans for house purchase - rhs

Consumer credit and other lending (net %)

Legend:
- Spending on durable consumer goods
- Consumer confidence
- Securities purchases
- Households savings
- Loans from other banks
- Demand for consumer credit and other lending - rhs

Conclusion

- Puzzling interrelations of various factors affecting credit demand and credit supply

- Model and BLS results - corporate and household credit demand and supply greatly influenced by domestic macro-environment

- The demand is subdued and is not healthy (i.e., corporates seek loans for the refinancing old debts, but not for investment), while supply is tightened, despite it exceeds demand

- Balance sheet clean-up for all sectors is needed

- The attractiveness of government loans additionally weakens the scope of measures that increase the liquidity of the system

Conclusion

- The reversal of negative economic developments and reform stimulate credit institutions to offer loans and ease lending st

- Uncertainty closely related to the delay in economic reforms

- Special challenge - creating more efficient legal framework - limitations to the seizure of collateral property, long and expensive legal processes - increase borrowing costs, indirectly affect the speed of recovery or growth

- Until such changes take place, despite the stability and high liquidity of the domestic banking sector, the scope of monetary policy to encourage credit growth is limited