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**Stress Testing of the Households Sector
in the Kyrgyz Republic Based on Microdata**

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Stress Testing of the Households Sector in the Kyrgyz Republic Based on Microdata

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Summary

Households stress testing was conducted in this paper to assess their sustainability in meeting their loan obligations. The households' resilience to the shocks of job loss, decrease in incomes, reduction of remittances and devaluation of the Kyrgyz som was investigated based on the data from the integrated household survey using Monte Carlo method.

Calculations demonstrate that in case of default, the burden on the financial sector is not significant. Possible losses for the financial sector amount to KGS 3-4 billion. However, the issue is the value of the *LGD* indicator (the share of losses in the total volume of issued loans), which is approximately 43 percent for the cities and 67 percent for the rural areas. That is, despite the fact that the total amount of possible default is insignificant for the financial system, it is focused on a small circle of borrowers, particularly in the rural areas. This indicates insufficient diversification of the loan portfolio of the financial market participants.

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Key words: stress testing, households, microdata, integrated survey of the household budgets and labor force.

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Introduction

According to the Institute of International Finance (Washington), at the beginning of Q4 2019, the total debt burden of the households, governments, financial and non-financial corporations in the world reached a record value of 322.0 percent of global GDP. In particular, during nine months of 2019, the total debt increased by almost USD 9 trillion, USD 1.7 trillion thereof are accounted for the households. According to the abovementioned institution, at the beginning of Q2 2020, the volume of debt burden will exceed USD 257 trillion due to the soft monetary policy conducted by the leading central banks.

According to CEIC Data, during 2009-2018, the level of household debt in the Kyrgyz Republic has grown from 2.5 to 4.7 percent of the nominal GDP. Excessive indebtedness of the governments, the corporate sector, and the household sector can pose a threat for the stability of the financial systems worldwide and for the global markets.

Stress tests are widely used in the world practice, for example in the financial sector to identify its weaknesses. Stress tests are the methods used to assess the vulnerability of portfolios in respect of significant changes in the macroeconomic situation or exceptional, but plausible events (National Bank, 2018). A similar approach is used for households stress testing to verify their sustainability during the periods of economic shocks.

With regard to the micro-level, stress testing studies the situation in the households in cases of changes in prices for goods and services during a certain period of time, income during a certain period of time, interest rates on loans/deposits, tax rates on citizens' income (growth/differentiation), unemployment, death of the household's head, exchange rate, etc.

During the previous decade, the Kyrgyz Republic has experienced two economic shocks: in 2008-2009 and 2014-2015, which were the result of global economic processes. These economic crises resulted in rise in prices, significant fluctuations in the exchange rate, and changes in the households' consumption, in particular, those having labor migrants among family members (through the money transfer channel). Thus, price shocks for the population are associated with devaluation of the national currency against the US dollar, which conditions an increase in prices for imported goods.

On the other hand, incomes of the households having labor migrants among family members and receiving remittances mainly from Russia decreased due to strengthening of the Kyrgyz som against the Russian ruble.

Households stress testing using survey data may better show mechanisms of likely bankruptcy at the micro-level compared to macro data (aggregated). Therefore, it helps to cluster households according to their degree of vulnerability and to assess it based on actual data, rather than on past data.

The main purpose of this research is to study the impact of macroeconomic shocks on the households' welfare and their ability to meet their debt obligations.

This working paper consists of the following sections: review of literature, which presents the approaches used for households stress testing, as well as the research methodology, obtained results, conclusions and recommendations.

Review of literature

Certain international experience has already been accumulated with respect to conducting desk research on stress testing. They are mainly conducted by the central/national banks of the countries to identify the households' weaknesses.

Similar testing of households to assess their sustainability were not conducted in the Kyrgyz Republic. Meanwhile, the World Bank (Tiongson etc. 2010) prepared a report that presented the results of evaluating the impact of the macroeconomic shock resulted from the global crisis in the late 2000s on the household welfare in several countries of Europe and Central Asia, including household income flows, consumption and liability levels.

The World Bank analyzes household vulnerability by examining the credit markets, external prices (food products and fuel) and income shocks, as well as assesses their impact on the household welfare.

Thus, the rapid growth of debt obligations in the CIS countries affected the households through a shock in the credit market. There are concerns that the longer the macroeconomic shocks last, the more households will be unable to service their debts. Tiongson etc. say that poorer households suffered from the crisis of 2008-2009 in the Kyrgyz Republic because they are considered net consumers of the food products with limited access to agricultural assets and resources.

The human capital of the household members also decreased during the crisis due to reduced investment in education and health care in response to strong exchange rate fluctuations. This paper gives recommendations to pay attention to the global nature of the crisis of 2008-2009, which made all (capital, labor) markets, being the sources of income, inaccessible. The response to the crisis must be as follows: (a) strengthening and targeting the social protection measures for affected and poor households, (b) raising financial literacy so that households could understand the risks they face due to their consumption, quality of work or way of borrowing.

The case of stress testing in Poland (2008) shows that the unemployment shock has a stronger effect on the ability of the households to service their debt compared to the shock of interest rates and exchange rate.

