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ACCESS TO BANK CREDIT BY AGRICULTURAL PRODUCERS IN KAZAKHSTAN: A MICRO-ECONOMETRIC ANALYSIS

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ABSTRACT

The Republic of Kazakhstan is a Central Asian country that was formerly a republic of the Soviet Union. Kazakhstan is significantly different from other Central Asian countries. It is relatively large but with a low population: about 5.7 people per square km. Agricultural financing is a major aspect of economic reform in Kazakhstan. The issue is - What kind of financial resources are necessary to maintain the development of agricultural production? Internal resources such as profit, depreciation capital, various reserve and insurance funds cannot be relied on as a secure financial base. In Kazakhstan, state financial support of agriculture, which plays a significant role in developed countries, is episodic in nature, limited in size and frequently fails to reach target recipients. Banking system and non-banking credit institutions such as credit cooperatives could be potential investors and suppliers of financial resources. However, the current investment climate in Kazakhstan does not promote lending to the agriculture sector. Commercial credit is not readily available because banks are reluctant to lend money to agricultural producers as they consider the agricultural sector to be high risk. Other obstacles are high interest rates, short-term lending, and insufficient collateral. In this paper, micro-econometric analysis is used to analyze the determinants affecting access to credit. Results suggest the main determinants that predict whether an agricultural enterprise will be given credit are: i) the size of a farm, ii) the farm's productivity, and iii) collateral.

Key words: Agricultural finance, Crediting, Micro-econometric analysis

JEL Classification: G21, O16, Q 14

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1. Introducti The development of rural financial markets is of great importance to Kazakhstan as 44% of the population lives in rural areas, and 24% of the total population is engaged in agricultural production. Moreover, Kazakhstan is the sixth largest grain exporter in the world and this grain producing industry is vital for the Kazakhstani economy.

There are three main sources of formal credit in the agricultural sector of Kazakhstan: commercial banks, rural credit partnerships (RCPs), and micro-credit organizations (MCOs). However, their contributions to lending in the agricultural sector are unequal. Commercial banks provide the major share of all loans i.e. more than 90%, the RCPs account for a declining share of about 5%, while the MCOs provide less than 1% of all loans (Table 1).

Table 1: Shares of Loans to Agriculture in Kazakhstan

	2005	2006	2007
Commercial banks	90.2	95.5	94.5
Rural Credit Partnerships (RCPs)	9.3	3.8	5.1
Micro Credit Organizations (MCO)	0.5	0.7	0.4

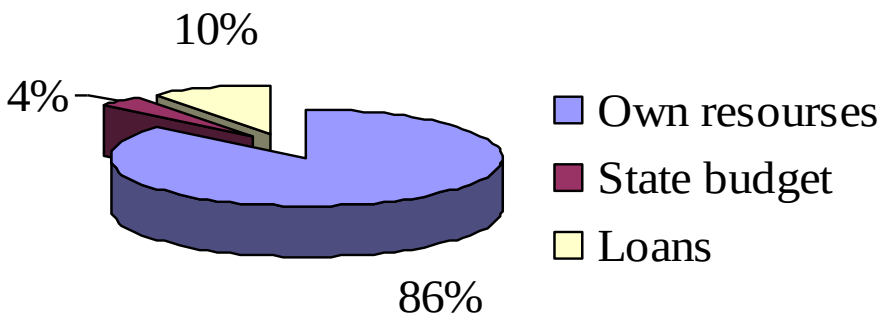
Source: Ministry of Agriculture of the Republic of Kazakhstan, http://www.minagri.kz

At present, there is no well-established rural banking system in Kazakhstan. Only two of the thirty commercial banks have a network of branches in rural areas. In comparison to urban areas, clients in rural Kazakhstan are widely dispersed and the average population density is only six individuals per square kilometre. According to statistical data, although all banks grant loans to agricultural producers, the share lent to the agricultural sector in is extremely low, accounting for a mere 5% of total loan portfolios.

In addition, commercial banks prefer to give loans to large-scale agricultural enterprises. In 2007, these enterprises received 95.5% of the total credit lent to the agricultural sector whereas the share of loans to private family farms was minimal and continues to decrease. Banks are wary of lending to small rural households and private family farms because of the unacceptably low rate of return, the high risk, the small size of loans, and high transaction costs.

