Assessing credit discipline of individuals in Romania

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"**Symposium on Financial Stability**"
Bucharest, 14th April 2011

The main research themes

- The paper aims to identify what are the characteristics of the loans reimbursement behavior in case of shocks on the labor, monetary, goods and services markets.

  - The innovating feature of the paper is given by the investigation of the importance of the developments in prices for food products, non-food products and energy on the reimbursing pattern of the debts.

- How can be characterized the households' credit discipline?

The mechanism for the households' reimbursement capacity
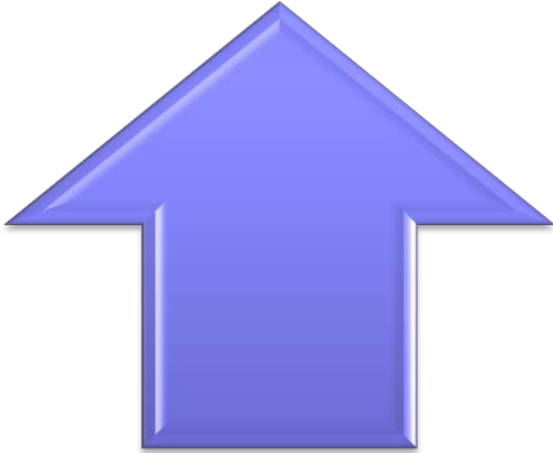
Variables reflecting **the households' income** (status of the labor market)

- Average income (for public and private sector)
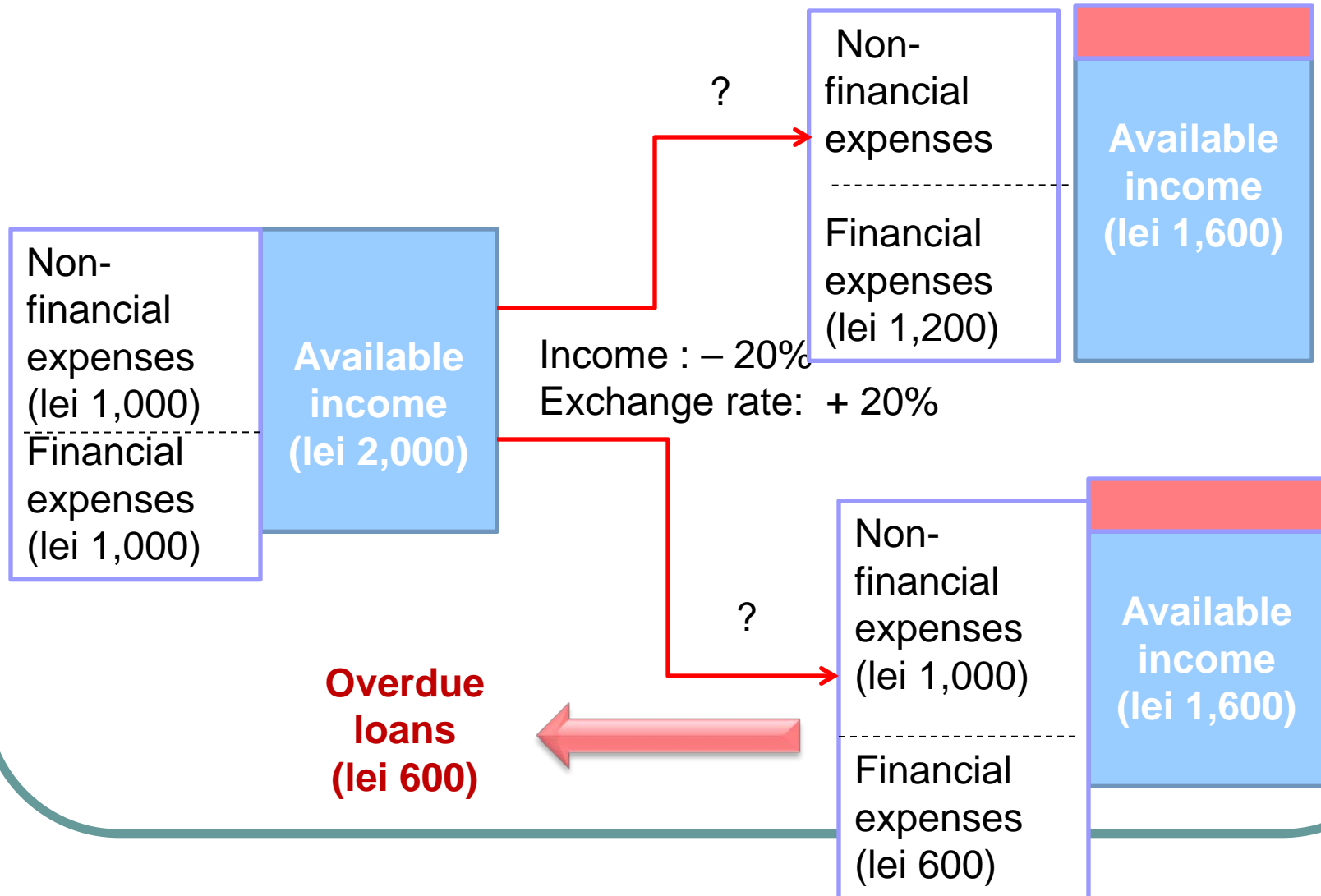- Unemployment rate / Number of employees (for public and private sector)
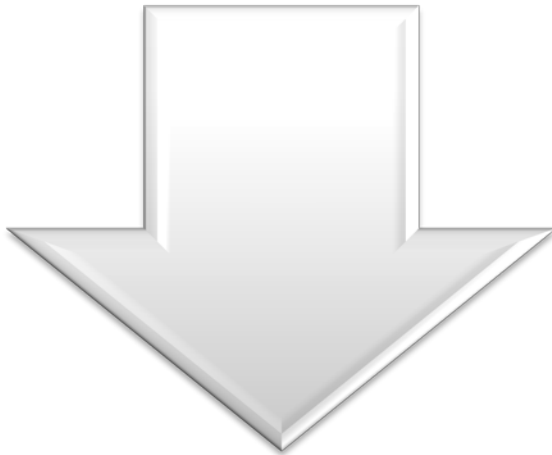
Variables reflecting **the households' expenditure**

