Risk rationing and agricultural credit demand in Kyrgyzstan: Evidence from life in Kyrgyzstan survey

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ABSTRACT

This study investigates the nature, causes, and behavioral effects of agricultural credit limits among rural households in Kyrgyzstan using nationally representative data from the 2019 Life in Kyrgyzstan (LiK) Survey. Despite recent growth in the domestic financial sector, formal credit remains difficult to obtain, especially for smallholder farmers. The analysis employs a direct elicitation methodology that categorizes families into four groups: unconstrained, quantity-rationed, price-rationed, and risk-rationed, to better capture both supply-side and demand-side restrictions. To identify the key variables associated with each type of constraint, a multinomial logit model is utilized. The findings reveal that risk rationing is the most prevalent form of credit exclusion, affecting approximately one-third of rural households. This indicates that borrowing decisions are more influenced by households' perceptions of risks, such as concerns about repayment, the threat of losing collateral, and limited trust in financial institutions, rather than merely the availability of credit. Additionally, the location of households significantly impacts the likelihood of quantity rationing. Exposure to adverse shocks notably increases the probability of credit limits among rural households, highlighting the importance of external factors in credit access issues.

Contribution/Originality: This study contributes to the existing literature by providing the first national-level evidence on rural credit constraints in Kyrgyzstan using the 2019 LiK survey. It employs a direct elicitation approach with multinomial logit estimation. It is among the few studies investigating risk rationing and documents that perceived risk, rather than credit supply, drives self-exclusion.

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1. INTRODUCTION

For rural development, access to finance is crucial. This facilitates investment, technology use, risk management, and corporate growth. However, households continue to be excluded from formal finance in many developing economies, not because credit is hard to obtain, but rather because borrowing is perceived as expensive or risky. This raises an important question: even when credit is available, why do rural households not borrow money?

In theory, efficient credit markets allocate funds to those with the most profitable opportunities. However, as Stiglitz and Weiss (1981) show, asymmetric information leads lenders to ration credit rather than raise interest rates. Later studies have extended this framework to agriculture, distinguishing between quantity, price, and risk premiums (Boucher, Barham, & Carter, 2009). Risk rationing occurs when farmers voluntarily avoid borrowing, fearing default or losing their collateral, recognising that constraints are not only shaped by supply but also by risk perception, limited financial literacy, and institutional mistrust. This issue remains particularly acute in Kyrgyzstan. Although agriculture employs about one-quarter of the workforce (World Bank, 2019), formal credit use remains limited. High interest rates, stringent collateral requirements, and the legal prohibition on using farmland as collateral restrict borrowing (Akramov & Omuraliev, 2009; Japan International Cooperation Agency Japan, 2014). Even where credit is available, many farmers avoid loans due to fear of repayment difficulties or mistrust toward financial institutions. As a result, a persistent gap has emerged between the supply of credit and actual participation, indicating that perceived risk, rather than credit scarcity, is the dominant barrier.

While previous studies in Kyrgyzstan and Central Asia have examined credit availability, lending costs, or institutional weaknesses, no research has systematically quantified the different types of credit rationing or distinguished between supply-driven and behavior-driven constraints using nationally representative data. This study fills that gap by applying the direct elicitation framework to the 2019 LiK survey, enabling the identification of risk, price, and quantity rationing and the analysis of their determinants through a multinomial logit model, thereby offering a more comprehensive explanation of why rural households self-exclude from formal credit markets despite an expanding financial sector. Although Kuhn and Bobojonov (2023) provide the first evidence on risk rationing in Kyrgyzstan, our study extends this work by using newer data, integrating a behavioral-institutional perspective, and employing a direct elicitation approach that captures both supply- and demand-side constraints. Together, these contributions demonstrate that the primary barrier to rural finance in Kyrgyzstan is not insufficient credit supply but the dominance of perceived risk, mistrust, and procedural complexity.

The remainder of this paper is organized as follows. Section 2 reviews the theoretical and empirical literature on credit constraints and risk rationing. Section 3 presents the conceptual framework and hypotheses. Section 4 describes the data and methodology. Section 5 reports and discusses the empirical results. Section 6 outlines policy implications, and Section 7 concludes the paper.

2. LITERATURE REVIEW

Development economists have long been fascinated by the connection between rural development and loan availability. Since its classic formulation by Stiglitz and Weiss (1981), credit rationing has been recognized as a fundamental market imperfection caused by information asymmetry, adverse selection, and moral hazard. In their model, lenders may prefer to ration credit rather than raise interest rates because higher rates attract riskier borrowers. This theoretical understanding has since shaped a large empirical literature examining how credit constraints constrain productivity and investment in smallholder agriculture (Conning & Udry, 2007).

Early empirical studies showed that credit market failures are particularly acute in agrarian economies, where production risks and weak enforcement mechanisms are prevalent (Bell, 1988; Eswaran & Kotwal, 1986; Kochar, 1997). When formal financial institutions require collateral that is inadequate for most small farms, borrowing is limited to a minority of relatively wealthy farmers (Feder, Lau, Lin, & Luo, 1990). Later work argued that even when credit is technically available, many potential borrowers are reluctant to take out loans because of the risk of default or loss of collateral, and a risk premium is set (Barham, Boucher, & Carter, 1996).

A major advance came from the "direct elicitation" approach, which classifies households into unconstrained, quantity-, price-, and risk-rationed groups based on their reported borrowing behavior (Ali, Deininger, & Duponchel, 2014; Guirkinger & Boucher, 2008; Jappelli, 1990). This method allows researchers to separate demand-side from supply-side constraints rather than inferring credit access indirectly from consumption patterns. Using this framework, estimated that removing credit constraints could increase Peruvian farmers' output by 15–32 percent, while Ali et al. (2014) found comparable productivity gains of 17 percent for Rwanda. Similar evidence of losses due to credit standards has been documented in Tunisia (Foltz, 2004), Ethiopia (Ali & Deininger, 2012), and Mexico (Verteramo, Khantachavana, & Turvey, 2014).

