Loan Repayment Performance of Public Agricultural Credit Agencies: Evidence from Jordan

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Abstract

The agricultural production process in many developing countries has been negatively impacted by poor loan repayment. Most of public credit agencies in such countries suffer from this critical problem. This study aimed at evaluating the loan-repayment performance of public agricultural credit agencies. The Agricultural Credit Cooperation (ACC) in Jordan was chosen to be investigated. To achieve its goals, the study delved into the determinants of loan-repayment performance among ACC borrowers. Data from ACC sources for the period of Financial Year 1960 to Financial Year 2011 (52 years) were analyzed. Simple descriptive statistics tests and regression techniques were conducted. Factors related to the accessibility of farmers to credits, to the collection performance of ACC, and to the administration performance of ACC were included in the analysis. The results of the study revealed that the repayment rate of the investigated public credit agency (ACC) was 0.92, indicating a high level of repayment performance and a low default rate (0.08). The positive effects of the volume of loans borrowed, volume of loans repaid, number of borrowers, number of credit agency staff, and borrower experience were the most important factors related to this result. Sufficient and strict controls as well as monitoring are required. Outreach to beneficiaries should be improved to enhance repayment performance. To avoid the burden of provisioning on agricultural credit agencies, legal actions and guarantees should be taken against loans defaulters. Introducing a reward system for those individuals who pay on time will be helpful in enhancing repayment performance.

Keywords: public agricultural credit, loan, repayment performance, repayment rate, default rate

1. Introduction

Depending on its production, in a developing country such as Jordan the agricultural sector assumes greater importance. The public agricultural credit activities are a major factor in determining the trends of this production. It is more useful to examine the validity and viability of public agricultural credit agencies as agricultural development instruments.

A critical problem most public credit-lending agencies face is poor loan repayment. This problem has negatively affected agricultural producers who need to obtain capital for their operations (Njoku & Obasi, 2001). Several studies investigated the importance of the credit facilities in less-developed countries. These studies concentrate on the effects of providing a large amount of money in the form of agricultural loans on the agricultural sector growth (FAO, 1996; Adams & Graham, 1981; Gonzalez, 1977; Pischke, 1980). An efficient utilization of agricultural credit is necessary to enhance the agricultural sector's productivity and, hence, the national economy (Yasir et al., 2012).

Public agricultural credit activities in many developing countries suffer from the problem of a high incidence of default rate among borrowers. Many of these credit agencies are inefficient or heavily subsidized to remain in business. In order to understand the reasons behind this problem, it is crucial to evaluate the agricultural credit agencies based on borrowers' repayment performance. It is important to accomplish this evaluation because a low repayment rate will reduce the volume of loanable funds to offer other borrowers, create a longer time for loan recovery and lower profitability (Timothy & Olatomide, 2010). Loan-repayment performance is largely affected...
by factors related to the borrower, the firm itself, the loan, and the lender. Among these factors, many studies concentrate on the borrower as the core of the problem. Most of these studies stated that, when the loan is not paid, it might be a result of the borrowers' unwillingness and/or inability to repay (Greenbaum & Thakor, 1995; Hoque, 2000; Colye, 2000; Ozdemir & Boran, 2004).

Unstable prices or agricultural inputs and outputs, interest rates, and the borrowers' social relations and responsibilities may influence the credit repayment-performance of the lending agencies. The negative effect of these factors may lead to the failure of these agencies (Mohammed, 2005). According to this situation, lending agencies should categorize the borrowers as good borrowers and bad borrowers. Monitoring the borrowers will aid in making sure that they are using the loans for the right purposes meaning that they can pay back their loans (Stiglitz & Weiss, 1981). Looking at the borrowers' past record is another criterion to determine if the borrower is likely to repay the loan or not (Greenbaum & Thakor, 1995). Borrowers with no training related to their agribusiness have a higher possibility to default (Roslan & Zaini, 2009). The lending firm characteristics may also affect their repayment performance. (Oke et al., 2007; Nannyonga, 2000; Arene, 1992). A firm's poor management procedures may contribute to most of the default. The design of the loan, access methods, screening methods, and incentives to repay may largely affect the lending agencies repayment performance (Hulme & Mosley, 1996). The loan volume may be another issue to discuss. Awunyo (2012) stated that the larger the loan size, the lower the probability of repayment default. A poorly designed lending program and improper implementation may lead to defaults (Copisarow, 2000). To minimize the loan default in the process loan repayment, both the borrowers and the institutional characteristics are important and should be taken into account (Derban et al., 2005).