The comparative results show that the impact of the shock in the labor market of Poland is much greater compared to the results of the similar analysis conducted in Sweden and Denmark. The main reasons for deeper impact of the shock are low unemployment benefits and low employment rates (large number of single-breadwinner households).

The Bank Austria (2010) used the shocks of interest rate, unemployment rate, asset price/value, exchange rate, and repayment vehicle yield to conduct the stress testing.

The interest rate rise scenario has the strongest impact (even in the short term) because about two-thirds of debtors in Austria are provided with floating rate loans. The unemployment rate growth scenario demonstrates rather moderate consequences. On the one hand, the probability for the homeowners to become unemployed is much lower compared to those who rent apartments.

Sugawara and Zalduendo (2011) conducted a research of the Croatian households' resilience to debt obligations. It was revealed that the household debts are not a restraining factor for economic activity in the country, the shocks do not affect the households' welfare, however they increase the probability of bankruptcy on loan obligations. Calculations made in the research should primarily focus on increased vulnerability of the households to shocks and may represent an upper limit of the financial stability risks that Croatia faces due to household debts.

The Bank of Australia (2015), based on the results of the research using microdata, concluded that the debt burden of the population generally increased, however it was concentrated among the households being able to service debt obligations. This indicates that aggregates of the population debt can be misleading regarding the financial imbalance of the entire household sector.

The results of stress testing conducted by the Czech National Bank (2017) demonstrated that low-income households with mortgage loans taken during the period of low interest rates are subject to risks of servicing credit obligations. Thus, in case of an increase in interest rates that will not be accompanied by corresponding growth in incomes of the abovementioned households, there is a threat of an increase in the size of loan payments.

Moreover, particularly the mortgage loans of the lowest income households condition excessive debt burden.

In Mongolia, assessment of the household financial resilience to macroeconomic shocks revealed that this sector was vulnerable to the shocks related to interest rates, the cost of basic consumer goods, asset prices and unemployment (Doojav and Bayarjargal 2018). In particular, household debt obligations (or expected loss on loans) are highly dependent on interest-bearing and consumer prices.

Moreover, a significant increase in household debt was found to result in financial imbalance of the household sector. These results have important political consequences for mitigating the growing financial imbalance of the household sector and the risks to financial stability.

Alfaro (2018) notes that negative shocks in incomes related to unemployment (as opposed to price shocks) are the best predictors of mortgage loans default. The stress testing made it possible to simulate growth of the consumer loan default observed during the global financial crisis in 2008-2009.

The calculation results show that the debt risk (more than three months) increases amid growth of the unemployment rate, as well as amid lower quality of employment. The data of credit histories

and the results of household surveys made it possible to determine that labor market dynamics (unemployment rate, job quality) pose a risk to the households.

Data and methodology

A household is vulnerable if it is unable to meet its financial obligations. All household incomes are summed up for calculation purposes; taxes, loan payments and necessary expenses are deducted therefrom. Let's take the vulnerability as an indicator (binary) variable:

$$V_i = I(Inc_i - CE_i - BE_i),$$

where Inc_i is the income of the i -th household, CE_i is the loan interest, BE_i is the required expenses.

Thus, $V_i = 1$, if the loan interest and the necessary expenses exceed the household income, that is, the household is vulnerable.

Exposure at default:

$$EAD = \sum V_i/n.$$

Being aware whether a household is vulnerable or not, the financial sector losses in case of a household default can also be calculated. Let's denote the debt of the i -th household as D_i . In this case, the financial sector losses are $Loss = \sum V_i D_i$, and the percentage of losses in the total share of loans is $LGD = Loss / \sum D_i$. LGD is an important indicator of the financial system stability.

It should be noted that the households may have assets that can be used to pay off debt. If the value of assets exceeds the amount of debt, therefore such debt is not irrecoverable. Let's introduce a new variable:

$$NW_i = I(A_i - D_i < 0),$$

where A is the sum of household assets. Accordingly, $NW_i = 1$ if the value of assets is insufficient to cover the debt. Thus, irretrievable losses are $Loss_{UC} = \sum (V_i D_i NW_i)$, and the percentage of non-performing loans is $LGD_{UC} = Loss_{UC} / \sum D_i$.

The main shocks used in the literature are job loss, changes in the interest rates, and rise in prices. It should be noted that some shocks are not universal and sometimes are applied only in some countries. For example, a change in the interest rate is a significant shock for some developed countries due to the fact that the interest rate on some debts in these countries is floating and change thereof directly affects the debt burden of the household and, accordingly, the ability of the household to meet its debt obligations.

A fixed interest rate, by default, does not affect the amount of the current debt. Taking into account that the interest rate on loans is fixed in the Kyrgyz Republic, the change in the interest rate does not affect

the current liabilities of the households. Accordingly, it is meaningless to consider this shock in the context of the Kyrgyz Republic.

A job that generates basic income is perhaps the most important factor in the households' financial stability. Job loss is a serious shock that can make the household unable to pay off its debt obligations. However, it should be noted that, according to the definitions of the International Labor Organization, the population of the Kyrgyz Republic is primarily employed, although employment (self-employment) thereof is so irregular that in many respects it does not differ much from the unemployment. Therefore, besides the shock of job loss, this research also examines the shock of income decline.