According to "pecking order theory," firms tend to cover their investment needs by drawing on their own (internal) financial sources rather than by applying for external finance (Myers 1984). However, if firms' own resources are not sufficient to maintain 'reproduction on a simple scale' at minimum, and their access to formal external finance is limited because of the credit rationing behavior of lenders, they face the problem of under-investment. This is particularly important for growing firms because to finance growth they must be able to access loans. From the investment structure of agriculture in Kazakhstan shown in Figure 1 it can be assumed that agricultural enterprises have either: i) sufficient internal finance for investment or ii) most agricultural enterprises do not access external finance, probably due to the rationing policy of formal credit institutions.

Figure 1. Structure of Investment in Agriculture in 2006



Source: Agency of Statistics of Kazakhstan, www.stat.kz

To give an example, even if an agricultural enterprise such as a grain producer possesses sufficient internal finance because it is highly profitable, it may still need some external loans (Voordeckers, 2007). In Kazakhstan, taking into consideration the risky business of grain production, it is likely that the probability of getting loans from formal credit institutions is higher during favorable years (with good harvest and high profitability). Moreover, grain producers are more likely to need external loans to cover their financial needs in periods of lower profitability. Therefore, ensuring access to formal credit based on a more long-term perspective, not merely in profitable years, could be a key factor in influencing growth of agricultural production in Kazakhstan.

2. Financial market development in transition economies

Lack of credit is one of the main reasons for insufficient investment in agriculture. This, in turn, creates a situation in which agricultural producers are not able to ensure optimal distribution of resources in the short-term (profit - liquidity effect), which results in a decline of long-term investment in land and equipment (investment demand effect) (Lerman and Subbotin, 2004).

As in many transitional countries of Europe and Central Asia (ECA), a major problem in Kazakhstan during the transition period was the breakdown of relationships of farms with input suppliers and output markets. The result is that many farms and rural households face serious limitations in obtaining essential inputs (feed, fertilizer, seeds, etc.) and selling their output (Swinnen, 2005).

It is nearly identical for all post-communist transition economies when governments intervened in the agricultural financial markets by establishing special agricultural credit institutions, loan guarantees schemes, and credit subsidies. For instance, loan guarantees cover up to 50% of loans for agricultural investment in most CEE countries (Swinnen and Gow, 1999, p. 35). Credit subsidies are another type of governmental intervention in the agricultural financial market in transition countries. Subsidized credit policy has been a controversial approach towards agricultural credit market development. In the beginning of the transition period, the institutional structure of rural credit markets was dominated by one specialized agricultural credit institution inherited from the centrally planned system. Governments used this institution mainly for the allocation of loan guarantees and credit subsidies. Since agricultural producers used to consider this credit institution as a source of governmental financial support, loans from these banks were often treated like government subsidies and not as commercial products one has to pay for. This resulted in a high rate of loan repayment default, which frequently led to the financial collapse of agricultural banks (Swinnen and Gow 1999, p. 40).

3. Investment and credit policies in Kazakhstani agriculture

Rural credit policy in transition economies is of great research interest for several reasons:

- investment support measures play a major role in the rural credit policies of all the transition economies. Governments develop and implement substantial national credit programs for agriculture,
- credit markets are particularly appropriate to reveal the interactive character of problems. This is due to the essentially inter-temporal nature of credit transactions and the specific roles which incentives, risks, and information play in these markets,

- although credit markets have been a major topic in the theoretical literature, normative assessment based on standard welfare theoretic arguments has proved to be less than satisfying, and has therefore been of little value to inform public policy (Petrick, 2004).

The characteristic feature of rural markets in centrally planned economies in most soviet republics was the presence of the centrally managed state or cooperative farms on the supply/demand side. The market in these countries did not behave like the market in western (market) economies, and it is called a one-sided market, which refers to the agricultural credit market as well (Daniłowska, 2004, p. 102).

In the centrally planned economy, specialized agricultural banks were given by the law a monopoly position in the agricultural credit market, and these banks' activities were regulated by a central bank. The central bank precisely defined the range and scope of their activities, including the terms of loans for farmers, and agricultural banks followed these guidelines. It is worth mentioning that the terms of loans were stable, and the only changes concerned newly granted loans (Daniłowska, 2004, p. 103).