In Jordan, the Agricultural Credit Cooperation is a major formal source of agricultural credits. Farmers are its main target group. The total value of the loans provided to farmers through this cooperation by the end of 2011 was nearly 500 million Jordan Dinars (JD), which is around 700 million US Dollars (USD); (1 JD = 1.4 USD) and benefited nearly 215,000 farmers (ACC, 2011). The amount of the loans introduced to the farmers by ACC has increased in recent years, but the number of loans, on the other hand, has decreased despite the increased values (Rashrash, 2004).

The present study is an attempt to assess the repayment performance of the public agricultural credit agencies as well as the repayment performance of the loanee farmers who has received agricultural loans from these agencies. Jordan's Agricultural Credit Cooperation (ACC) is the agency studied. The study also tries to investigate some important factors related to loan repayment performance. Drawing lessons from the ACC’s experience and making recommendations are other objectives for the study.

2. Materials and Methods

2.1 Data

To achieve the goals of this study assessing the repayment performance of public agricultural credit agencies as well as the repayment performance of the loanee farmers, secondary sources of information were the main data sources. Due to the availability and accessibility of required data from their reliable sources, these secondary sources were preferred. It is difficult to collect primary data from all borrowers who received loans from Jordan's Agricultural Credit Cooperation (ACC) over a long time of more than 50 years (since 1960). Hence, secondary data based on annual reports from the Agricultural Credit Cooperation (ACC) were the main source of data applied in this study. Meanwhile, other secondary sources such as the Department of Statistics (DoS), the Ministry of Agriculture (MoA), and the Agricultural Directorates (ADs) in the governorates were helpful. These available sources confirmed data for the period of Financial Year 1960 to Financial Year 2011 (52 years). Because a broad range of farm sizes and enterprises was included, the data gave a good representation of the borrowers' characteristics throughout Jordan. Table 1 shows the main credit related items of the ACC since 1960. Loans are in Jordanian Dinars (1 JD = 1.4 USD).
Table 1. Main credit-related items of the ACC since 1960