In a more comprehensive theoretical literature, Carter and Olinto (2003) relate credit limits to poverty traps: households turn to low-income, risk-averse methods to survive when they are unable to fund profitable investments. According to recent behavioral models, borrowing decisions are influenced by structural factors as well as perceived risk, lack of confidence, and low financial literacy (Boucher et al., 2009; Giné & Yang, 2009). Empirical studies in Asia confirm that these mechanisms extend beyond Africa. In Vietnam, Dang, Dam, Pham, and Nguyen (2020) compared multinomial logit and machine learning methods to explain credit participation and found that collateral, farm size, income, lending procedures, and financial literacy were the key factors.. In Malawi, access to microfinance did not necessarily improve farm income because high risk and monitoring costs persisted (Diagne & Zeller, 2001).

In Central Asia's transition economies, rural credit markets face increased complexity. Land fragmentation and inadequate property rights have decreased the collateral value of farmland after the collapse of collective farms

(Mogilevskii, Abdrazakova, Bolotbekova, Chalbasova, & Tilekeyev, 2017; Pomfret, 2016). The majority of farms in Kyrgyzstan operate on less than two hectares, which limits scale efficiency in a country where agriculture employs 25% of the labor force (World Bank, 2019). Credit is dominated by commercial banks and microfinance institutions charging high interest rates of 22–39% (Akramov & Omuraliev, 2009; Japan International Cooperation Agency Japan, 2014). The effectiveness of such credit programs depends heavily on the capacity of local financial institutions (Karymshakov, Sultakeev, & Sulaimanova, 2015). Because agricultural land cannot serve as collateral, farmers often pledge homes or livestock, increasing risk. Recent evidence shows that risk rationing, driven by fear of default and mistrust of lenders, is the main barrier to borrowing (Kuhn & Bobojonov, 2023), confirming that credit availability alone cannot ensure participation when informal insurance substitutes formal finance (Verteramo et al., 2014). Additional evidence from Kyrgyzstan reinforces the importance of risk in household decision-making. Sultakeev and Petrick (2025) show that responses to severe winter shocks differ sharply by wealth: wealthier households sell livestock to smooth consumption, while poorer households avoid distress sales to protect their limited assets even at the cost of reduced food intake. This poverty-trap dynamic demonstrates how shock exposure and susceptibility influence financial behavior and may deter people from taking out loans.

Microfinance institutions (MFIs) were supposed to take over for commercial banks in Kyrgyzstan, but their operations are still focused on cities, and short-term consumer loans continue to be the most common (Akramov & Omuraliev, 2009). Empirical work using the Life in Kyrgyzstan (LiK) study in Kyrgyzstan shows that rural credit is often directed towards housing or daily living expenses, rather than productive investment (Muktarbek, Seyitov, & Jenish, 2016). This suggests that supply-side expansion alone cannot ensure credit utilization for growth. Behavioral economics highlights the importance of information, social norms, and trust in addition to structural limitations. Giné and Karlan (2014) show that exposure to insurance products and transparent communication can change borrowing behavior. Risk-taking is increased in the Kyrgyz setting due to insufficient financial literacy and a lack of knowledge about lending terms.

When these results are combined, three recurring motifs emerge. First, access to credit is multifaceted; participation requires alignment of fund availability, affordability, and perceived safety. Second, risk and trust dominate decision-making in environments with weak enforcement and volatile returns. Third, information and financial capability significantly influence how households interpret and respond to credit opportunities. This body of literature provides a strong conceptual foundation for examining Kyrgyzstan's case. The coexistence of formal supply and low participation points to demand-side constraints that are largely behavioral rather than purely structural. Consequently, the present study situates Kyrgyz rural credit within the broader theoretical evolution from equilibrium credit rationing (Stiglitz & Weiss, 1981) to behavioral risk rationing (Kuhn & Bobojonov, 2023), bridging the gap between institutional economics and household finance in transition contexts.

The influence of spatial inequality and behavioral characteristics plays an important role in shaping rural lending outcomes. Trust in financial institutions can substantially increase loan uptake in rural areas, while improved digital access helps reduce information and knowledge gaps in credit decision-making. In Central Asia, geographic isolation and weak infrastructure continue to pose significant barriers to financial inclusion (Kuhn & Bobojonov, 2023). Building on these insights, the present study tests the following hypotheses: H1: Households located farther from main roads or agricultural markets are more likely to experience quantity rationing, as remoteness increases transaction costs and reduces lender outreach. H2: Asset ownership (such as cars, tractors, or mobile phones) reduces the likelihood of risk and price rationing because greater wealth and information access increase borrowing capacity and lender confidence. H3: Exposure to environmental or economic shocks increases the probability of risk and quantity rationing, as shocks elevate household vulnerability and perceived borrowing risk. H4: Household demographic characteristics, particularly higher dependency ratios and male-headed households, are associated with a greater likelihood of risk rationing, while female-headed households are less likely to self-exclude from borrowing.

3. CONCEPTUAL FRAMEWORK

This study adopts the direct elicitation approach developed by Boucher et al. (2009) and further applied by Ali et al. (2014) and Verteramo et al. (2014) to identify the nature of credit constraints among rural households. This approach recognizes that farmers' participation in credit markets involves a sequence of decisions influenced by both institutional access and behavioral perceptions of risk.

Under imperfect credit markets, households face a two-stage decision process. In the first stage, they decide whether to apply for a loan. In the second stage, if they apply, lenders determine the approval outcome and the amount disbursed. Non-applicants are also asked about their reasons for not applying. The combination of these responses allows households to be classified into four mutually exclusive categories: unconstrained, quantity rationed, price rationed, and risk rationed.

1. Unconstrained households are those that either did not need external credit or received the full loan amount they requested and expressed no further borrowing desire.
2. Quantity-rationed households are those whose loan applications were rejected or only partially approved, or those who refrained from applying because they believed they lacked sufficient collateral.
3. Price-rationed households chose not to borrow because they found interest rates or transaction costs too high to make borrowing worthwhile.
4. Risk-rationed households voluntarily avoided borrowing because they feared default, collateral loss, or social consequences associated with debt.

