



NATIONAL BANK OF ROMANIA

Sinaia, 20 October, 2016

Household debt and monetary policy transmission in a high-inequality environment

Liviu Voinea
Horatiu Lovin
Alexandra Cojocaru

The opinions expressed in this presentation are those of the authors and do not necessarily reflect the views of the National Bank of Romania.

Introduction

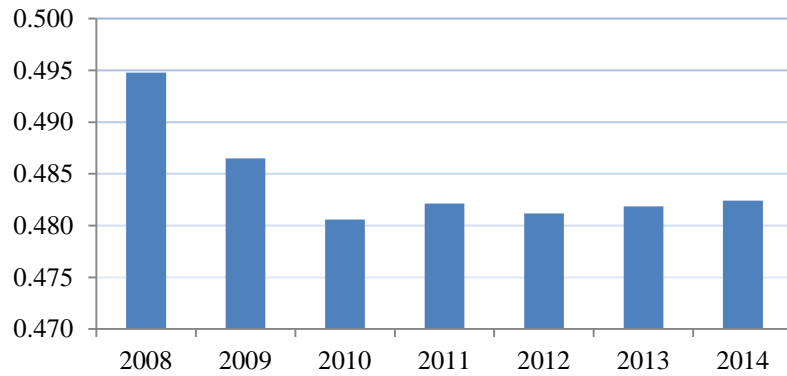
- Income and wealth distribution become a central topic in economic analysis globally
- There is wide empirical support for the idea that higher inequality of income distribution may lower economic growth and impair its sustainability
- Central banks reacted to the global financial crisis by adopting stabilizing measures; many central banks in advanced economies implemented quantitative easing
- In the emerging European countries, central banks adopted only conventional policies
- The stabilizing measures implemented by the central banks may have unintended redistributive consequences
- Until recently, central banks avoided the discussion about inequality, as they are not explicitly responsible for income and wealth distribution

Access to credit and consumption

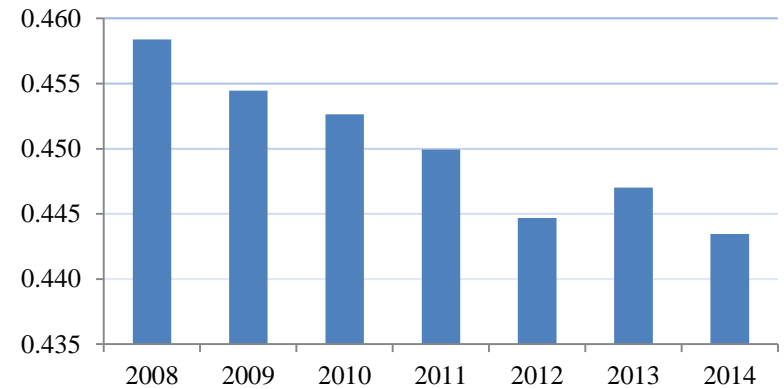
- Indebtedness and consumption differ amongst households; income inequality is responsible to a large extent for these differences
- Central bank has the capacity to influence the level of indebtedness and consumption by changing the interest rates, yet other factors are equally important (income growth, lending standards, credit supply)
- Given the heterogeneity of income distribution, changes of interest rates lead to a variety of responses in terms of households' indebtedness and consumption
- Over-indebted households could experience consumption constraints, in particular when their income growth prospects are not favorable
- Low and middle income households with low debt or no debt may increase consumption by taking new loans if they have access to credit