From the very beginning of economic reforms in Kazakhstan, the main problem for the agricultural sector was the lack of credit resources. This was a natural consequence of credit market liberalization; like any other resources, credit flowed to the most profitable parts of the economy, for example, the extractive and processing industries: extraction of raw oil, additional gas and natural gas, the power and metallurgical industry. Agriculture is not a sector able to provide high returns or a fast turnover for the capital invested. In the middle of the 1990s, at the peak of the economic crisis in Kazakhstan, agriculture could be described rather as a way of surviving for agricultural producers. Introduction of national currency in 1993 led to an increasing shortage of cash inflow in the economy at whole, including agriculture that caused the increase in barter trade. Barter was the main tool of trade and payment during 1993-1998. Many farms in remote areas became bankrupt and were deprived of needed financial and nonfinancial assets. Since nonfinancial assets were basically immovable, livestock products, in particular sheep have been the most liquid assets and were often used as payment for farm debts, including payments to farms workers. Livestock served as a reserve stock for these farms helping to adapt to new economic conditions; however, these reserves could not serve sufficiently and therefore could not maintain farms` survival. The situation was aggravated with a high budget deficit and delays in payments of salary, pensions and other social payments. Access to formal credit resources throughout this period was a critical issue for the agricultural sector.

A very high interest rate at the beginning of transition to a market economy affected farmers' credit demand, and access to loans was hampered by lack of collateral. Additionally, some other discouraging factors appeared. The decrease in demand for agricultural products as an effect of the liberalization of imports was the most important; bankruptcies of food enterprises and their insolvency were painful too (Daniłowska, 2004, p. 105). Farmers' income in Kazakhstan was decreasing dramatically. In 1995, the average rate of profitability was (-25)%, and the number of unprofitable farms was four times the number of profitable ones. In these circumstances, farmers borrowed less money from banks.

The economic upturn in Kazakhstan at the end of the 1990s started to accelerate the pace of positive changes in agriculture, and this acceleration will probably continue in the future. One of the results of these changes is a tremendous need for capital, which cannot be generated internally by the farm business itself. Therefore, farmers rely more and more on formal credit.

The bank system corresponding to the market system services mainly large-scale means of production. "Small borrowers" such as agricultural producers have limited access to credit resources, since commercial banks are reluctant to deal with small-scale agricultural borrowers due to their financial instability, high production risks, and high cost of credit transactions. However, even large-scale agricultural producers routinely experience difficulties obtaining bank credit. As a result, demand for vital investments in new machinery, equipment and construction is not satisfied. The inability to replace or repair existing machinery and inputs is a major productivity constraint in Kazakhstani agriculture (Meng et al., 2000).

During the 1990s, the government considered agricultural producers development as their own personal responsibility, and most state subsidies to the agricultural sector were revoked. Central and regional authorities' weak and, in some cases, improper regulations and directions caused farms concentrate on loss-making activities. Additionally, due to the extension of nonsubsidized loans to loss-making farms, the latter found themselves in a deep debt crisis. Moreover, heavy penalties for tax arrears made it more complicated and sometimes impossible for them to repay their creditors (Pomfret, 2007). Since the level of output in agriculture fell sharply to for below the pre-1990 (pre-transition) level, and remained below that level a decade later, unemployment and underemployment in agriculture reached unprecedented levels (Bacchetta and Drabek, 2002).

In general terms, Kazakhstani problems in rural credit market development are similar to those experienced by most transition economies:

- commercial banks consider collateral in the agricultural sector, as compared to other sectors of the economy, as insufficient. This could be explained partly by the relatively

slow reform of property rights and land titling than for example in industry. The underdeveloped and poorly regulated rural land market in Kazakhstan is a significant constraint in this regard;

- financial institutions perceive the agricultural sector generally as being particularly risky due to changes in price, the behavior of government agencies, and climate risks etc., that may affect output and profitability,
- as a result of the two aforesaid problems, there is a general consensus that providing finance for the sector is a government responsibility, through favorable and subsidized lending facilities;
- commercial banks are generally wary of involvement with discounted lending schemes as they have to assume some of the risk;
- in common with most transition economies, the Kazakhstani banking system was used to dealing with large enterprises and farms. It has been slow to adapt its institutional base or develop systems for small scale lending, which has inhibited the development of small-scale processors, traders and private farmers; and
- given the relative lack of skills and experience of newly emerging market agents, it is probably unreasonable to expect new farmers to possess the financial skills to deal successfully with bankers (Davis and Hare, 1997).

There are a number of conditions underlying the underdevelopment of the formal rural financial market in Kazakhstan. The most important obstacles here are: (i) lack of sufficient collateral and (ii) far-reaching governmental interference in the emerging rural financial market.