In the context of developing countries, currency devaluation is also a significant shock that results in growth of the inflation rate. Rise in prices, in turn, condition growth of expenditures for basic consumption, and may make it impossible to pay debt by the low-income households.

Taking into account the importance of remittances in the budgets of many households in the Kyrgyz Republic, the shock of fall in remittances is also considered.

In this research paper, the author uses data of the National Statistical Committee of the Kyrgyz Republic (hereinafter referred to as the NSC KR) from the annual integrated survey of the household budgets and labor force for 2017. This survey contains information on the amount and sources of household incomes and detailed expenditures. The total household incomes were calculated using the "Household income and expenditures" module. However, the household data does not include information on monthly payments and loan rates. To approximate this amount, the debt balance is multiplied by 0.1722 (the average interest rate on the bank loans in 2017 according to the National Bank of the Kyrgyz Republic) for the urban population and by 0.3378 (the average interest rate on the microfinance organizations loans in 2017 according to the National Bank of the Kyrgyz Republic) for the rural population. Such calculation gives us the average annual accrued interest.

Two criteria are considered in respect of the necessary expenditures. The first criterion is the subjective necessary expenditures (in the households' opinion) not to fall below the poverty line. The question in the household questionnaire is: "What do you think? How much money on average does a family with the same number of people as yours need per month to avoid poverty at the current price level?". The second criterion is the general poverty line, which, according to the official data, was KGS 32,093 in 2017.

According to the first criterion, about 37.9 percent of the urban households in the Kyrgyz Republic and 24.7 percent of the rural households are vulnerable. According to the second criterion, approximately 5.3 percent of the urban and 7.2 percent of the rural households are vulnerable.

As the results show, the urban households are more vulnerable according to the first criterion; meanwhile the rural households are more vulnerable according to the second criterion. This is due to the fact that the general poverty line is not calculated separately for villages and cities, although this level

is probably higher in the cities. Therefore, rural households are more vulnerable according to the second criterion. The subjective needs of the households are considered according to the first criterion. The minimum needs may be overestimated according to this criterion; however on the other hand, it takes into account the difference in the level of necessary expenditures between the cities and villages.

According to the first criterion, the total amount of default debt will amount to KGS 3.4 billion in the cities and KGS 3.9 billion in the rural areas. According to the second criterion, the amount of default in the cities will amount to KGS 1.7 billion, and in the rural areas – KGS 2.6 billion.

LGD_1 (according to the first criterion) constitutes 85.4 percent in the cities and 99.5 percent in the rural areas; LGD_2 (according to the second criterion) constitutes 42.7 percent in the cities and 67.0 percent in the rural areas. That is, disproportionately large amount of debt in fact fall on the vulnerable households despite the fact that the share thereof is small according to the second criterion.

The value of household assets was calculated to determine the amount of debts unsecured by assets (i.e. potentially irrecoverable). The “Household personal property” module provides information on the availability of own housing, durable goods, agricultural machinery and draught animals, as well as on the price to be proposed by the household to sell them. Household assets are assessed based on these data.

In terms of irrevocable debts, the amount of irrevocable debt (unsecured by assets) $LossUC_2$ (according to the second criterion) constitutes KGS 1.6 billion in the cities and KGS 1.9 billion in the rural areas.

Monte Carlo simulations were used to calculate the impact of unemployment on the households financial stability. The main idea of the simulation is to generate a new sampling frame based on the current one, where the unemployment indicator is generated from the binomial model. Meanwhile, the parameter of the binomial model ($p = u + \Delta$) is equal to the actual share of the unemployed people in the sampling frame plus defined change. For example, if the current unemployment rate is 5 percent and it is necessary to determine how the households vulnerability will change with an increase in unemployment rate by 2 percentage points, the binomial model parameter $p = 0.07$ should be set. Thus, the total share of the unemployed people is constant with each new generation of the sampling frame, however the distribution of employment rate among the individuals changes.

There are two approaches to the choice of the binomial model parameter in the literature. In the first case, this parameter is the same for all observations, i.e. each individual has the same probability of becoming unemployed. In the second case, this probability is different for each individual. The probit regression model is used to estimate individual probability:

$$Pr(u=1) = \Phi(X\beta),$$

where X is the matrix of the socio-demographic characteristics of an individual, and Φ is the standard normal distribution function. The following characteristics of probit regression are used in the literature: gender, education level, age, and region.

The employment module of the integrated household survey was used for these calculations, it contains information on employment rate and employment income of the household each member. The binary unemployment indicator (u_i) is equal to 1 for the unemployed people (economically active and of working age (15-62 years), however unemployed). This indicator is equal to 0 for employed people. This indicator is not defined for those who are inactive and/or not of working age. A probit regression is further performed $Pr(u = 1) = \Phi(X\beta)$, where X includes binary indicators of gender, rural area, education level³ and region, as well as age and age squared. Estimated values of β vector are calculated based on this regression. β vector is used to determine the estimated probability for each member in the household $\Phi(X\hat{\beta})$.