Figure 1, which displays the conceptual decision tree modified from the previously discussed studies and summarizes the sequence of household credit decisions.
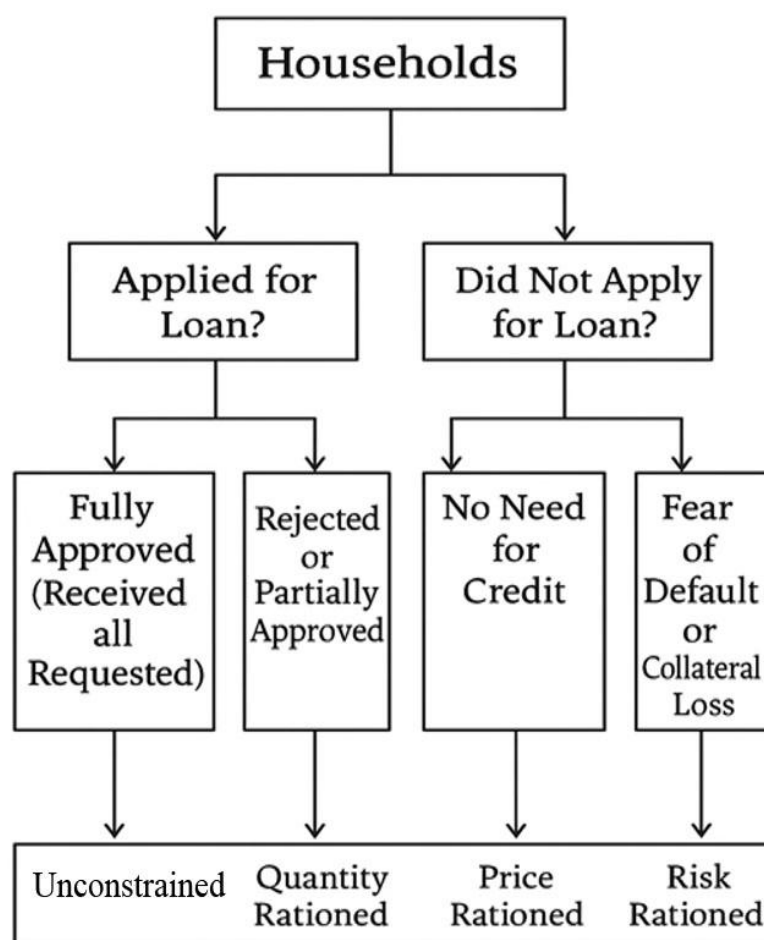

Figure 1. Participation in the credit market conceptual framework.
Source: Boucher et al. (2009), Ali et al. (2014), and Verteramo et al., (2014).

The figure depicts how households are classified based on their responses to loan applications and borrowing decisions. Those who apply for credit and receive full approval are labeled unconstrained, while rejected or partially approved applicants fall under quantity rationing. Among non-applicants, those reporting 'no need for credit' are price rationed, whereas those citing fear of default or collateral loss are risk rationed.

This approach incorporates ideas from behavioral finance, which highlights how perceived risk and trust influence borrowing behavior, and the credit market defects model of Stiglitz and Weiss (1981) in which lenders restrict credit because of moral hazard and adverse selection. High borrowing rates, stringent collateral requirements, and low financial literacy all exacerbate these dynamics in Kyrgyzstan (Akramov & Omuraliev, 2009; Japan International Cooperation Agency Japan, 2014; Pomfret, 2016).

As a result, many farmers self-exclude not because loans are unavailable but because they perceive borrowing as unsafe or overly complex, a phenomenon consistent with risk rationing (Kuhn & Bobojonov, 2023).

By distinguishing between applicants and non-applicants and between voluntary and involuntary exclusion, this model provides a more nuanced understanding of credit access. It enables empirical testing of whether the main constraint in rural Kyrgyzstan arises from supply-side barriers (collateral, cost) or demand-side deterrents (fear, mistrust, and complexity). The framework also forms the empirical basis for the multinomial logit model estimated in this paper, where the dependent variable represents one of the four credit constraint categories derived from the LiK 2019 survey responses.

This study hypothesizes that a substantial share of Kyrgyz farm households remains risk-rationed despite the apparent supply of credit. This reflects persistent perceptions of high contractual risk, low institutional trust, and procedural burdens in formal lending systems. By empirically identifying these constraint categories, the research seeks to inform policies that expand not only credit availability but also borrower confidence and institutional transparency.

4. DATA AND METHODOLOGY

This study investigates the determinants of rural households' credit constraint status using a multinomial logit (MNL) model. Unlike earlier work on Kyrgyzstan, most notably Kuhn & Bobojonov (2023), who used hierarchical regression to study credit applications and uptake, this paper directly classifies households into four explicit types of

credit rationing using the direct elicitation framework of Boucher et al. (2009). This approach allows us to distinguish between supply-driven constraints (Quantity rationing) and behaviorally driven constraints (Price and risk rationing), which previous studies in Central Asia did not measure systematically. Furthermore, we utilize the most recent nationally representative LiK 2019 data, enabling an updated analysis of rural credit behavior during a period of expanded financial services.

4.1. Multinomial Logit Model and Dependent Variable

We estimate a multinomial logit model to analyze the determinants of rural households' credit constraint status. The dependent variable C_i takes four mutually exclusive values: $C_i = 0$ for unconstrained households (base category), $C_i = 1$ for quantity rationed, $C_i = 2$ for price rationed, and $C_i = 3$ for risk rationed. X_i denotes the vector of explanatory variables. The probability that household i belongs to category j is given by the standard multinomial logit formulation.

$$\Pr(Y_i = j) = \frac{\exp(X_i\beta_j)}{1 + \sum_{k=1}^{3} \exp(X_i\beta_k)}, \quad j = 1, 2, 3 \tag{1}$$

The unconstrained category (j=0) is the base outcome, with coefficients normalized to zero.