| Year | Volume of loan borrowed (JDs) | Volume of loan repaid (JDs) | Number of borrowers | Number of staff |
|------|-------------------------------|-----------------------------|---------------------|-----------------|
| 1960 | 457680                        | 80500                       | 4242                | 115             |
| 1961 | 470196                        | 150718                      | 2000                | 127             |
| 1962 | 1036306                       | 150028                      | 2688                | 158             |
| 1963 | 902802                        | 473896                      | 2938                | 197             |
| 1964 | 833471                        | 707835                      | 3333                | 215             |
| 1965 | 1206990                       | 869414                      | 2049                | 214             |
| 1966 | 1293935                       | 636221                      | 2147                | 213             |
| 1967 | 675440                        | 695608                      | 1331                | 182             |
| 1968 | 747458                        | 573021                      | 1350                | 217             |
| 1969 | 467328                        | 922153                      | 833                 | 217             |
| 1970 | 437705                        | 500556                      | 886                 | 215             |
| 1971 | 710019                        | 606248                      | 1616                | 206             |
| 1972 | 1439351                       | 1031623                     | 1213                | 207             |
| 1973 | 1843519                       | 1078099                     | 2448                | 207             |
| 1974 | 2139375                       | 1509987                     | 1617                | 214             |
| 1975 | 3190479                       | 2351309                     | 1633                | 216             |
| 1976 | 2792022                       | 2074318                     | 1029                | 223             |
| 1977 | 2366753                       | 2267215                     | 815                 | 221             |
| 1978 | 3224883                       | 2794577                     | 705                 | 221             |
| 1979 | 3466360                       | 2707104                     | 1450                | 213             |
| 1980 | 4855184                       | 3473554                     | 740                 | 211             |
| 1981 | 6793872                       | 4241738                     | 889                 | 218             |
| 1982 | 6287454                       | 4426914                     | 937                 | 240             |
| 1983 | 5605485                       | 5235767                     | 956                 | 215             |
| 1984 | 5467559                       | 5718727                     | 1438                | 224             |
| 1985 | 7930299                       | 5916410                     | 1910                | 234             |
| 1986 | 5682638                       | 5508608                     | 1453                | 229             |
| 1987 | 5145023                       | 4298174                     | 1913                | 226             |
| 1988 | 4750785                       | 3942975                     | 1865                | 227             |
| 1989 | 4954498                       | 5375840                     | 1687                | 230             |
| 1990 | 7404847                       | 6216038                     | 4745                | 237             |
| 1991 | 10527686                      | 6511604                     | 3133                | 255             |
| 1992 | 32388507                      | 7505174                     | 7952                | 264             |
| 1993 | 18909314                      | 12010890                    | 8759                | 302             |
| 1994 | 14307265                      | 12337558                    | 4989                | 350             |
| 1995 | 19345227                      | 15236697                    | 6391                | 379             |
| 1996 | 21188319                      | 18242230                    | 7627                | 400             |
| 1997 | 16797331                      | 19876409                    | 6174                | 402             |
| 1998 | 19680900                      | 18726206                    | 7248                | 419             |
| 1999 | 27368944                      | 22978324                    | 10003               | 424             |
| 2000 | 20891375                      | 24667207                    | 8260                | 423             |
| 2001 | 13376951                      | 20737899                    | 4166                | 417             |
| 2002 | 17199522                      | 19452318                    | 4669                | 442             |
| 2003 | 13206155                      | 22151404                    | 3854                | 443             |
| 2004 | 10991096                      | 23196712                    | 3761                | 443             |
| 2005 | 16266946                      | 26258937                    | 4462                | 455             |
| 2006 | 19387065                      | 27800000                    | 4809                | 474             |
| 2007 | 20777039                      | 27123474                    | 5038                | 479             |
| 2008 | 25488470                      | 32168543                    | 5130                | 487             |
| 2009 | 24930487                      | 26385876                    | 4748                | 501             |
| 2010 | 24082721                      | 27600000                    | 5268                | 480             |
| 2011 | 28613085                      | 30800000                    | 5321                | 480             |
| Total | 501204103                      | 518133836                    | 176618              |                 |

Source: ACC, 2011.
2.2 Analytical Framework

Simple descriptive statistics, correlation determinations, and regression techniques were used in the data analysis for this study. To test the differences between the mean volume of credit borrowed and the mean volume repaid, Students t-test was used. The Ordinary Least Square (OLS) method of regression was used in estimating the relationship between the repayment rate and the predictor (explanatory) variables. The predictor variables were chosen according to their importance to the repayment process. Results of many studies investigating repayment performance considered these factors critical in determining the credit agency’s repayment performance level (Yasir et al., 2012; Greenbaum & Thakor, 1995; Hulme & Mosley, 1996; Derban et al., 2005). The variables considered in our study include the volume of loans borrowed from the ACC (X1); the volume of loans repaid to the ACC including ACC profits (X2); the number of borrowers (X3); the number of ACC staff members (X4), the borrower's age (X5), and the borrowers’ farming experience (X6). The volume of loans borrowed from the ACC and the number of borrowers are variables related to farmers accessibility to credits offered by the ACC. The volume of loans repaid to the ACC is a variable related to ACC collection performance. The dependent variable is the repayment rate (volume of repaid loans divided by the volume of loans given by the ACC). The volume of loans per ACC staff member and the number of borrowers per ACC staff member are variables derived from X1, X3, and X4. These two variables are related to the ACC’s administrative performance and they were not included in the regression model to avoid a multicollinearity problem that is mostly the result of including a variable that is computed from other investigated variables.