Thereafter, an unemployment indicator is generated from the binomial model with a given parameter $p = \Phi(X\hat{\beta})$ having an individual estimate of the probability for each member of the household. If household member who was employed in the original sampling frame becomes unemployed in the newly generated sampling frame, his/her employment income is updated and the household income is recalculated. All indicators of vulnerability and irrevocable debts are recalculated based on the updated incomes. A thousand of new values are determined for each vulnerability parameter after a thousand of simulations. These parameters are used to calculate the average value and the confidence interval.

Results

Job loss shock

Monte Carlo simulation results show no noticeable changes in vulnerability and default amount when unemployment rate increases by 2 and 5 percentage points. Moreover, vulnerability (Table 1), as well as losses due to default (Table 2), practically do not differ from the current status quo.

Taking into account that the population of the Kyrgyz Republic is primarily employed, although employment (self-employment) thereof is so irregular that in many respects it does not differ much from the unemployment, therefore, the shock of income decline was also considered besides the shock of job loss.

³ The education level is divided into three groups: secondary or vocational secondary, higher and below secondary.

Table 1. Households vulnerability, in percent

No.	Rise in unemployment rate, in percentage points	Exclusive of assets		Inclusive of assets
		Criterion 1	Criterion 2	Criterion 2
1	0.0	62.8	12.8	0.5
2	2.0	62.9	12.8	0.5
3	5.0	62.9	12.9	0.5

Table 2. Households losses due to debt default and rise in unemployment rate, in bln. of KGS.

No.	Rise in unemployment rate, in percentage points	Exclusive of assets		Inclusive of assets
		Criterion 1	Criterion 2	Criterion 2
1	0.0	6.8	3.5	3.4
2	2.0	6.8	3.5	3.4
3	5.0	6.8	3.5	3.4

Income loss shock

The following scenario was considered to define an income shock: 20 percent of the population will lose 50 percent of their income. Additionally, a separate analysis was carried out for urban and rural areas, as well as calculations were performed for each quintile group⁴ by income level.

The following results were obtained upon use of Monte Carlo method described above⁵. The share of vulnerable households in cities, according to the second criterion constituted 14.6 percent, and in rural areas – 22.9 percent. However, if the value of household assets is taken into account, the share of vulnerable households declines to 0.27 percent and 1.0 percent, respectively.

The amount of default will make KGS 2.8 billion in the villages, and KGS 2.04 billion in the cities. If only debts unsecured by assets are calculated, the amount of default will constitute KGS 1.9 billion in the cities and KGS 1.91 billion in the rural areas.

It should be noted that the highest share of vulnerability in the cities falls on the fifth quintile group (0.66 percent), the losses thereof will amount to KGS 0.8 billion in case of default. The third quintile group (0.36 percent and KGS 1.0 billion) is also vulnerable. Less than 1 percent of the total amount of possible losses (KGS 0.01 billion) fall on the first quintile group. The first quintile group (1.8 percent) with the share of KGS 0.58 billion or 31.0 percent of the total amount of possible losses is the most vulnerable in the rural areas.

⁴ Where the first quintile group is 20 percent of the population with the lowest income and the fifth quintile group is 20 percent of the population with the highest income.

⁵ 1,000 samples were generated for each criterion. The tables show the average value of 1,000 samples.

Table 3. Income loss shock by households quintile groups

No.	Indicators	Cities					
		1	2	3	4	5	Total
1	Vulnerability, in percent	37.23	19.67	11.15	6.47	3.09	14.59
2	Vulnerability, in percent (inclusive of assets)	0.24	0.00	0.36	0.07	0.66	0.27
3	Losses in case of default, bln. of KGS	0.02	0.00	1.09	0.04	0.88	2.04
4	Losses in case of default, bln. of KGS (inclusive of assets)	0.01	0.00	1.05	0.01	0.80	1.87
		Rural area					
		1	2	3	4	5	Total
5	Vulnerability, in percent	49.26	30.28	12.82	9.11	4.53	22.92
6	Vulnerability, in percent (inclusive of assets)	1.75	0.80	1.49	0.72	0.22	1.04
7	Losses in case of default, bln. of KGS	0.61	0.15	0.68	0.68	0.71	2.83
8	Losses in case of default, bln. of KGS (inclusive of assets)	0.58	0.11	0.51	0.65	0.07	1.91

National currency depreciation shock

Taking into account the significant share of imported goods, depreciation of the Kyrgyz som against other currencies is a significant shock for the Kyrgyz Republic. It is not possible to calculate directly the effect of this shock due to lack of data. Nevertheless, this effect can be calculated indirectly based on assessment of the inflation sensitivity to the Kyrgyz som depreciation conducted by the Eurasian Development Bank (2019). Thus, depreciation of the Kyrgyz som against the US dollar by one percent increases the inflation rate by 0.2 percentage points. We calculated the effect of the shock on the population vulnerability and the amount of default in case of the Kyrgyz som depreciation against the US dollar by 10 percent, which can result in increase of the inflation rate by two percentage points and, accordingly, increase in consumer prices.