4.2. Independent Variables

All covariates included in the model align with the theoretical literature on credit rationing and the structure of rural credit markets in Kyrgyzstan. The vector X_i includes variables capturing.

4.2.1. Wealth and Asset Endowments (Supply-Side Factors)
- Distance to main road (km).
- Distance to agricultural market (km).
- Car ownership.
- Tractor ownership.
- Households' access to mobile phones.

4.2.2. Demographic Characteristics
- Household size.
- Number of children.
- Dependency ratio.
- Gender composition.
- Age.
- Gender.

4.2.3. Shocks and Risk Exposure (Demand-Side Factors)
- Drought, flood, cold winter, landslide.
- Water shortages.
- Death or illness of household members.

These variables represent both credit supply constraints (e.g., collateral, remoteness) and behavioral constraints (e.g., fear of default, vulnerability to shocks, risk exposure).

By jointly estimating these determinants, the Multinomial Logit (MNL) model provides a comprehensive assessment of why households in Kyrgyzstan may self-exclude from credit markets, even when formal credit is available.

Table 1. Application to take a loan.

Application	Number of Households	Percentage (%)
Yes	393	16.97
No	1,835	79.23
Don't know	88	3.80
Total	2,316	100.00

Source: Life in Kyrgyzstan Survey data 2019.

5. DESCRIPTIVE STATISTICS AND ECONOMETRIC RESULTS

5.1. Descriptive Statistics

Table 1 shows that only 16.97% of surveyed households reported having household members who applied for a loan in the past 12 months, while 79.2% did not apply. A small proportion (3.8%) were unable or unwilling to recall. Despite official initiatives to increase financial inclusion, this research highlights the generally low penetration of formal or informal credit products among rural households in Kyrgyzstan. These results align with previous research on loan limitations in Kyrgyzstan (Kuhn & Bobojonov, 2023) and similar transition countries. For instance, Boucher et al. (2009) and Verteramo et al. (2014) emphasize that risk rationing often outweighs quantity rationing, as borrowers

refrain from applying due to fears of collateral loss and inability to repay in volatile agricultural settings. This is in line with Mogilevskii et al. (2017) and Pomfret (2016) who document persistent low uptake of credit in Kyrgyzstan.

Table 2. Sources of borrowed credit.

Source of credit	Number of borrowers	Percentage (%)
Private person	6	1.83
Commercial bank	185	56.57
Commercial organization	7	2.14
Microcredit agency	97	29.66
Credit union	22	6.73
Other sources	7	6.0
Don't know	3	0.92
Total borrowers	327	100.0

Note: This table includes only households that borrowed in the past 12 months.
Source: Life in Kyrgyzstan Survey data 2019.

Table 2 presents only households that borrowed in the past 12 months. Among borrowers, the majority (56.6%) took loans from commercial banks, indicating that formal banks are the main source of credit1. Microcredit agencies were the second most common source (29.7%), while credit unions (6.7%) and other sources played minor roles. Very few households (1.8%) relied on private persons for borrowing. Overall, most rural credit came from regulated financial institutions rather than informal lenders.

This highlights the dominant role of commercial banks (57%) and microfinance institutions (30%) as sources of credit, echoing Angioloni, Kudabaev, Ames, and Wetzstein (2018) who note high transaction costs and collateral constraints in formal banking channels.

In rural Kyrgyzstan, credit is primarily used for housing and consumption rather than company investment, as seen by the distribution of loan reasons in Figure A1.

While the majority of borrowers financed housing (19.9%), everyday costs (15.9%), and social duties (7.3%), only a tiny percentage used loans to launch a business (6.4%) or purchase agricultural gear (1.5%).

This suggests that credit primarily helps meet immediate needs rather than drive income growth or farm modernization.

Table 3. Summary statistics for loan conditions.

Variable	Mean	Standard deviation	Minimum	Maximum
Loan amount (KGS)	155,317	234,844	5000	2,000,000
Outstanding balance (KGS)	68,657	113,110	0	1,000,000
Annual interest rate (%)	22.57%	8.43	0	38

Note: Only households reporting a loan were included in this table. KGS = Kyrgyz som.
Source: Life in Kyrgyzstan Survey data 2019.

Table 3 presents substantial heterogeneity in loan conditions among Kyrgyz households with loans in 2019. The average loan amount is KGS 155,317, with a wide range from KGS 5,000 to KGS 2,000,000, indicating large differences in borrowing levels.

Outstanding balances average KGS 68,657, suggesting that many households had already repaid part or all of their loans, while others still carried significant debt. The mean annual interest rate of 22.6%, ranging up to 38%, reflects the high cost of borrowing and variation in credit sources, including formal, informal, and possibly subsidized loans.

The combined assets of banks and non-bank financial and credit organizations (NBFOs) accounted for 60.6% of GDP in the first half of 2024, as shown in Figure A2, indicating a reasonably advanced and dynamic financial sector for an emerging economy. However, the entire loan portfolio only made up 25.0% of GDP, indicating that there remains a sizable unmet credit demand, particularly in the infrastructure, agriculture, and small and medium-sized business (SMEs) sectors.

Notably, banks held 86% of the total loan portfolio, underscoring their dominant role in credit provision. The comparatively limited contribution of NBFOs points to opportunities for policy interventions to strengthen and diversify the financial sector.

Expanding the capacity of NBFOs could help broaden access to credit and better meet the financing needs of underserved households and businesses.

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1 The number of commercial banks remains constant at 23 throughout the five years (2020–2024). This indicates a mature banking sector. The number of microfinance institutions has declined, from 134 in 2020 to 113 in 2024. Similarly, there has been a decline in the number of credit unions, from 93 in 2020 to 79 in 2024. This may be due to a decline in membership, increased competition, or operational difficulties. Overall, commercial banking remains stable, while the number of microfinance institutions and credit unions has declined. Since microfinance institutions play an important role in promoting financial inclusion in underserved areas, a larger presence of these institutions would facilitate the flow of credit to rural areas. For more details, see Table A1 in the appendix.