The regression model is specified explicitly as follows:

\[ Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \ldots + \beta_6X_6 + e \]

\( Y \) = repayment rate (volume of repaid loans divided by the volume of loans given by the ACC).
\( X_1 \) = volume of loans borrowed from ACC.
\( X_2 \) = volume of loans repaid to ACC.
\( X_3 \) = number of borrowers.
\( X_4 \) = number of ACC staff members.
\( X_5 \) = borrower’s age.
\( X_6 \) = borrower’s farming experience of borrower.(the word borrower’s should be omitted).
\( e \) = error term.
\( \beta_0, \beta_1, \beta_2, \ldots, \beta_6 \) are regression parameters to be estimated.

3. Results and Discussion

In general, agricultural credit has an indirect effect on production through providing the financial resources to overcome a lack of inputs so that farmers can effectively engage in the agricultural production process. The process of offering loans to farmers, along with the repayment of these loans, is actually subject to many factors that may prevent agricultural credit agencies from being efficient in providing the needed financial resources to farmers. The repayment performance of any agricultural credit agency may be negatively affected by these factors, meaning that the agency will not be able to perform its job efficiently as part of the process of agricultural development. This study investigated some factors that are strongly related to the repayment performance of a public agricultural credit agency in Jordan (the ACC). The effects of factors related to the farmers’ accessibility to credits offered by agricultural credit agencies, the collection performance of agricultural credit agencies, and the administrative performance of agricultural credit agencies were investigated.

3.1 Main Credit-Related Items

Figure 1 shows the development of loans offered to borrowers (dark line) and the loans repaid to the ACC since 1960. Table 2 shows the repayment rate, or the percentages of repaid loans to borrowed loans (R/B), since 1960 for the ACC. Figure 2 shows the development of the repayment rate since 1960.
Development of loans offered by the ACC and loans repaid to the ACC since 1960

Source: Based on data from the ACC’s annual reports.

Table 2. Repayment rate (R/B) since 1960

| Year | R/B (%) | Year | R/B (%) | Year | R/B (%) | Year | R/B (%) | Year | R/B (%) |
|------|---------|------|---------|------|---------|------|---------|------|---------|
| 1960 | 18      | 1971 | 85      | 1982 | 70      | 1993 | 64      | 2004 | 211     |
| 1961 | 32      | 1972 | 72      | 1983 | 93      | 1994 | 86      | 2005 | 161     |
| 1962 | 14      | 1973 | 58      | 1984 | 105     | 1995 | 79      | 2006 | 143     |
| 1963 | 52      | 1974 | 71      | 1985 | 75      | 1996 | 86      | 2007 | 131     |
| 1964 | 85      | 1975 | 74      | 1986 | 97      | 1997 | 118     | 2008 | 126     |
| 1965 | 72      | 1976 | 74      | 1987 | 84      | 1998 | 95      | 2009 | 106     |
| 1966 | 49      | 1977 | 96      | 1988 | 83      | 1999 | 84      | 2010 | 115     |
| 1967 | 103     | 1978 | 87      | 1989 | 109     | 2000 | 118     | 2011 | 108     |
| 1968 | 77      | 1979 | 78      | 1990 | 84      | 2001 | 155     |      |         |
| 1969 | 197     | 1980 | 72      | 1991 | 62      | 2002 | 113     |      |         |
| 1970 | 114     | 1981 | 62      | 1992 | 23      | 2003 | 168     |      |         |

Source: Calculated by the researchers using data from the ACC’s annual reports.

As shown in Figure 1 (see Table 1), the volume of loans offered by the ACC to the borrowers increased from 457,680 JDs (1 JD = 1.4 USD) borrowed by 4,242 farmers in 1960 to 28,613,085 JDs borrowed by 5,321 farmers in 2011. The increase in the offered loans is nearly 62% while the increase in borrowers for the same period is nearly 25%, indicating that the average volume per beneficiary is higher in the later operational years of the ACC compared to the earlier years. The small increase in borrowers compared to the loans’ volume increase is a crucial factor in determining the repayment performance of an agricultural credit agency. This situation seems to be good
in the ACC’s case according to the results presented in Table 2. This goodness may be attributed to the experienced staff, good logistic facilities, and better efficiency with respect to both coordination and performance. The repayment rate will surely go up under such circumstances.