The first obstacle (i − lack of sufficient collateral) could be related to the fact that, although the private ownership of farmland was prescribed in the new Land Code established in June 2003, land ownership and transactions have made little progress because the price for land bought from the government is relatively high.

According to the Land Code, it is allowed to use land plots under private ownership and land-use rights as collateral. However, to convert a pledged land plot or land-use rights into ownership of a pledge holder, it is necessary to have state approval. Moreover, collateral agreement cannot provide for automatic transference of land plots (land-use rights) to the creditor and the latter cannot extract any returns from that plot of land. It means the use of agricultural land as collateral is possible only to a limited extent (Desphande, 2006, p. 134).

Nowadays, the land market is relatively inactive in Kazakhstan. Land laws and land reforms were designed to improve agricultural efficiency and increase the use of land as collateral, but in practice they failed to encourage land trade in Kazakhstan.

Commercial banks with a clear profit orientation are still reluctant to increase agricultural lending, despite the introduction of a set of governmental measures lowering the risk of default by agricultural borrowers. The main question, however, remains open: would commercial banks perform better for agriculture if they had more solid collateral submitted by agricultural borrowers and less interference from the government? Even if this were the case, it seems likely that the risky nature of investing in agricultural production in Kazakhstan would still lead formal credit institutions, (particularly private ones) to favor non-price methods of allocating credit among agricultural producers.

Corporate farms that are willing to pay a market interest rate for formal credit are restricted by their ability to provide adequate collateral. In the context of Kazakhstan, where most agricultural land is rented (not privately owned), land-use rights are accepted as collateral for commercial banks. However due to unclear and underdeveloped regulations regarding land-use rights, commercial banks prefer to accept more liquid assets as collateral.

The second obstacle to rural financial market development (ii − governmental interference) implies that the state can help to decrease financial risks by improving audit and control over the entities, and by supporting the development of specialized bureaus to collect and sell information on potential borrowers to potential lenders. Along with the development of transport networks and communications, this information supply can also contribute to a decrease in financial risks.

This so-called governmental interventionist approach to the development of agricultural financing often entails many problems, because such intervention leads financial institutions to offer credit to priority sectors at low interest rates. However, due to their small scope they cannot cover their expenses. In addition, borrowers often perceive such credit as a grant from the government and therefore default on their loans, thereby weakening the financial activity of credit institutes. Governmental control of the interest rate and transaction costs should be gradually reduced to the minimum. Lastly, competition should be strengthened by introducing new financial institutions introduction (Izumida, 2001).

4. Econometric analysis of access to bank credit by agricultural producers in Kazakhstan4.1 Outline of data set

In order to investigate how and to what extent some factors influence the probability to be granted a loan by commercial banks present in the rural credit market (as alternative to RCPs) an analysis based on a static model with cross-sectional data from a specific production period (the year 2006) was used. Data on corporate farms were obtained from the Regional Agency of

Statistics (Pavlodar Region, Kazakhstan), which records data submitted annually (sometimes quarterly) to local statistical offices, on all medium and large-scale corporate farms. Data on agricultural land was obtained from the Regional Land Committee (Pavlodar Region, Kazakhstan), which has records on the amount of arable or pastureland (measured in hectares: ha) rented or owned by corporate farms. Data concerning RCP members and RCP credit were obtained from the regional head quarters of Agro-Credit Corporation (Pavlodar Region, Kazakhstan).

All corporate farms which reported in 2006 to the Regional Agency of Statistics were included in the sample. This sample includes both crop farms and livestock farms. Of 157 corporate farms in the Pavlodar region, 127 farms had submitted reports to the Agency of Statistics in 2006. From them seven farms did not provide all needed data and were excluded from the sample. The final sample covers 76.4% of the total number of corporate farms in Pavlodar region in 2006, which cover 96.7% of the agricultural land possessed by corporate farms.

It should be noted that this study is confined to the analysis of the agricultural side of the farms included. The variables expressed in terms of money are indicated in Kazakhstani currency – KZT (US 1 dollar = 132 KZT in 2006).

4.2 Classification of variables affecting access to commercial bank credit

The factors (variables), supposed to influence corporate farms' access to formal credit in Kazakhstan, were clustered into three sets. The first set included such characteristics as sources of funds to cover both principal and interest, and factors that characterize the reliability and sustainability of the enterprise such as ability to cover debt with collateral. The second set included factors characterizing farm size, and the third set included factors reflecting performance level. Thus, the three sets of variables include the following:

The first set includes factors such as amount of profit and assets. These factors express the ability of a farm to guarantee that both the principal and the interest will be paid.