Table 4. Classification of households by credit constraint status.

Credit Constraint	N	Percent	Interpretation	LiK response in h244 question
Unconstrained	427	23.27%	Have adequate collateral or savings	Never needed any credit
Risk rationed	873	47.57%	Avoided borrowing due to fear of default, distrust, or religious aversion	Too risky to take credit and religious reasons
Price rationed	428	23.32%	Discouraged by high interest rates or fees	The interest rate was too high
Quantity rationed	107	5.83%	Formally rejected due to collateral or credit limits	No collateral
Total	1835	100%		

Note: Unconstrained households either reported never needing credit or cited religious reasons for not borrowing. Quantity rationed households did not apply because they lacked collateral. Price rationed households did not apply due to high interest rates. Risk-rationed households avoided borrowing due to fear of default or collateral loss.

Source: Life in Kyrgyzstan Survey data 2019.

Table 4 presents the recoded results from question H244 into four credit constraint categories are based on the direct elicitation framework by Boucher et al. (2009). According to the results of this research, 47.6% of rural households in Kyrgyzstan are risk-averse, meaning they purposefully refrain from taking out loans for moral and religious reasons, fear of default, or collateral loss. A comparable percentage of households (23.3%) are unconstrained, indicating no perceived need for credit, whereas one in four households (23.3%) is price rationed, discouraged from taking out loans due to high interest rates. Only a small fraction (5.8%) are quantity rationed, unable to borrow because they lack sufficient collateral. Overall, these results suggest that risk perception and mistrust, rather than limited credit supply, are the primary barriers preventing rural households from participating in formal credit markets. Descriptive statistics of the independent variables by credit rationing categories are presented in Appendix A2. Quantity-rationed households are the most disadvantaged: they live farthest from main roads and markets and report the lowest ownership of cars, tractors, and mobile phones, indicating limited collateral and weak physical access to lenders. Risk- and price-rationed households are relatively similar, with moderate asset ownership and better spatial access but continued reluctance to borrow due to perceived risks or high costs. Demographic characteristics and shock exposure vary little across groups, suggesting that remoteness and asset scarcity, rather than household composition or recent shocks, primarily distinguish quantity rationing from other forms of credit constraint (see Appendix A2)

5.2. Econometric Results

The regression results in Table 5 show that households located farther from main roads are more likely to face quantity rationing, indicating that remoteness constrains access to credit. Owning a car dramatically lowers the likelihood of being risk- and quantity-rationed, but owning a mobile phone somewhat lowers the likelihood of risk-rationing, indicating the beneficial influence of assets and information availability. Families headed by women are less likely to be risk-rationed than those headed by men. Floods and household deaths are two shocks that increase the likelihood of risk rationing and quantity rationing, respectively.

Other factors, such as education, household size, and age, show no significant effects, suggesting that asset ownership, gender, and exposure to shocks are the main determinants of credit rationing types.

Table 5. Multinomial logit regression results for risk, price, and quantity rationing.

Variables	Risk Rationing		Price Rationing		Quantity Rationing	
	Mprobit (SE)	Marginal Effects(SE)	Mprobit (SE)	Marginal Effects(SE)	Mprobit (SE)	Marginal Effects (SE)
Distance to main road	-0.309** (0.143)	0.044 (0.077)	0.0715 (0.136)	0.208* (0.082)	0.0426 (0.249)	0.450*** (0.110)
Distance to the agricultural market	-0.00602 (0.0109)	-0.015** (0.005)	0.0108 (0.0108)	-0.006 (0.006)	-0.0143 (0.0288)	-0.009 (0.010)
Car	-1.092*** (0.299)	-0.677*** (0.123)	-1.015*** (0.343)	-0.705*** (0.143)	-16.03 (636.7)	-1.652*** (0.280)
Tractor	0.942 (1.166)	0.722 (0.513)	0.788 (1.281)	0.322 (0.610)	4.079** (1.868)	0.355 (1.113)
Mobile phones	0.0484 (0.109)	0.032 (0.044)	-0.104 (0.124)	0.076 (0.050)	-0.501 (0.309)	-0.049 (0.087)
Household size	0.162** (0.0717)	0.120*** (0.032)	0.202** (0.0788)	0.118** (0.036)	0.0319 (0.163)	0.164** (0.055)
Children	-0.0341 (0.187)	-0.032 (0.078)	0.108 (0.208)	0.105 (0.090)	0.366 (0.412)	0.004 (0.142)
Dependent	-0.512 (0.387)	-0.310* (0.148)	-0.150 (0.431)	-0.086 (0.173)	0.437 (0.889)	-0.185 (0.277)

Variables	Risk Rationing		Price Rationing		Quantity Rationing	
	Mprobit (SE)	Marginal Effects(SE)	Mprobit (SE)	Marginal Effects(SE)	Mprobit (SE)	Marginal Effects (SE)
Female share	–0.618 (0.929)	–0.098 (0.416)	1.030 (1.077)	1.219* (0.504)	0.338 (2.017)	0.961 (0.787)
Male share	0.816 (0.969)	–0.185 (0.406)	0.655 (1.159)	0.908 (0.488)	1.089 (2.044)	–0.486 (0.830)
Gender	0.129 (0.335)	–0.062 (0.134)	–0.0929 (0.390)	–0.096 (0.156)	0.306 (0.714)	–0.414 (0.261)
Age	0.0114 (0.0150)	0.001 (0.005)	0.00355 (0.0171)	–0.004 (0.006)	–0.0392 (0.0295)	–0.005 (0.010)
Death	0.0894 (0.367)	0.114 (0.298)	0.0253 (0.419)	0.192 (0.342)	0.286 (0.695)	0.313 (0.512)
Cold winter	0.284 (0.412)	0.089 (0.370)	–0.780 (0.559)	–0.749 (0.527)	0.975 (0.838)	0.120 (0.706)
Flood	0.488 (0.599)	0.225 (0.552)	–0.307 (0.802)	–0.550 (0.766)	–14.68 (1,664)	–12.888 (518.278)
Drought	–0.0129 (0.331)	–0.074 (0.278)	–0.309 (0.381)	–0.086 (0.320)	0.0188 (0.759)	–0.511 (0.583)
Illness	0.332 (0.384)	0.238 (0.332)	0.192 (0.429)	0.269 (0.374)	1.237* (0.737)	0.474 (0.543)
Insufficient water	0.0554 (0.354)	–0.059 (0.319)	0.0433 (0.400)	0.180 (0.357)	–1.232 (1.137)	–1.568 (1.058)
Landslides	0.0662 (1.229)	0.083 (1.152)	–0.758 (1.531)	–0.356 (1.444)	–14.33 (3,121)	–12.911 (1102.936)
Constant	–0.275 (0.988)	0.646 (0.403)	–1.095 (1.134)	–0.990* (0.477)	0.114 (2.002)	–1.193 (0.747)