Inequality in Romania

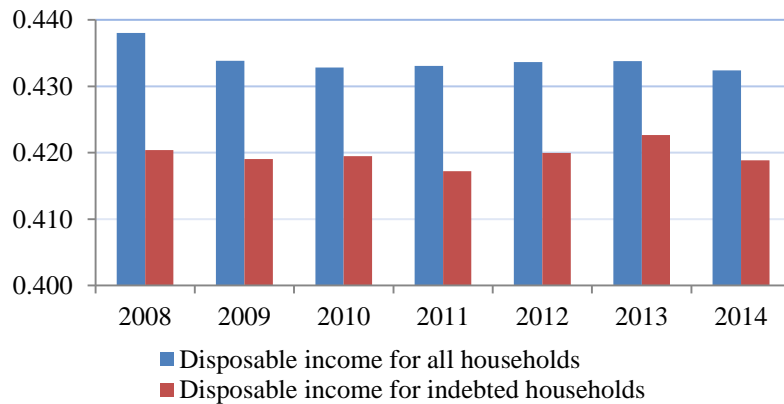
Gini coefficient for gross income



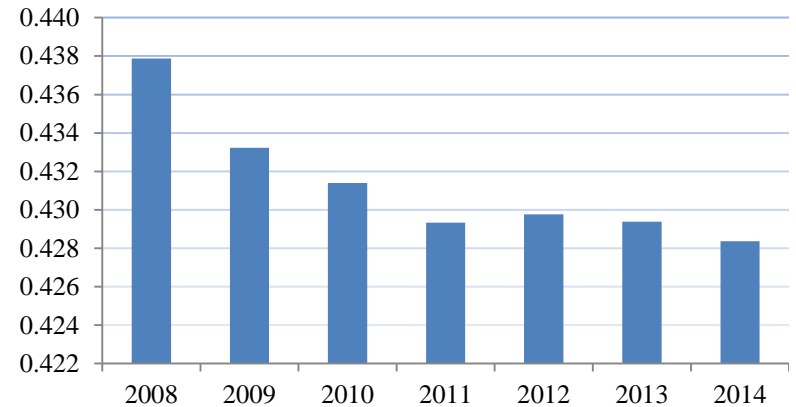
Gini coefficient for income from salaries



Gini coefficient for disposable income



Gini coefficient for consumption



Source: Households Budget Survey, National Institute of Statistics, authors' calculations

Inequality in Romania (cont.)

Distribution of income, consumption, indebtedness and access to credit for households; 2008 - 2014

| | Income share | Share of disposable income* | Share of consumption | Average DSTI | Share of households with loans | Share of income from labour (salaries) | Share of income from capital |
|-----------------|--------------|-----------------------------|----------------------|--------------|--------------------------------|--|------------------------------|
| First quintile | 0.078 | 0.087 | 0.101 | 0.107 | 0.096 | 0.039 | 0.024 |
| Second quintile | 0.132 | 0.143 | 0.150 | 0.096 | 0.165 | 0.108 | 0.068 |
| Third quintile | 0.175 | 0.183 | 0.187 | 0.098 | 0.211 | 0.171 | 0.125 |
| Fourth quintile | 0.228 | 0.229 | 0.229 | 0.106 | 0.255 | 0.261 | 0.166 |
| Fifth quintile | 0.387 | 0.358 | 0.333 | 0.129 | 0.272 | 0.420 | 0.617 |
| Bottom 10% | 0.030 | 0.034 | 0.042 | 0.120 | 0.039 | 0.012 | 0.008 |
| Top 10% | 0.238 | 0.216 | 0.196 | 0.142 | 0.136 | 0.240 | 0.419 |