The inflation rate is determined as:

$$\pi = (P_1 - P_0) / P_0,$$

where P_1 is the price level in the current period and P_0 is the price level in the previous period. After depreciation of the Kyrgyz som, $\pi' = (P'_1 - P_0) / P_0$, where π' is the new inflation rate and P'_1 is the new price level. The new price level can be calculated with available data on the inflation rate and the price level of the previous period $P'_1 = P_0(0.02 + \pi + 1)$. This formula can be used to determine a new poverty income threshold amid rise in prices⁶.

According to our calculations, the share of vulnerable households in the cities based on the second criterion will constitute 9.9 percent, and in the rural areas – 18.1 percent in case of the Kyrgyz som

⁶ If poverty rate changes with the inflation rate.

depreciation by 10 percent. At the same time, if the loans not secured by assets are only taken into account, the share of vulnerable households in the cities will make 0.24 percent, and in the rural areas – 0.91 percent.

At the same time, the total amount of default under this scenario will amount to KGS 1.7 billion in the cities and KGS 2.6 billion in the rural areas. If we take into account only debts unsecured by assets, the default amount will be KGS 1.6 billion in the cities and KGS 1.4 billion in the rural areas.

Table 4. National currency devaluation shock by households quintile groups

No.	Indicators	Cities					
		1	2	3	4	5	Total
1	Vulnerability, in percent	33.27	15.18	4.60	0.51	0.78	9.94
2	Vulnerability, in percent (inclusive of assets)	0.41	0.00	0.33	0.00	0.47	0.24
3	Losses in case of default, bln. of KGS	0.03	0.00	1.09	0.03	0.58	1.72
4	Losses in case of default, bln. of KGS (inclusive of assets)	0.01	0.00	1.03	0.00	0.55	1.59
		Rural area					
		1	2	3	4	5	Total
5	Vulnerability, in percent	47.67	24.62	12.82	1.91	0.27	18.14
6	Vulnerability, in percent (inclusive of assets)	1.75	0.75	1.49	0.48	0.00	0.91
7	Losses in case of default, bln. of KGS	0.61	0.15	0.68	0.61	0.60	2.62
8	Losses in case of default, bln. of KGS (inclusive of assets)	0.39	0.02	0.42	0.54	0.00	1.38

As for the quintile groups, the vulnerable urban households primarily fall on the fifth and third quintile groups – 0.47 percent and 0.33 percent, respectively. The total default amount for these households will make KGS 0.6 billion and KGS 1.0 billion. This is almost 100 percent of the total amount of a possible default. The first and third quintile groups – 1.8 percent and 1.5 percent, respectively are the most vulnerable in the rural areas. The total default amount for these households will make KGS 0.4 billion and KGS 0.5 billion, respectively, or almost 60 percent of the total amount of possible default.

Shock of decrease in remittances

Migrant workers' remittances are an important source of income for many households. A decrease in remittances would be a significant shock to many households. The scenario considered in this paper is termination of the remittances inflow for half of the recipient households. Monte Carlo method was also used for this analysis. Based on the results of simulations of this scenario, the share of vulnerable households (according to the second criterion) will increase up to 9.2 percent in the cities, and up to 17.6 percent in the rural areas. If we consider only debt unsecured by assets, the share of vulnerable households will be 0.2 percent in the cities, and 0.9 percent in the rural areas. At the same time,

the total amount of default will make KGS 1.7 billion in the cities and KGS 2.7 billion in the rural areas. If we take into account availability of the household assets, the amount of default is likely to make KGS 1.6 billion in the cities and KGS 1.9 billion in the rural areas.

Analysis of the quintile groups shows that the fifth and third quintiles are the most vulnerable groups in the cities (0.47 percent and 0.33 percent). At the same time, losses in case of default for these groups will amount to KGS 0.6 billion and KGS 1.0 billion, or 98 percent of the total amount of default.

The amount of possible default for the first quintile is insignificant (approximately KGS 10 million), as for the rural areas, the first and third quintiles are the most vulnerable here (1.8 percent and 1.3 percent, respectively). Losses in case of default will amount to KGS 0.6 billion and KGS 0.5 billion for these groups.

Table 5. Shock of decrease in remittances by households quintile groups

No.	Indicators	Cities					
		1	2	3	4	5	Total
1	Vulnerability, in percent	31.84	13.78	3.70	0.51	0.63	9.19
2	Vulnerability, in percent (inclusive of assets)	0.20	0.00	0.33	0.00	0.47	0.20
3	Losses in case of default, bln. of KGS	0.02	0.00	1.09	0.03	0.58	1.72
4	Losses in case of default, bln. of KGS (inclusive of assets)	0.01	0.00	1.04	0.00	0.55	1.62
		Rural area					
		1	2	3	4	5	Total
5	Vulnerability, in percent	46.89	24.12	5.47	1.44	0.69	17.56
6	Vulnerability, in percent (inclusive of assets)	1.75	0.75	1.27	0.48	0.14	0.93
7	Losses in case of default, bln. of KGS	0.61	0.15	0.65	0.61	0.67	2.69
8	Losses in case of default, bln. of KGS (inclusive of assets)	0.58	0.10	0.49	0.61	0.07	1.92

Charts 6 and 7 of the Appendix show that possible losses of different quintile groups do not strongly depend on the type of shock. The large possible losses fall on the third quintile in the urban and rural areas. At the same time, it is clear that the large possible losses fall on the fifth quintile in the cities, rather than in the rural areas. The large possible losses fall on the first quintile in rural areas, rather than in the cities.