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

6. DISCUSSION

The results demonstrate that risk rationing is the primary barrier to credit participation among rural households in Kyrgyzstan, indicating that behavioral and informational frictions outweigh simple supply constraints. According to studies conducted in Ethiopia (Ali & Deininger, 2012) and Rwanda (Ali et al., 2014) households with greater asset holdings, especially car ownership, are consistently less likely to encounter risk or quantity rationing, suggesting that wealth and mobility reduce perceived vulnerability. Female-headed households are less likely to experience risk rationing, suggesting that gendered decision-making roles and household structures shape borrowing behavior in the Kyrgyz context, consistent with evidence on risk rationing from rural credit markets in the country.

Physical access and infrastructure continue to be important determinants of financial inclusion, as evidenced by recent studies conducted in Vietnam (Dang et al., 2020). Increased distance to major roads also significantly increases quantity rationing.

Low expected returns, price volatility, and missing insurance markets increase perceived production and repayment risks, leading households to channel credit toward consumption smoothing rather than productive investment. This behavior is documented in Kyrgyzstan (Muktarbek et al., 2016) and mirrors evidence from Mexico showing that credit expansion without risk-mitigation mechanisms fails to induce investment (Verteramo et al., 2014).

7. CONCLUSION

This study provides new nationally representative evidence on the determinants of credit rationing among rural households in Kyrgyzstan using a direct elicitation framework and a multinomial logit model. The results show that risk rationing is the dominant constraint, affecting nearly half of non-borrowing households. Exposure to shocks, higher dependency ratios, and remoteness increase the likelihood of being rationed, whereas ownership of assets such as cars and mobile phones lowers it. Quantity rationing plays a comparatively minor role, indicating that self-exclusion driven by perceived risk and mistrust, rather than credit supply, is the primary barrier to credit participation.

The findings suggest that improving credit access requires interventions beyond loan supply expansion. Priority areas include.

- Risk-mitigation instruments (Agricultural insurance, guarantee schemes).
- Simplifying lending procedures to reduce perceived procedural risk.
- Strengthening institutional trust through transparency and consistent enforcement.
- Targeted financial literacy programs that improve understanding of loan terms and repayment risks.
- Infrastructure improvements to reduce spatial barriers to credit access.

- Self-reported views of borrowing limits are included in the analysis, which may contain subjective biases. In addition, the cross-sectional structure makes it more challenging to capture how borrowing behavior changes dynamically after repeated shocks.

More research should examine how social capital, religious or cultural norms, and unofficial risk-sharing networks influence rural borrowing decisions.

REFERENCES

Akramov, K. T., & Omuraliev, N. (2009). *Institutional change, rural services, and agricultural performance in Kyrgyzstan.* IFPRI Discussion Paper No. 914, International Food Policy Research Institute.

Ali, D. A., & Deininger, K. (2012). *Causes and implications of credit rationing in rural Ethiopia: The role of risk and transaction costs.* Policy Research Working Paper No. 6096 World Bank.

Ali, D. A., Deininger, K., & Duponchel, M. (2014). Credit constraints and agricultural productivity: Evidence from rural Rwanda. *Journal of Development Studies, 50*(5), 649-665. https://doi.org/10.1080/00220388.2014.887687

Angioloni, S., Kudabaev, Z., Ames, G. C. W., & Wetzstein, M. (2018). Household allocation of microfinance credit in Kyrgyzstan. *Post-Communist Economies, 30*(1), 78-98. https://doi.org/10.1080/14631377.2017.1361691

Barham, B. L., Boucher, S., & Carter, M. R. (1996). Credit constraints, credit unions, and small-scale producers in Guatemala. *World Development, 24*(5), 793–806. https://doi.org/10.1016/0305-750X(96)00001-0

Bell, C. (1988). Credit markets and interlinked transactions. In H. Chenery & T. N. Srinivasan (Eds.), Handbook of Development Economics. In (Vol. 1, pp. 763–830). Amsterdam, Netherlands: Elsevier.

Boucher, S. R., Barham, B. L., & Carter, M. R. (2009). The impact of land ownership and credit constraints on the adoption of new technology in rural Nicaragua. *World Development, 37*(4), 829-842.

Carter, M. R., & Olinto, P. (2003). Getting institutions "right" for whom? Credit constraints and the impact of property rights on the quantity and composition of investment. *American Journal of Agricultural Economics, 85*(1), 173-186. https://doi.org/10.1111/1467-8276.00111

Conning, J., & Udry, C. (2007). Rural financial markets in developing countries. In R. Evenson & P. Pingali (Eds.), Handbook of Agricultural Economics. In (Vol. 3, pp. 2857–2908). Amsterdam, Netherlands: Elsevier.

Dang, H. D., Dam, A. H. T., Pham, T. T., & Nguyen, T. M. T. (2020). Determinants of credit demand of farmers in Lam Dong, Vietnam: A comparison of machine learning and multinomial logit. *Agricultural Finance Review, 80*(2), 255-274. https://doi.org/10.1108/AFR-06-2019-0061

Diagne, A., & Zeller, M. (2001). *Access to credit and its impact on welfare in Malawi.* IFPRI Research Report No. 116 International Food Policy Research Institute.