The second set includes such factors as labor hired, and could be used to characterize the size of both crop producing and livestock producing farms.

The third set includes such factors as productivity, characterizing the level of a farm's performance.

4.3 General analysis of samples

As a first step of this study, a general analysis of the groups of corporate farms was carried out to compare them in terms of variables. The mean values of all the variables were calculated for the two groups of corporate farms under study: i.e. the two groups either with or without credit. Results are obtained using a t-test and are presented in Table 2.

Table 2: Comparison of Two Groups of Enterprises, with and without Credit

Factors	Entire sample (N=120)	With credit (N=43)	Without credit (N=77)	t-test
Average amount of profit, thousand KZT	8.91	10.72	7.89	2.01
Average number of labor, people	42.20	65.42**	29.23**	1.99
Average amount of productivity, thousand KZT	0.94	1.08*	0.86*	1.51
Average cost of assets, million KZT	0.31	0.41*	0.26*	1.98

Note: ** - significant at a level of 5%; ** - significant at a level of 10%

The results showed that there are significant differences between the two groups of corporate farms compared with respect to variables such as cost of assets, labor, and level of productivity. This means that enterprises that have sufficiently valuable assets and can show sufficient level of productivity, are more likely to obtain credit.

The amount of profit is not significantly different between the groups of corporate farms. Even though this analysis can give some information about general tendencies, it is not able to explain how each individual variable actually influences access to bank credit (Lerman and Subbotin, 2004).

4.4 Empirical model

Several empirical studies have analyzed the influence of economic and non-economic variables on farmers' access to formal and informal credit sources. In most cases, the use of probit or logit models is applied (Petrick, 2005; Lerman and Subbotin 2004; Keiser and Szczesny, 2000; Briggeman et al, 2009).

In this study, a bivariate probit model is used to predict the probability that corporate farms have received credit from commercial banks, in the presence of an opportunity to receive credit from RCPs, and to describe the factors influencing this choice. A bivariate probit model is a "natural extension" of the individual probit model (Greene, 1993). Four outcomes are denoted: Y10 (i.e. Y1 = 1 and Y2 = 0), Y01, Y11, Y00.

There are two credit sources for corporate farms in the formal credit market: commercial banks and RCPs. The model specifies the probability of access to the formal credit sector as a bivariate normal distribution, jointly determined by having received credit from a commercial bank, and having received credit from the RCP. However, an agricultural enterprise may also receive credit from both sources at the same time. Thus, the dependent variables are two binary choice variables, Y1 and Y2, indicating an agricultural enterprise's access to bank credit (Y10) along with access to both formal sources (Y11) and RCP's credit (Y01) along with access to both formal sources (Y11).

More formally:

Y1 = 1 if an agricultural enterprise states that it has credit from a bank (Y10), and from a bank and the RCP (Y11), and is zero otherwise (Y00);

Y2 = 1 if an agricultural enterprise states that it has credit from the RCP (Y01), and from a bank and the RCP(Y11), and is zero otherwise (Y00).

A bivariate probit model is used because it is possible to see whether the two types of credit source are interdependent. Unfortunately, it was impossible to get information on whether enterprises in the sample just did not have credit, or they never wanted to apply. Thus, in the analysis it is assumed that all enterprises in the sample want to apply for credit.

In this study, it is assumed that the same regressors are used for both outcomes. The descriptive statistics of the variables included in the empirical model are given in Table 3. The agricultural enterprise explanatory variables are profit (PROFIT); cost of assets (ASSETS), productivity level (PRODUCTIVITY), and number of people hired by a corporate farm (LABOR):

- PROFIT refers to the profit before taxation.
- ASSETS measures the cost of machinery, buildings, and equipment.
- LABOR measures number of people working at a corporate farm.
- PRODUCTIVITY is a measure of output from a production process, per unit of input.

Table 3: Description of Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
LABOR, 100 people	120	0.01	4.52	0.42	0.81
PRODUCTIVITY, million.KZT	120	0.00	6.64	0.94	0.61
PROFIT, billion KZT	120	-0.11	0.113	0.01	0.03
ASSETS, billion KZT	120	0.01	2.89	0.31	0.47

Source: Agency of Statistics of the Republic of Kazakhstan, www.stat.kz

The bivariate probit model was analyzed using STATA. The summary containing the most important results of the regression analysis shows that the likelihood ratio chi-square of 4.38 and value of ρ of .542 (exceeds zero) is significant at 1%, indicating that a bivariate probit model is more appropriate than two univariate probit (Nkamleu and Adesina, 2000).