Note: disposable income equals gross income minus direct taxes and loan payments

Source: National Institute of Statistics, authors' calculations

Income developments in Romania

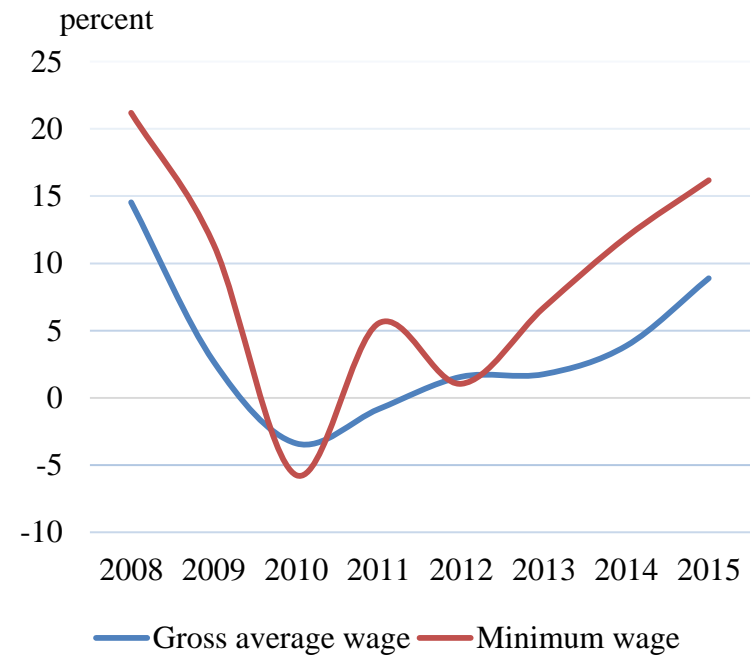
Evolution of disposable income

| | Gross income | Tax burden | Loan payments | Disposable income |
|----------------|--------------|------------|---------------|-------------------|
| 2008 | ↑ | → | ↑ | ↑ |
| 2009 | ↓ | → | ↑ | ↓ |
| 2010 – 2012 H1 | ↓ | ↑ | ↑ | ↓ |
| 2012 H2 | ↑ | → | → | ↑ |
| 2013 | ↑ | ↓ | → | ↑ |
| 2014 | ↑ | ↓ | ↓ | ↑ |

Note: disposable income equals gross income minus direct taxes and loan payments

Source: National Institute of Statistics, authors' calculations

Real (deflated) growth of wages



Source: National Institute of Statistics, authors' calculations

Assumptions

We explore the interaction between the transmission of monetary policy and income inequality by assessing the influence of indebtedness over households' consumption

During an economic downturn:

- Lower interest rates reduce burden with loans' reimbursement and allow debtors to accommodate a possible income adjustment with less impact on consumption
- Lower interest rates stimulates low and middle income households to access loans aiming to cover consumption expenditures, in case their revenues are affected by the recession
- Lower interest rates support a gradual deleverage and alleviate pressures on consumption

During the recovery phase of the business cycle:

- Stimulative interest rates encourage lending that further stimulate consumption growth
- Stimulative interest rates make credit more affordable, in particular for low and middle income population
- Lower interest rates stimulate local currency loans and reduce credit risk

Results: influence of households' indebtedness on consumption

| | Bottom 10% | First quintile | Second quintile | Third quintile | Forth quintile | Fifth quintile | Top 10% |
|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Intercept | 4.674*** [167.144] | 4.732*** [226.757] | 5.666*** [316.264] | 5.858*** [350.004] | 6.120*** [404.655] | 6.462*** [394.886] | 6.595*** [279.252] |
| Debt service-to-income ratio ($\bar{\gamma}$ coefficient) | 0.000 [-0.441] | -0.001 [-0.869] | -0.605*** [-19.473] | -0.681*** [-23.911] | -0.663*** [-27.401] | -0.564*** [-22.188] | -0.598*** [-16.863] |
| Debt service-to-income ratio for individual years (γ coefficient) | | | | | | | |
| 2008 | -0.441* [-2.504] | -0.476*** [-4.070] | -1.307*** [-18.093] | -1.327*** [-20.022] | -1.290*** [-22.007] | -1.091*** [-17.067] | -1.077*** [-12.007] |
| 2009 | -0.043 [-0.548] | -0.146* [-2.140] | -0.744*** [-10.310] | -0.911*** [-14.319] | -0.952*** [-17.042] | -0.754*** [-13.428] | -0.673*** [-8.373] |
| 2010 | -0.438** [-2.778] | -0.047 [-0.606] | -0.718*** [-10.164] | -0.915*** [-14.941] | -0.812*** [-15.544] | -0.636*** [-11.691] | -0.606*** [-8.338] |
| 2011 | 0.188 [1.668] | 0.065 [0.704] | -0.478*** [-6.707] | -0.618*** [-9.221] | -0.589*** [-10.574] | -0.614*** [-10.901] | -0.722*** [-8.813] |
| 2012 | 0.015 [0.115] | 0.003 [0.028] | -0.478*** [-6.002] | -0.384*** [-5.526] | -0.553*** [-9.663] | -0.383*** [-6.093] | -0.508*** [-5.906] |
| 2013 | 0.000 [-0.438] | -0.001 [-0.837] | -0.132 [-1.542] | -0.349*** [-4.790] | -0.306*** [-4.929] | -0.206*** [-3.277] | -0.302*** [-3.318] |
| 2014 | 0.311* [2.125] | 0.276* [2.387] | -0.016 [-0.178] | 0.132 [1.660] | -0.096 [-1.656] | -0.158* [-2.379] | -0.244** [-2.662] |
| Control variables | | | | | | | |
| Age | 0.006*** [18.951] | 0.008*** [35.180] | 0.002*** [11.523] | 0.003*** [17.356] | 0.003*** [14.195] | -0.002*** [-10.520] | -0.003*** [-12.068] |
| Number of children | 0.119*** [30.372] | 0.116*** [41.060] | 0.046*** [22.560] | 0.041*** [23.831] | 0.035*** [24.117] | 0.074*** [50.312] | 0.078*** [37.090] |
| Education level | -0.037*** [-16.075] | -0.039*** [-22.940] | -0.038*** [-27.016] | -0.044*** [-29.915] | -0.054*** [-33.204] | -0.098*** [-37.769] | -0.104*** [-22.957] |
| Financial position (dummy) | 0.019* [1.966] | 0.032*** [4.859] | 0.085*** [19.777] | 0.070*** [17.870] | 0.073*** [19.069] | 0.029*** [5.592] | 0.018* [2.112] |
| Income source (dummy) | 0.219 [1.741] | 0.232* [2.497] | 0.084 [1.538] | 0.084 [1.732] | -0.007 [-0.157] | 0.276*** [7.285] | 0.298*** [5.870] |
| No. of observations | 11,421 | 22,793 | 22,944 | 22,895 | 22,972 | 23,349 | 11,865 |