- *financial* (monetary conditions)
  - The exchange rate
  - The loans interest rate (for lei and euro)
- *non-financial* (status of the goods and services market)
  - Inflation for food goods
  - Inflation for non-food goods
  - Inflation for energy component

Households' reimbursement behavior (1)

- Usually, the shocks on the labor market are accompanied by the deterioration of the loans terms, while the goods and services for current needs become more expensive
- The key problem of the forecasting the dynamics for the overdue loans rate is the adjustment technique of the households' expenditure structure to the new conditions
  - do the households prefer the individual consumption adjustment in favor of banking installments payment?
  - are there partial payments being made (income reduction) or defaults (job loss)?
- The experience gathered along the crisis shows that, usually, the defaults are generated by the individuals' difficult situations: income decrease per family, unemployment.

Households' reimbursement behavior (2)

Non-financial expenses (lei 1,000)

Financial expenses (lei 1,000)

Available income (lei 2,000)

Income : – 20%
Exchange rate: + 20%

?

Non-financial expenses

Financial expenses (lei 1,200)

Available income (lei 1,600)

?

Overdue loans (lei 600)

Non-financial expenses (lei 1,000)

Financial expenses (lei 600)

Available income (lei 1,600)

Challenges for the analytical framework

- Identification of the determinant factors for the households' overdue loans rate is difficult, especially that the late payments are not due to the deterioration of the reimbursement capacity, but to the following:
  - Negotiations for loan restructuring;
  - Non due to creditor decision to increase the risk premium/loan commissions for the loan although the debtor's income was not significantly altered
- Modeling the rate of the volume of overdue loans is difficult also due to the partial payments made by debtors

Theoretical framework

- Simultaneous equations systems which emphasize the different profiles of the explaining factors between the rate of number of overdue loans and rate of volume of overdue loans

$$\begin{cases} d(dr_t) = \alpha + \sum_{l=1}^{k} c_l \times d(v_l) + \sum_{m=1}^{n} c_m \times d(v_m) + \sum_{gs=1}^{r} c_{gs} \times d(v_{gs}) + \varepsilon_{dr} \\ d(odr_t) = \alpha + \sum_{l=1}^{k} a_l \times d(v_l) + \sum_{m=1}^{n} a_m \times d(v_m) + \sum_{gs=1}^{r} a_{gs} \times d(v_{gs}) + \varepsilon_{odr} \end{cases}$$

- The framework for identifying the determinant factors is improved by using autoregressive vectors that can better identify the persistence and impact in time of the macroeconomic and financial factors on dependent variables

Data

- Dynamics of the overdue household loans was illustrated both as an overdue loans number weight and as an overdue loans value weight. A loan is considered overdue if the debt service is higher that 30 days.

