

The Impact of Restructuring Principal Bank for Development and Agricultural Credit (PBDAC) on Financing the Agricultural Sector in Egypt

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Abstract: In 2016, PBDAC has been restructuring into the ABE and become one of the commercial banks. After 5 years the major question is what is the impact of the restructuring on credit policy and the agricultural sector?. This paper aims to measure the impact of restructuring on the number of loans directed to the agricultural sector by using Piecewise Linear Regression. The total value of Agricultural loans was decreased gradually from 1.97 billion in 2009/10 acres to 1.07 billion acres in 2019/20. While there were a decrease was rate of change in the area covered by agricultural credit was estimated over the study period to reach -38% compared to -5.5% after restructuring. This means the rate of decline in credit-covered areas during the first period is greater than the rate of decline after the bank's restructuring. ABE has retreated from its role since its inception in the form of an agricultural credit bank that provides the farmer with all the needs of various types of agricultural lending and services. So reviewing the credit policy issued after the restructuring included reducing the financing ratios of some agricultural projects compared to the previous policy before restructuring.

Keywords: Agricultural Bank of Egypt, Agricultural Credit Policy, Piecewise Linear Regression

1. Introduction

Nowadays, banks are facing fierce competition, not only at the local level, but also at the global level, especially with the liberalization of financial services in international trade, and the growing tendency towards market economy and interest in investment, which resulted in increasing interest in bank credit, where the financial position of any bank is influenced by several variables. However, a loan portfolio, in particular, occupies an important position in any bank's terms of financial position. This is because the loan portfolio's safety boosts the bank returns at the minimum possible levels of risks associated with the decisions of granting credit. Credit analysis has recently acquired increasing importance as it represents an important tool for reducing losses incurred by banks due to non-performing loans, which lead to freezing an important part of the bank's funds, thus the lending bank is exposed to losses that exceed the return on the opportunity cost of investment, causing a real

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financial loss represented in the underwriting of loans and associated interest, especially when not enough guarantees are under the Bank's authority to use for debt recovery. Other negative impacts include reducing the fund's turnover rate thus the full operational capacity of bank resources, leading to lower profits and incurring losses. Access to finance is critical for the growth of the agriculture sector. The shift from subsistence to commercial agricultural production requires funds. However, in developing countries, where agriculture is a source of livelihood for 86 % of rural people. Financing for investments in agriculture is scarce, even for large investors. In Africa, less than 1 % of commercial lending is destined to the agriculture sector (International Finance Corporation, 2013). Financial institutions are reluctant to accept the risks prevalent in the agricultural sector, such as droughts, floods, pests and diseases, or the transaction costs of covering large geographical distances. Consequently, although governments are now making efforts to attract investment for agriculture, the lack of understanding of the financial risks and opportunities in agriculture, deprives the sector of much-needed funds to boost production, processing and marketing (Ruete, 2015). In line with the contributions this sector is expected to make to the overall growth and development of the economy, the government had often designed measures to stimulate its growth. And considering the general belief that the provision of cheap credit is a precondition for growth and development of sectors, the government had often fostered the growth of institutional financial markets mainly to provide credit facilities for agriculture activities on concessionary (Olubiyo, 2019). PBDAC has been specialized, acting away of all market mechanics and following strict measures to maintain the bank's capital based on the service role it was entrusted to play as the representative entity performing the government's policy regarding the services and support to be offered to small farmers to continue production, either through providing subsidized loans, cash or in-kind, rescheduling debts for defaulters, or writing off nonperforming loans. Agricultural development banks were established to extend credit and other financial services to customers not considered creditworthy by commercial banks. Although frequently unprofitable, they can play an important role in the fight against rural poverty. Should these banks be closed or are they worth revamping? (Seibel, 2000). In 2016, after nearly 40 years of its establishment, Egypt decided to reform the bank by restructuring it into ABE and become one of the commercial banks. Due to a decrease in the financial state of PBDAC, facing a rise in the number of overdue customers and increased Credit risks that threaten to maintain of providing its services with efficiency. Thus, Egypt had restructured the bank into a commercial bank, and will adopt the name of the "ABE". Hence, the bank would have the right to practice all the business of commercial banks on its credit portfolio. As a result, the bank encounters an issue regarding the balance between the activities which achieve the maximal yield and high-cost activities, for the first time. At the same time, adhering to its role as an agricultural bank indicates that it should achieve the state's policies regarding farmer's support; this could be achieved through the appropriate provision of funding and the different credit lines. Following more than 5 years since the restructuring, we observe that there are several questions raised: the most significant, being whether the credit policy has changed following the restructuring? And, to what extent has this change impacted the agricultural sector in Egypt?. Was the amount of finance aimed at the Egyptian agricultural sector influenced by the bank restructuring and reforming?

The main objective of this paper is to identify the volume of credit directed to the agricultural sector, over the period (2009/10-2019/20) and that's through Identifying stages of development of ABE, studying the credit policy of the bank and the changes that occurred to it, study the distribution of the credit portfolio of agricultural loans, whether productive or investment loans. Measuring the impact of restructuring on the amount of financing directed to the agricultural sector. Was the amount of finance aimed at the Egyptian agricultural sector influenced by the bank restructuring and reforming?