Note: ***, **, * refers to 0.1%, 1% and 5% significance level; t-statistic in brackets

Source: authors' calculations

Model with two approaches: cross-sectional and panel

Households' sources of income Y are labour Y_l , capital Y_k and transfers from the government TR :

$$Y = Y_l + Y_k + TR$$

Households use income to pay taxes T , reimburse the loans LP , whilst the remaining income is called the disposable income YD :

$$Y = YD + T + LP$$

We introduce indebtedness in the model, given that the high indebtedness put pressure on households' finance and influenced their consumption behavior. Indebtedness level is quantified by the debt service-to-income ratio ($DSTI$), computed as loan payments (LP) divided by net income ($Y - T$):

$$DSTI = \frac{LP}{Y - T}$$

Model with two approaches: cross-sectional and panel (cont.)

Households' disposable income is allocated for consumption C , investments I and savings S :

$$YD = C + I + S$$

where consumption equal the sum of product between quantity and price of each individual good and service:

$$C = \sum_{k=1}^K x_k * P_k$$

The relation for disposable income is further divided by disposable income:

$$pc + pi + ps = 1$$

where pc is households' propensity to consume, pi is propensity to invest and ps is propensity to save

Model with two approaches: cross-sectional and panel (cont.)

- Cross-sectional approach
 - We adapted the model of Bunn and Rostom (2015) to explain the relation between consumption (c) and indebtedness ($DSTI$) for households. The equation is estimated for each quintile of income distribution

$$c_{it} = \alpha + \bar{\gamma} * DSTI_{it} + \gamma * DSTI_{it} * year_{it} + \rho * X_{it} + \mu * F_{it} + \varepsilon_{it}$$

where

- X_{it} is a vector of households' feature, such as age, number of children, education
 - F_{it} is a vector with dummy variables, as income source and household's financial position
-
- Coefficients $\bar{\gamma}$ and γ detect the relation between households' indebtedness and consumption for the entire period and for each given year

Model with two approaches: cross-sectional and panel (cont.)