On the other hand, the volume of repaid loans increased from 80,500 JDs in 1960 to 30,800,000 JDs in 2011. The highest volumes of repaid loans were recorded in the last 20 years because most ACC loans were long-run loans and needed more than 20 years to be paid. Political and Middle East area related factors might be reasons for low repayment rate in certain years (1967 and 1973).

The results presented in Table 2 show that the average ACC repayment rate is 0.92 (1960-2011), indicating good repayment performance. Considering the fact that no agricultural credit agency can have a 100% repayment rate, as this rate is approaching 1, the agency is doing well. Because the rate is away from 1 for some years, the agency has a poor repayment performance. The ACC repayment rate from 1960-1966 is low when compared with the other periods. The repayment rate in other periods is higher. (Above 100% from 2000-2011). This high value of the repayment rate could be attributed to the lack of consistency in the growth performance of Jordan’s agricultural sector from 1960-1966 as well as to instability and inconsistencies in agricultural policies, policy implication, and poor monitoring and management during other periods, except those after the year 2000.

Concerning the ACC’s administrative performance, on average, the volume of loans per staff member was 28,108.83 JDs, and the number of borrowers per staff member was 11. These low figures compared to agricultural credit agencies in other developing countries indicate that the ACC’s administrative performance is good. The lower the two indicators are, the better the administrative performance that, in turn, reflects on the agency’s repayment performance. Loan defaults arose from poor management or administrative procedures.

3.2 T-test

T-test could be used to compare statistical differences. It assesses whether the means of two groups of data are statistically different from each other. This analysis is appropriate whenever a comparison of the means of two groups is wanted.

The statistical difference between the mean values of loans obtained (X1) and the mean amount of loans repaid (X2) by borrowers is presented in Table 3.

Table 3. Repayment rate (R/B) since 1960

| Variable         | Mean     | Standard Deviation | Degrees of Freedom | t-value | Sig. (2-tailed) |
|------------------|----------|--------------------|--------------------|---------|-----------------|
| Volume borrowed  | 9813540.4| 9248949.8          | 51                 | 7.651   | .000            |
| Volume repaid    | 9967358.4| 10354951.4         | 51                 | 6.941   | .000            |

Source: Based on data from the ACC’s annual reports.

The results presented in Table 3 reveal that further analysis using a student’s t-test at the 5% level of significance showed no significant difference between the mean volume of loans borrowed and the mean volume of loans repaid by borrowers. The implication of these results is that farmers exhibited high loan-repayment performance that will be positively reflected in the credit agency’s repayment performance. These results confirm the information presented in Table 2.

3.3 Regression Model

The results for the multiple regression of factors that influence the ACC’s loan repayment performance are presented below (Table 4). An evaluation of the model for loan repayment performance showed that the R² value was 0.796 (80%) while the adjusted R² value was 0.763 (77%). This result means that nearly 80% of the variation in the repayment rate (the dependent variable) was due to the joint effects of the explanatory variables. Regression estimates showed that the volume of loans repaid, the number of staff members, and the borrowers’ farming experience prove to be significant at the 95% confidence level. The remaining three variables were not significant at that level. This result shows the importance of considering these variables when planning to analyze the repayment performance of agricultural credit agencies. The signs of the variables in the model were previously expected. Comparisons related to the signs were conducted after model estimation. The positive sign of the borrowed loans coefficient is not in line with the prior expectations for this variable. It was expected to have a negative sign. The positive sign for the coefficient of the volume of the repaid loan, the number of borrowers, the numbers of staff members, and borrowers’ farming experience as well as the negative relationship for the
coefficient of the borrower’s age with the repayment rate are in line with prior expectations. The signs for the coefficient of independent variables and the significance of these variables are used to determine the impact of each independent variable on the dependent variable. The results presented in Table 4 reveal that all the explanatory variables in the model have a positive effect on the repayment rate, and hence repayment performance, except the borrower’s age which had a negative effect. Each 1% increase for the volume of loans borrowed from the ACC; the volume of loans repaid to the ACC, including ACC profits; the number of borrowers; the number of ACC staff members; and the borrowers’ farming experience causes an increase of 0.256%, 0.574%, 0.079%, 0.613%, and 0.071% in the repayment rate, respectively. A 1% increase for the farmer’s age will cause a 0.047% decrease for the repayment rate.