Eswaran, M., & Kotwal, A. (1986). Access to capital and agrarian production organisation. *The Economic Journal, 96*(382), 482-498. https://doi.org/10.2307/2233128

Feder, G., Lau, L. J., Lin, J. Y., & Luo, X. (1990). The relationship between credit and productivity in Chinese agriculture: A microeconomic model of disequilibrium. *American Journal of Agricultural Economics, 72*(5), 1151-1157. https://doi.org/10.2307/1242524

Foltz, J. D. (2004). Credit market access and profitability in Tunisian agriculture. *Agricultural Economics, 30*(3), 229-240. https://doi.org/10.1111/j.1574-0862.2004.tb00191.x

Giné, X., & Karlan, D. (2014). Group versus individual liability: A field experiment in the Philippines. *Journal of Political Economy, 122*(1), 1–37.

Giné, X., & Yang, D. (2009). Insurance, credit, and technology adoption: Field experimental evidence from Malawi. *Journal of Development Economics, 89*(1), 1–11. https://doi.org/10.1016/j.jdeveco.2008.09.007

Guirkinger, C., & Boucher, S. R. (2008). Credit constraints and productivity in Peruvian agriculture. *Agricultural Economics, 39*(3), 295-308. https://doi.org/10.1111/j.1574-0862.2008.00334.x

Japan International Cooperation Agency Japan. (2014). *Data collection survey on agricultural finance in the Kyrgyz Republic.* Japan: International Cooperation Agency.

Jappelli, T. (1990). Who is credit constrained in the U.S. economy? *The Quarterly Journal of Economics, 105*(1), 219-234. https://doi.org/10.2307/2937826

Karymshakov, K., Sultakeev, K., & Sulaimanova, B. (2015). *The impact of microfinance on entrepreneurship in Kyrgyzstan.* Proceedings of the International Conference on Eurasian Economies 2015 (pp. 176–181). Bishkek, Kyrgyzstan.

Kochar, A. (1997). An empirical investigation of rationing constraints in rural credit markets in India. *Journal of Development Economics, 53*(2), 339-371. https://doi.org/10.1016/S0304-3878(97)00020-5

Kuhn, L., & Bobojonov, I. (2023). The role of risk rationing in rural credit demand and uptake: Lessons from Kyrgyzstan. *Agricultural Finance Review, 83*(1), 1-20. https://doi.org/10.1108/AFR-04-2021-0039

Mogilevskii, R., Abdrazakova, N., Bolotbekova, A., Chalbasova, S., & Tilekeyev, K. (2017). *The outcomes of agrarian reform in Kyrgyzstan.* Institute of Public Policy and Administration Working Paper No. 41, University of Central Asia.

Muktarbek, K. A., Seyitov, T., & Jenish, N. (2016). *Remittances and expenditure patterns of households in the Kyrgyz Republic.* Retrieved from https://ssrn.com/abstract=2733425

Pomfret, R. (2016). *The economies of Central Asia.* United States: Princeton University Press.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review, 71*(3), 393-410.

Sultakeev, K., & Petrick, M. (2025). Harsh winter shocks and distress sales: Consumption and asset smoothing among livestock farmers in Kyrgyzstan. *Journal of International Development, 37*(7), 1421-1440. https://doi.org/10.1002/jid.70011

Verteramo, C. L. J., Khantachavana, S. V., & Turvey, C. G. (2014). Risk rationing and the demand for agricultural credit: A comparative investigation of Mexico and China. *Agricultural Finance Review, 74*(2), 248–270. https://doi.org/10.1108/AFR-05-2014-0011

World Bank. (2019). *Kyrgyz republic: Agriculture and rural development overview.* USA: World Bank Group.

Appendix

Table A1. The number of financial institutions in Kyrgyzstan during the last five years.

Financial institutions	2020	2021	2022	2023	2024
Commercial banks	23	23	23	23	23
Other financial companies, incl.					
Microfinance organizations, incl.	134	134	130	129	113
— Microcredit companies	87	87	85	86	68
— Microcredit agencies	38	38	35	34	35
— Microfinance Companies	9	9	10	9	10
Specialized financial-credit organizations	1	1	1	1	1
Credit Bureaus	2	2	2	2	2
Credit Unions	93	91	86	83	79

Source: NBKR, 2024. Report on the stability of the economic sector of the Kyrgyz Republic.
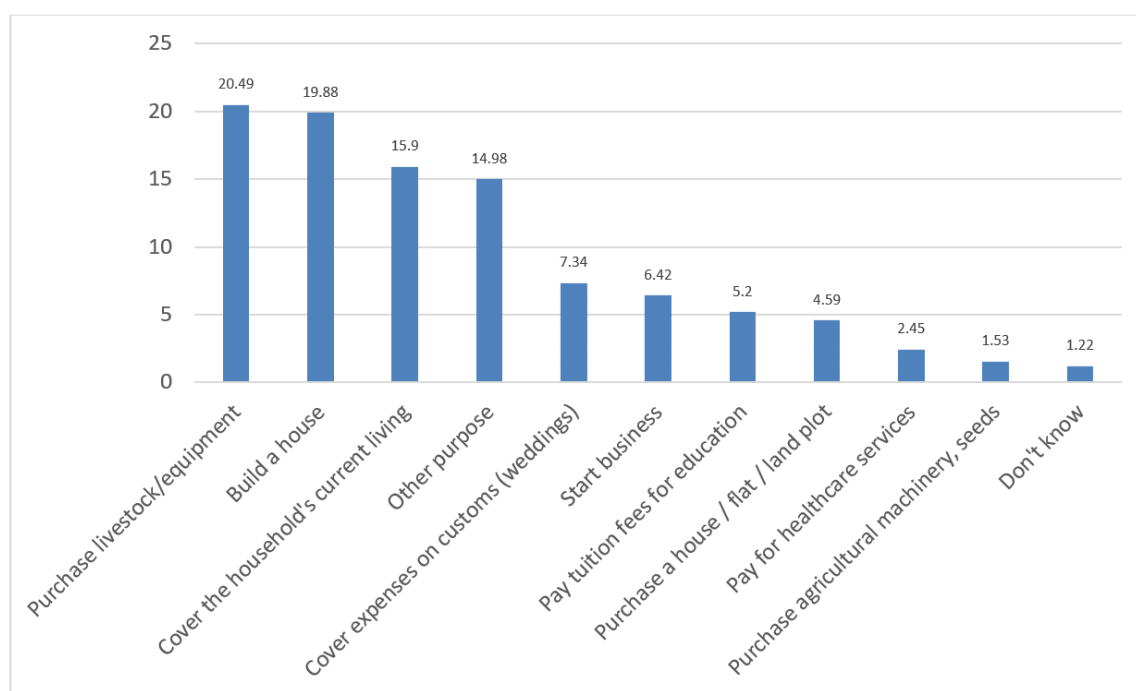