Conclusion

The economy, its industries and economic agents depending on its cycles, external and internal factors, will periodically experience shocks of rise in prices, devaluation/strengthening of the Kyrgyz som, unemployment, accidental situations, loss of income, etc.

Household stress tests provide an excellent opportunity to move down to the micro-level to identify the household quintile and decile groups that may be vulnerable under certain conditions.

Calculations have shown that the total default for the urban households was mainly concentrated in the third and fifth quintiles, for the rural households – 1, 3 and 4. From social security perspective, the first quintile in the rural areas is the most vulnerable group of the population.

The results of stress testing show that in case of default, the burden on the financial sector is not significant. Possible losses for the financial sector are likely to amount to KGS 3-4 billion. However, the issue is the value of the *LGD* indicator, which is approximately 43 percent for the cities and 67 percent for the rural areas. In other words, despite the fact that the total amount of possible default is insignificant for the financial system, it is focused on a small circle of borrowers, particularly in the rural areas. This indicates insufficient diversification of the loan portfolio of the financial market participants.

Recommendations

1. The regular reporting on the integrated household survey in the Kyrgyz Republic provided by the NSC KR can be supplemented based on the needs of the National Bank, government agencies, and the financial sector for continuous monitoring of the households to verify their financial stability. For example, the amount of debt denominated in the national currency and the amount of debt denominated in foreign currency could be separately requested in the issues related to household debt. The source of debt could also be requested, i.e. the source of loan provision: a commercial bank, a microcredit organization or an individual. It will contribute to better calculation of the cost of debt service and the probability of possible default.

2. The National Bank should regularly conduct simulations taking into account their impact on the households, including quintile/decile groups, prior to taking any monetary policy measures.

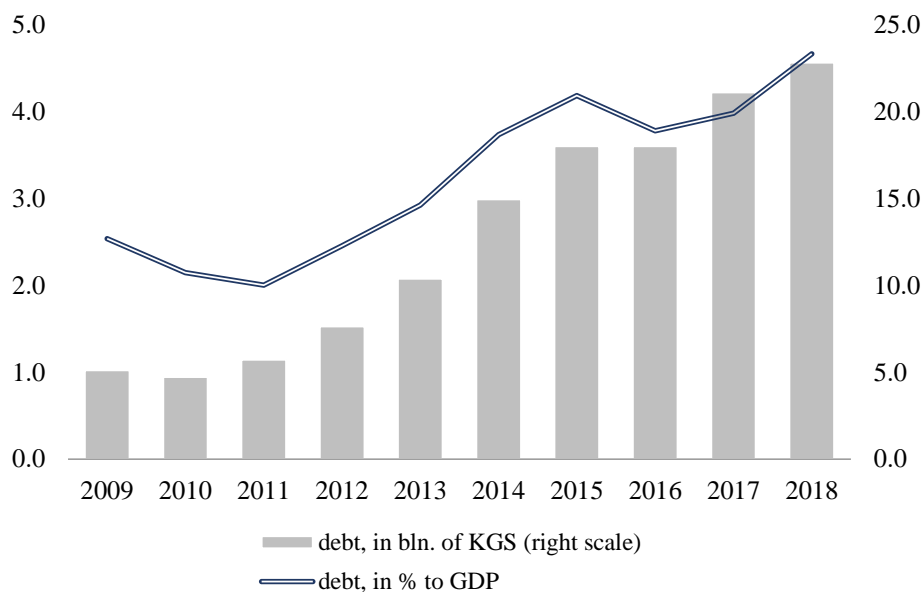
3. Commercial banks, microfinance organizations and credit unions are direct actors working with the households. The analysis demonstrated insufficient diversification of the credit portfolio. The debt concentration in a small circle of borrowers creates risks for the commercial banks and the microfinance organizations. Availability of scoring or other instruments to notify about deterioration of the household financial stability, as well as availability of a collateral, is a way to predetermine the borrower's economic status and avoid adverse consequences in case of external and internal shocks.

4. The National Bank is suggested to conduct experimental stress testing with the pilot banks and microfinance organizations:

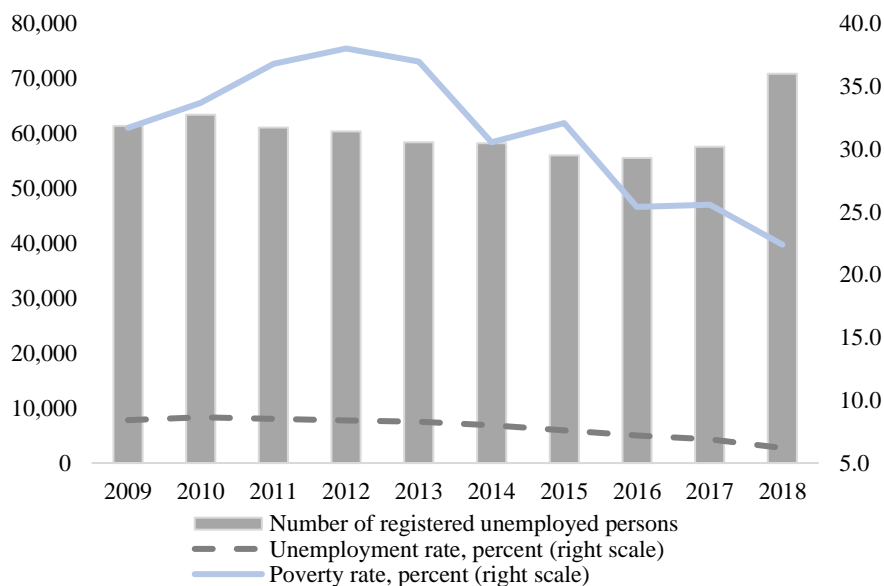
- for the corporate sector, since its indicators are relevant for the key indicators of the banking assets quality;
- for the borrowers regarding unemployment shock, shock of breadwinner loss, currency shock, shock of income loss and natural disasters, etc.

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Chart 1. Household debt to nominal GDP in the Kyrgyz Republic in 2009-2018⁷.

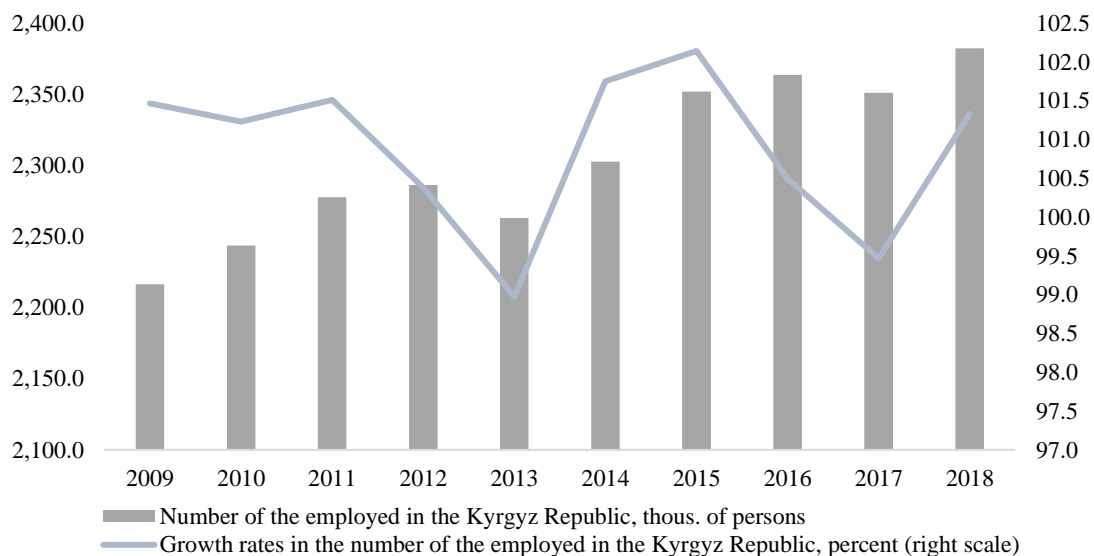
Source: ceicdata.com/CEIC Data, National Statistical Committee of the Kyrgyz Republic, author's own calculations

Chart 2. Unemployment in the Kyrgyz Republic in 2009-2018

Source: National Statistical Committee of the Kyrgyz Republic.