Table 4. Output of the multiple linear regression model

| Variables             | Coefficient (B) | t -value | Sig.  |
|-----------------------|-----------------|----------|-------|
| Constant              | 0.922           | 16.77    | 0.000 |
| Loan borrowed (X1)    | 0.256           | 1.874    | 0.337 |
| Loan repaid (X2)      | 0.574           | 4.954    | 0.000 |
| No. of borrowers (X3) | 0.079           | 0.559    | 0.579 |
| No. of staff members (X4) | 0.613    | 5.481    | 0.000 |
| Borrower's age (X5)   | -0.047          | -0.331   | 0.742 |
| Borrower's Experience (X6) | 0.071    | 0.505    | 0.015 |

Source: Conducted by researchers based on data from ACC annual reports.

As shown in Table 4, the volume of the borrowed loans has a positive influence on the repayment performance. It was hypothesized to have a negative relationship with the repayment rate. The regression result disagreed with this hypothesis. This result could be attributed to the explanation that higher loans make larger investments with potentially higher returns possible. In other words, larger loan sizes would enhance the beneficiary farmer’s access to basic inputs and improved farm-management opportunities, which would lead to higher productivity, reduced per unit cost, and increased income.

The volume of the repaid loans is a very important factor in determining the agricultural credit agencies’ repayment performance. The results of this study revealed that the average repayment rate to the ACC was 92%. This high repayment rate may be attributed to the sound lending policy adopted by the ACC that was believed to result in low probabilities of loan default.

The relationship between the number of borrowers and the repayment rate, as indicated by the figures in Table 4, is a positive one. The number of borrowers could be a useful indicator for the credit agency’s outreach. The coefficient of the variable was positive, suggesting that the greater the number of people covered, the greater the repayment rate.

The borrower’s age is a very important factor in agriculture operations because youths and young adults who are full of vigor are required for production. The average age of the ACC beneficiaries was 48 years. The majority of borrowers were between 30 and 50 years old, an age in which they are considered highly productive and active to practice farm work. In spite of this fact, the older borrowers cannot have a meaningful impact on agricultural production even if they are adequately motivated with the needed credit facilities. The results of this study showed that there is a negative effect for aging on the repayment rate, which is acceptable and true. Based on this result, the agricultural credit agencies should be able to consider the age of borrower when offering loans. Older farmers tend to be conservative and less vulnerable to the winds of change.

As with the borrower’s age variable, it is very important to consider the borrower’s experience when offering loans to beneficiaries. The average experience of the ACC beneficiaries is 20 years. This experience is reflected in the high repayment rate. Borrowers who have a lot of farming experience exhibit a willingness to adopt new technologies. The result is that there is higher productivity, more revenues, and higher abilities to repay loans.

The administrative performance of agricultural credit agencies is largely affected by the number of staff members introducing services to clients. As shown in Table 1, the ACC has a well-trained and experienced staff. This staff is a major factor for the ACC achieving its high repayment rate. A sufficiently trained staff will result in proper
monitoring and supervision of the credit agencies. Insufficient staff numbers cause lack of supervision and monitoring services. Hence, farmers may transfer their agricultural credit to non-farm purposes.

4. Conclusions

According to the results of this study, the repayment rate of the investigated public credit agency (ACC) is 0.92, indicating a high level of repayment performance and a low default rate (0.08). This result may be attributed to many exogenous and endogenous factors. The volume of loans borrowed, the volume of loans repaid, the number of borrowers, the number of credit agency staff members, the borrower’s age, and the borrower’s experience were the most important factors related to the credit agencies’ repayment performance. All these factors had a positive effect on the repayment performance of the investigated agency, except the age of the borrower that had a negative effect, contrasting the prior expectations. Sufficient and strict controls along with monitoring are required, and outreach to beneficiaries should be improved to enhance the repayment performance. To avoid the burden of provisioning on agricultural credit agencies, legal actions and guarantees should be taken against loans defaulters. Introducing a reward system for those individuals who paid on time will be helpful in enhancing the repayment performance.

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