- Data used for the empirical analysis cover monthly information during December 2004 – June 2010, while the data for ex-post out-of-sample testing cover July 2010 – December 2010

- Data range was limited by the availability of information regarding the dependent variables

Empirical analysis

- Employing a reasonable number of models (both VAR and simultaneous equation systems) that used a large diversity of exogenous variables (both single market and combined).
- Models' specifications, including number of lags, was chosen so that to insure functional stability of the mechanism both from the economical and econometrical point of view
- Empirical results lead to the selection of two (relatively) distinct specifications which were estimated both with SUR systems of equations and VAR models.

Specifications

Estimation Method: Seemingly Unrelated Regression **MODEL 1**
Sample: 2004M12 2010M06

	Coefficient	Std. Error	t-Statistic	Prob.
C(11)	0.002390	0.000335	7.129186	0.0000
C(12)	-0.047921	0.017007	-2.817717	0.0056
C(13)	0.050826	0.010966	4.634691	0.0000
C(14)	0.024846	0.008388	2.962165	0.0037
C(15)	0.118778	0.045445	2.613637	0.0100
C(21)	0.000236	4.65E-05	5.074897	0.0000
C(22)	-0.100997	0.009272	-10.89257	0.0000
C(23)	0.018455	0.008389	2.200028	0.0296

| Determinant residual covariance | 4.03E-13 |

Equation: D(R_PD/100) = C(11) + C(12)*DLOG(L_**VENIT_MEDIU**_SA(
 -1)) + C(13)*DLOG(B_**CURS**(-2)) + C(14)*DLOG(L_**SOMAJ**_SA(-3)) +
 C(15)*D(B_**RATADOB_LEI**(-1)/100)
Observations: 67

| Adjusted R-squared | 0.449310 | S.D. dependent var | 0.002493 |
| Durbin-Watson stat | 2.313096 | | |

Equation: D(R_NPL_SA/100) = C(21) + C(22)*DLOG(L_**ANG_PRIV**_SA
 (-3))+ C(23)*L_**SOMAJ_GAP**(-5)/100
Observations: 67

| Adjusted R-squared | 0.642194 | S.D. dependent var | 0.000627 |
| Durbin-Watson stat | 2.264129 | | |

Estimation Method: Seemingly Unrelated Regression **MODEL 5**
Sample: 2004M12 2010M06

	Coefficient	Std. Error	t-Statistic	Prob.
C(11)	0.001757	0.000250	7.016414	0.0000
C(12)	-0.005937	0.002676	-2.218755	0.0283
C(13)	0.041538	0.010306	4.030368	0.0001
C(14)	0.096838	0.042354	2.286393	0.0239
C(15)	-0.085029	0.027913	-3.046171	0.0028
C(16)	-0.233076	0.044297	-5.261681	0.0000
C(21)	0.000277	7.17E-05	3.861189	0.0002
C(22)	-0.090312	0.009804	-9.211888	0.0000
C(23)	-0.007041	0.002899	-2.428637	0.0166
C(24)	0.014150	0.006578	2.151079	0.0334
C(25)	0.015116	0.009506	1.590201	0.1144

| Determinant residual covariance | 3.01E-13 |

Equation: D(R_PD/100) = C(11) + C(12)*DLOG(L_**VENIT_PUBLIC**_SA(
 -1)) + C(13)*DLOG(B_**CURS**(-2)) + C(14)*D(B_**RATADOB_LEI**(-1))
 +C(15)*DLOG(L_**ANG_PUBLIC**_SA(-5)) + C(16)
 *DLOG(L_**ANG_PRIV**_SA)
Observations: 67

| Adjusted R-squared | 0.555889 | S.D. dependent var | 0.002493 |
| Durbin-Watson stat | 2.060769 | | |

Equation: D(R_NPL_SA/100) = C(21) + C(22)*DLOG(L_**ANG_PRIV**_SA
 (-3)) + C(23)*DLOG(L_**VENIT_PRIVAT**_SA) + C(24)
 *DLOG(M_**INDICE_P_NEALIM**(-1)) + C(25)*D(B_RATADOB_LEI(-3))
Observations: 67

| Adjusted R-squared | 0.671302 | S.D. dependent var | 0.000627 |
| Durbin-Watson stat | 1.945029 | | |

Findings

- Goods and services prices increases does not significantly affect the dynamics of the overdue household loans
  - result suggests a sound reimbursement discipline of the households which prefer the individual consumption adjustment in favor of banking installments payment