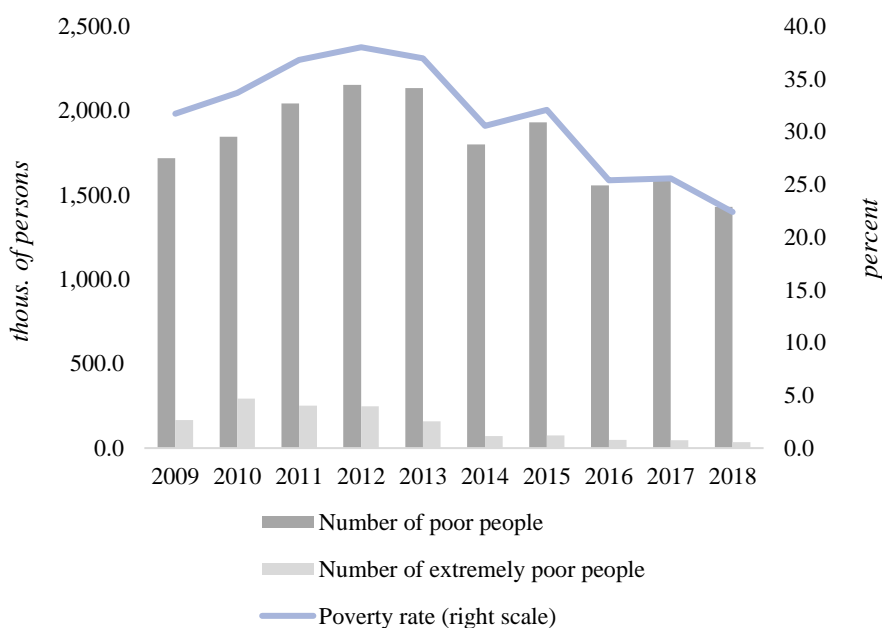
⁷ As of December 1, 2018

Chart 3. Number of employed people in the Kyrgyz Republic in 2009-2018



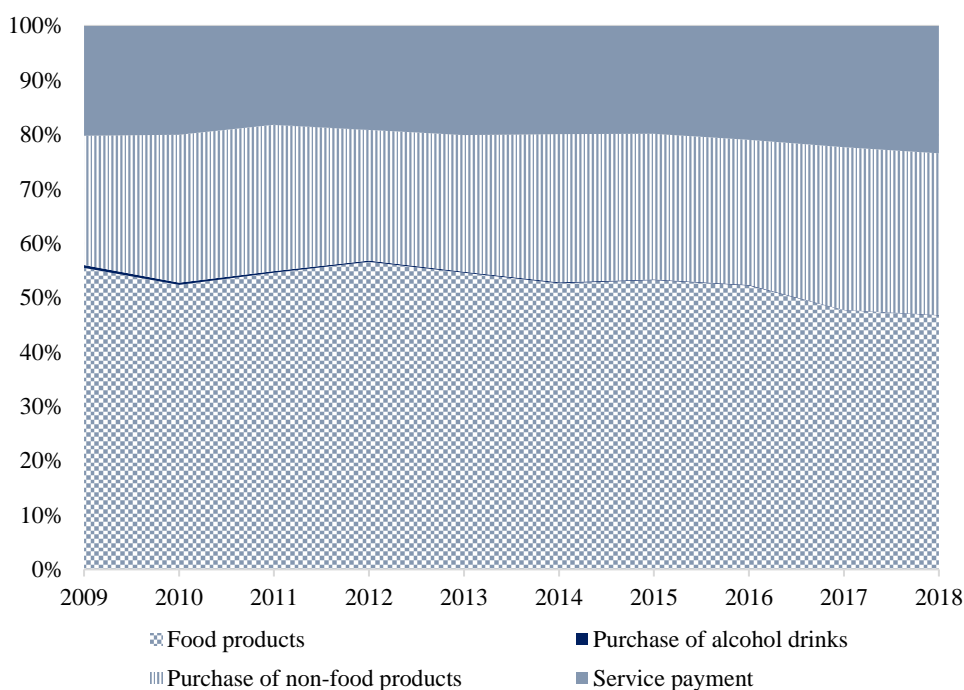
Source: National Statistical Committee of the Kyrgyz Republic

Chart 4. Poverty rate in the Kyrgyz Republic in 2009-2018



Source: National Statistical Committee of the Kyrgyz Republic

Chart 5. Structure of households average expenditures in the Kyrgyz Republic per month in 2007-2017



Source: National Statistical Committee of the Kyrgyz Republic

Chart 6. Aggregate default of urban households

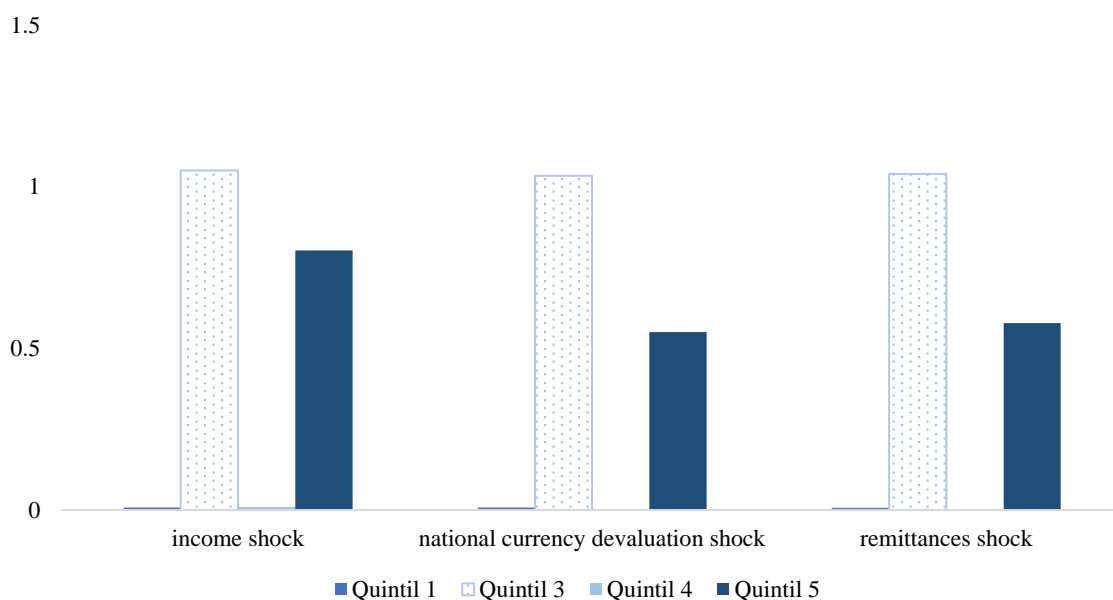


Chart 7. Aggregate default of rural households