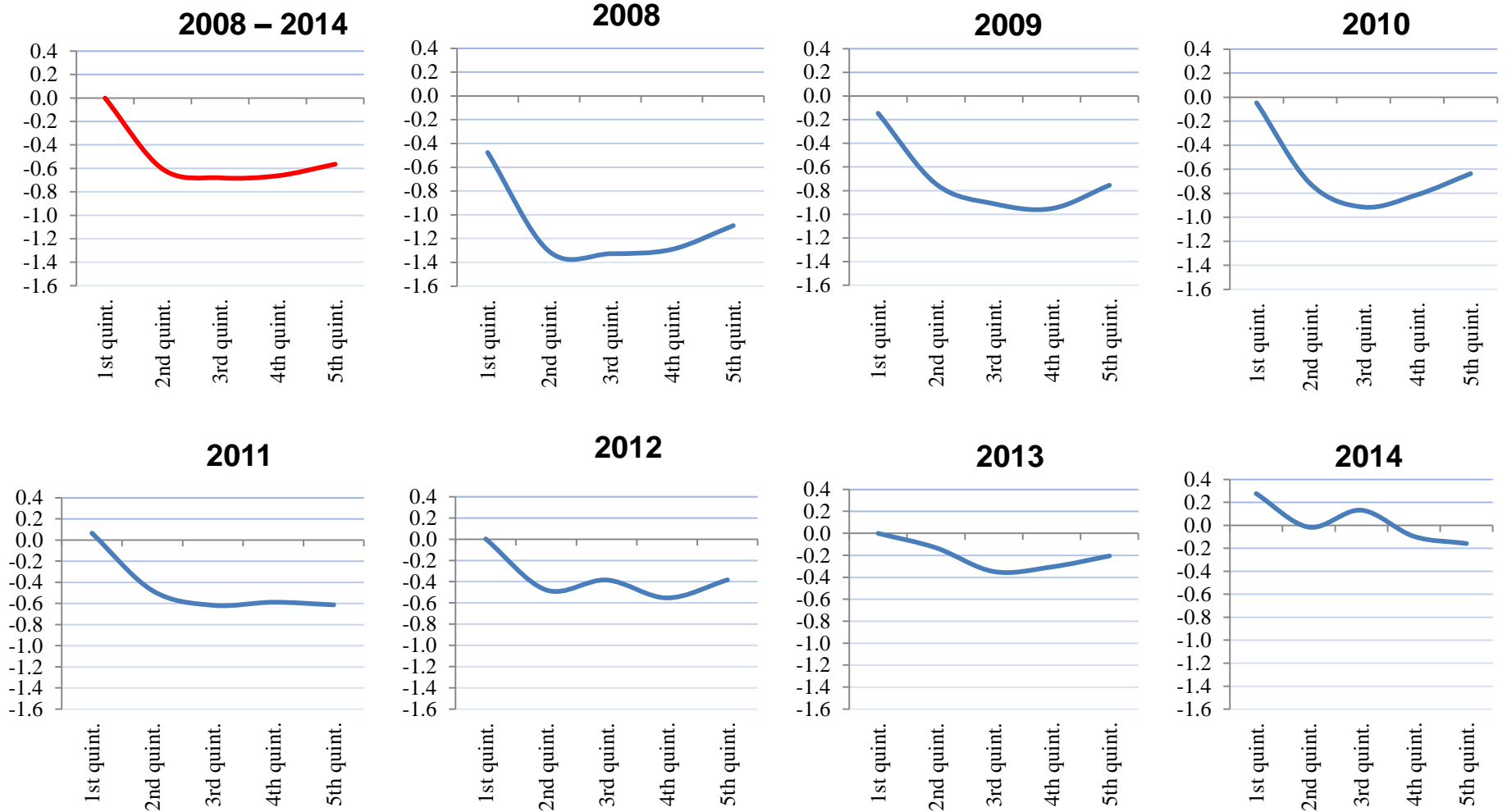
- Panel approach
 - We followed Bunn and Rostom (2015) and Deaton (1985) to transform a cross-sectional data sample into synthetic panel by computing the average of consumption, disposable income and debt-to-income for household cohorts, grouped by buckets of age:

$$\Delta c_{it} = \alpha_0 + \alpha_1 * \Delta yd_{it} + \alpha_2 * \Delta DSTI_{it} + \eta_{it}$$

where

- c is log of consumption per capita,
 - yd is log of disposable income per capita
 - $DSTI$ is debt service-to-income
- By estimating the relation for households whose income corresponds to percentile k of income distribution, the resulting coefficients can be written as follows:
 - $\alpha_j = (\alpha_{jp_1} \alpha_{jp_2} \dots \alpha_{jp_k})'$, where $j=0,1,2$