Figure A1. Main Purposes of Loans.

Note: Responses are based on H240 (main purpose of the loan).
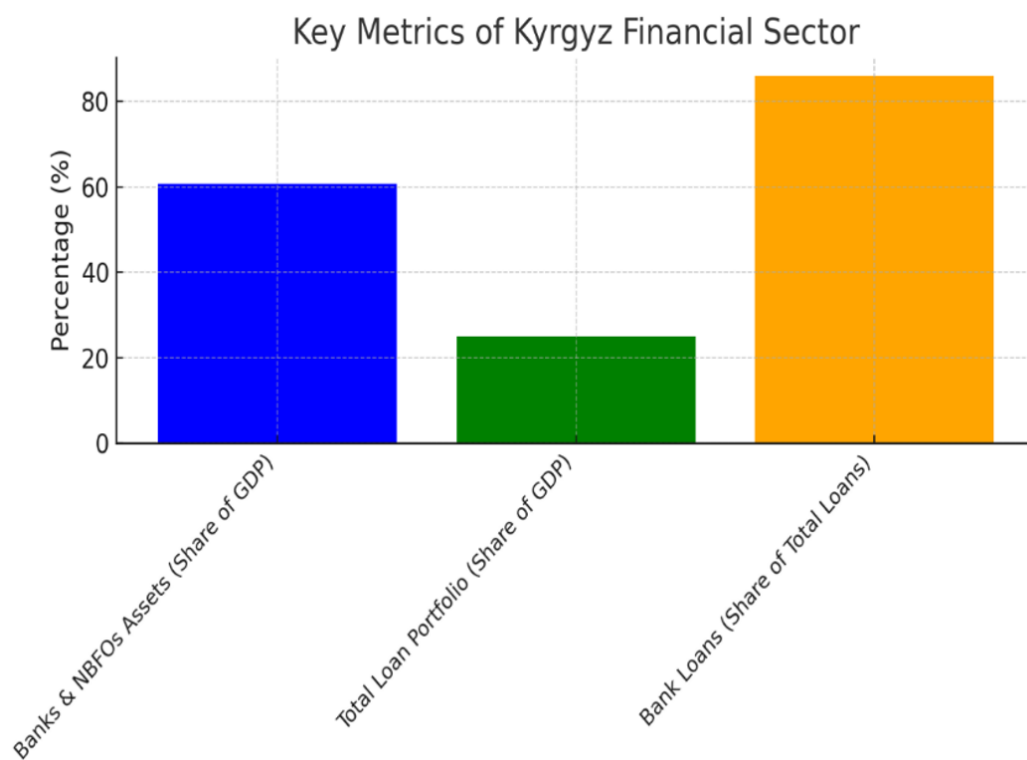**Source:** Life in Kyrgyzstan Survey data 2019.

Figure A2. Structure of the credit portfolio in 2024 for Kyrgyzstan.
Source: NBKR, 2024. Report on the stability of the economic sector of the Kyrgyz Republic.

Table A2. Summary statistics of independent variables by credit rationing category (Risk, price and quantity rationing).

Independent Variables	Risk				Price				Quantity			
	Mean	Count	Min.	Max.	Mean	Count	Min.	Max.	Mean	Count	Min.	Max.
Distance to main road	0.69	865	0.01	8	0.83	420	0.01	6	1.06	101	0.01	6
Distance to agricultural market	5.98	865	0.05	80	7.30	420	0.1	80	7.41	101	0.1	45
Car	0.40	865	0	3	0.41	420	0	2	0.19	101	0	1
Tractor	0.02	865	0	2	0.01	420	0	1	0.01	101	0	1
Mobile phones	2.32	865	0	12	2.46	420	0	17	2.04	101	0	10
Household size	5.83	865	1	20	5.95	420	1	16	5.86	101	1	14
Children	1.05	865	0	6	1.10	420	0	7	1.14	101	0	3
Dependent	0.30	865	0	3	0.28	420	0	2	0.30	101	0	2
Female share	0.30	865	0	1	0.31	420	0	1	0.31	101	0	1
Male share	0.28	865	0	1	0.30	420	0	1	0.27	101	0	0.6
Gender	1.36	865	1	2	1.34	420	1	2	1.32	101	1	2
Age	53.59	865	6	93	53.39	420	20	87	52.42	101	20	89
Death	0.04	865	0	1	0.05	420	0	1	0.05	101	0	1
Cold winter	0.03	865	0	1	0.01	420	0	1	0.02	101	0	1
Flood	0.01	865	0	1	0.01	420	0	1	0	101	0	0
Drought	0.05	865	0	1	0.05	420	0	1	0.03	101	0	1
Illness	0.04	865	0	1	0.04	420	0	1	0.05	101	0	1
Insufficient water	0.04	865	0	1	0.04	420	0	1	0.01	101	0	1
Landslides	0.00	865	0	1	0.01	420	0	1	0	101	0	0

Source: Life in Kyrgyzstan Survey data 2019.