Table 4 shows that the cost of machinery, equipment, and buildings (ASSETS) has an increased effect on access to RCP credit (significant at 10%) whereas for bank credit this variable is positively correlated, but less significant. This could mean that those farms with costly assets have better access to bank and RCP credit. Moreover, this effect could be explained by the fact that even though most machinery and buildings owned by Kazakhstani corporate farms are obsolete and worn-out, this still could be considered by commercial banks and RCPs as suitable collateral.

The variable characterizing level of productivity (PRODUCTIVITY) is not significant for RCPs, but at the same time it is significant for commercial banks (10% level of significance). This could mean that banks having more opportunities for detailed screening of potential borrowers allocate credit to more productive farms.

One would expect a variable such as profit (PROFIT) to be significant and have a positive effect on the probability of obtaining credit. However, the opposite seems to be the case. The variable PROFIT is not significant for commercial banks, while it is significant for RCPs, but it has a negative sign. It was found that corporate farms with high profitability preferred to finance the purchase of goods and investments from their own recourses rather than borrowing from commercial banks (Buchenrieder, 2002). At the same time, RCP credit, being significantly subsidized by the state, is allocated among large-scale but not always profitable farms.

The most significant variable is the number of hired workers (LABOR), which is significant at the level of 5% for both cases. Since this variable characterizes farm size, one can conclude that for both commercial banks and RCPs large-scale corporate farms are borrowers that are more attractive.

Table 4 shows the marginal effects of the probability of a farm to have bank or RCP credit when the independent variables are at their mean. A bivariate probit model shows a marginal effect of 0.17 ($p < 0.05$) reflecting that additional units of machinery cost increase the likelihood of having RCP credit by 17%; additional ten hired people could increase the likelihood of having bank and RCP credit by 2.5% and 9.2% respectively; increase in the productivity level by one thousand KZT would increase the probability of obtaining bank credit by 6%.

Table 4. Bivariate Probit Results of Access to Bank and RCP Credit, 2006[a]

Independent variables	Dependent variables			
	Bank credit probability 6.9%		RCP credit probability 21.6%	
	Marginal effect	Coefficient	Marginal effect	Coefficient
LABOR	0.025	0.44** (2.17)	0.092	0.47** (1.86)
PRODUCTIVITY	0.06	0.517* (1.62)	-0.05	-0.017 (-0.08)
PROFIT	-0.82	-2.152 (-0.45)	-5.36	-19.54** (-1.88)
ASSETS	0.014	0.197 (0.5)	0.17	0.669* (1.67)
Const.		-1.845 (-5.08)		-0.786 (-3.12)

Note: [a] Figures in parentheses are corresponding t-values;

** - significant at a level of 5%;

* - significant at a level of 10%

According to this analysis, a corporate farm could obtain credit from commercial banks with the probability of 6.9% whereas it is more likely to obtain credit from the RCP with the probability of 21.6%. However, the probability of obtaining no credit at all is 64.6%. Thus, even

large-scale corporate farms have limited access to formal credit and often rely on their own financial resources or state support.

5. CONCLUSIONS

The main results of this analysis can be summarized as follows. The major determinant of access to formal credit is the size of farms. This shows that existing Kazakhstani agricultural policy tends to support large-scale farms. Given that large-scale farms are mainly grain-producing farms in Kazakhstan, one can conclude that both commercial banks and rural credit partnerships prefer to deal with large-scale grain-producing farms, which in turn are represented chiefly by corporate farms (successors of soviet type farms). The cost of equipment and machinery as an expression of collateral is significant for obtaining RCP credit. Indeed, commercial banks in Kazakhstan are reluctant to have any dealings with farms having insufficient collateral. Since the majority of agricultural producers own old and even obsolete machinery and buildings, it is inevitable that commercial banks will not consider their assets as valuable collateral.

The analysis also shows that the variable PROFIT is not significant for obtaining bank credit and has an inverse relation to the probability of having credit. The negative sign of a parameter of this variable probably expresses the unwillingness of farms to apply to a third party if they have enough resources to finance their investment needs themselves. This is evidence of the so-called demand-side credit constraints that influence agricultural borrowers' preferences and choices (Cheng, 2009).

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