Transmission of monetary policy (influence of indebtedness on consumption)

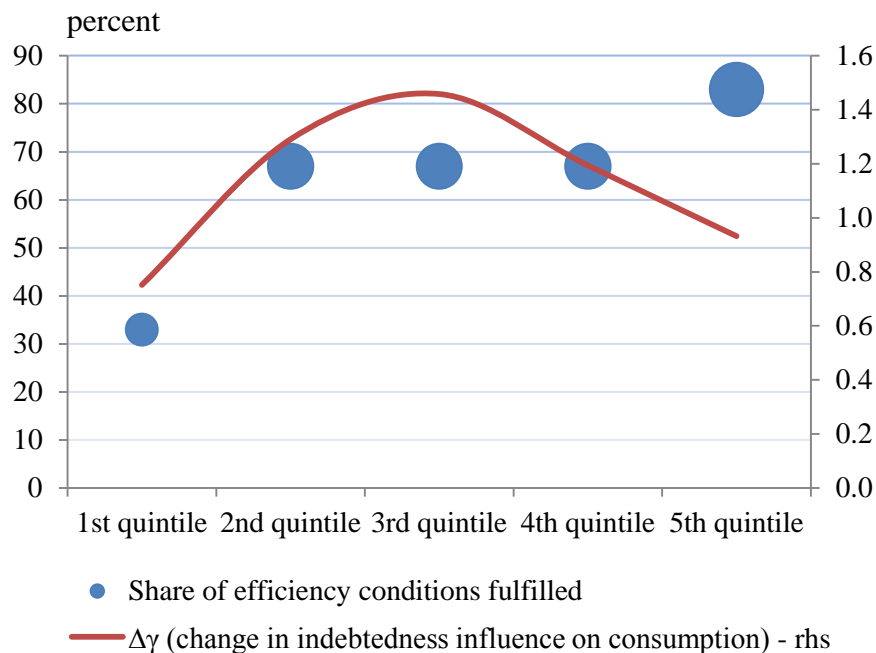


Source: authors' calculations

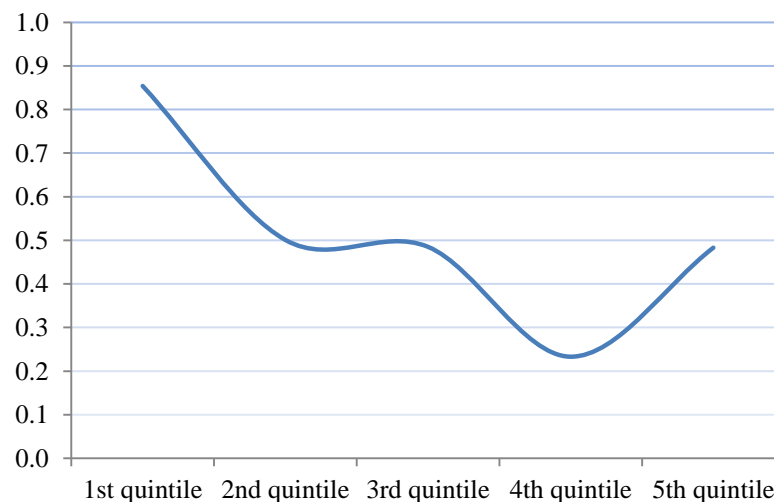
Efficiency of monetary policy transmission

- Monetary policy was most efficient for middle income households, followed by top income population
- Disposable income matters most for households in the left-end of the income distribution

Efficiency of monetary policy transmission along the income distribution



Influence of disposable income on consumption



Source: authors' calculations

Concluding remarks

- Households' response to changes in monetary conditions depends on their income and indebtedness profile
- Middle income households with relatively high debt and loans with adjustable rates facilitate the transmission of monetary policy
- Low income households respond to a less extent to changes monetary conditions; they have reduced access to credit, whereas the borrowed money are mainly allocated to cover the cost for the basic consumption needs
- Lower inequality is associated with stronger efficiency and higher homogeneity of monetary policy transmission



Thank you