2. Method

The paper relied on secondary data published by the Central Agency for Public Mobilization and Statistic. This paper will rely on the analytical Approach. In the linear regression models considered the dependent variable Y and the explanatory variables, the X's have been numerical or quantitative. But this may not always be the case; there are occasions when the explanatory variable can be qualitative. These qualitative variables, often known as dummy variables which have some alternative names used in literature, such as indicator variables, binary variables, categorical variables, and dichotomous variables, In this respect, the dummy variable approach has a distinct advantage, for it not only tells if the two are different but also pinpoints the source of the difference, the knowledge that two regressions differ in this or that coefficient is as important as, if not more than, the plain knowledge that they are different (Gujarati, 2004). So this research employed the Dummy variables "Piecewise Linear Regression" Technique to analyze the impact of restructuring PBDAC on the volume of finance directed to the agricultural sector by examining the impact of structural changes. When estimating a regression function from long-term time-series data, the use of quantitative interpretive variables in estimating this function does not give a real explanation of the behavior of the phenomenon over this period. Long periods may involve fundamental changes as a result of certain events, such as wars, crises, or the application of certain policies, which in turn divide that period into stages and make the behavior of the phenomenon different at each stage. It is, therefore necessary to estimate an independent regression equation for each stage because of the different nature of the phenomenon between them, but in this case, it is noted that the use of dummy variables helps us to estimate one slope equation for all stages and then derive one independent equation for each stage while identifying the difference in the behavior of the phenomenon through periods.

The impact of structural changes affecting the volume of financing directed by the bank can be examined after the restructuring and some adjustments to the bank's credit policy, particularly targeted at the agricultural sector. By using dummy variables over the period (2009/10- 2019/20) .Using three independent variables in the first equation (X) which reflects time trend, (D) takes zero values over the first period and values one over the second period is called Zero-One Dummy Variables, the last independent variable (DX) It is the product of multiplying the time variable in the dummy variable and is called Cross Product.

$$\hat{Y}_t = \alpha_1 + \beta_1 X_t + \beta_2 (X_t - X^*)D_t + \beta_3 DX_t + \mu_t$$

Where Y_t = volume of loans , X^* threshold value also known as knot

$$D = 0 \quad \text{if } X_t > X^* \quad , \quad D = 1 \quad \text{if } X_t < X^*$$

Assuming $E(\mu_t) = 0$, we see at once that

Therefore, the equation of the first period (2009/10-2015/16) can be derived as follows:

$$E(Y_t \mid D_t = 0, X_t, X^*) = \hat{Y}_{t1} = \alpha_1 + \beta_1 X_t$$

which gives the mean loans commission up to the target level X^*

The equation for the second period(2016/17-2019/20) is as follows:

$$E(Y_t \mid D_t = 1, X_t, X^*) = \hat{Y}_{t2} = (\alpha_1 + \beta_2) + (\beta_1 + \beta_3) X_t$$

Which gives the mean loans beyond the target level X^* . Thus, β_2 gives the slope of the regression line in segment I, and $\beta_1 + \beta_3$ gives the slope of the regression line in segment II of the piecewise linear regression (Gujarati, 2004).

3. Findings and Discussions

Foundation and Development Stages for the Agricultural Bank

1. **Foundation and Development Stages for the Agricultural Bank:** Since its inception ABE is the main source of credit in the agricultural and rural sectors. Recently, the Bank's objectives and policies have increased and diversified to provide multiple lines of credit to agricultural and rural activities. It should be

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noted that, while credit policies have changed and developed, the Bank's general policy of encouraging farmers and cooperative societies remained unchanged for years. The following sections address the emergence and development phases of the bank and agricultural credit policies over time.

2. **Foundation Phase (1931-1947):** The Agricultural Credit Bank was first established In July 1931, a Royal decree was issued to amend the Bank's name to the "Egyptian Agricultural Credit Bank", with a capital of one million Egyptian pounds to serve the Egyptian agricultural sector by the banking norms followed at that time to provide the necessary fund for small farmers and investors.
3. **Cooperative Transformation Phase (1948-1956):** In 1948 the bank transformed into the Cooperative Agricultural Credit Bank, and new job positions were added to serve and support cooperatives. During this phase, the Bank's policy was purely headed towards cooperative directions, thus the Bank started accepting deposits from cooperative societies of all kinds, and granting them loans for all kinds of activities, either short, medium, or long-term loans. The volume of cooperative credit increased and the distinguishing feature at this stage was the "Banking Services", a new service created by the transformation law. Medium-term lending was mostly disbursed to cooperatives to purchase agricultural machinery and livestock. In addition, disbursing medium and long-term non-agricultural loans started to be applied at this stage (Sabaa, 2000) .
4. **The Phase of Cooperative Investment (1957-1961):** At this stage, credit policy was characterized by "Controlled Agricultural Cooperative Credit". Cooperative societies became the sole source of agricultural credit in villages, which led to weakening the grip moneylenders and crop traders have on small farmers and tenants in particular. This stage targeted applying the policy of ensuring proper use of loans for the purposes they were disbursed for.
5. **The Phase of "Credit for All Holders" (1962–1966):** In 1964, the Bank transformed into a public institution known as the "Egyptian General Corporation for Agricultural and Cooperative Credit". During this phase, the bank issued instructions for disbursing loans, regardless of farmers' indebtedness, and guarantees in case of loans in kind. Cash loans. This stage is considered one of the worst stages credit service has gone through because it did not take into account the logic of credit policy principles regarding the terms of disbursement and collateral, it rather opened the door wide for everyone who requests credit (Aly, 1991).
6. **The Phase of "Correcting the Path" (1967-1976): The Policy of Strict Control:** In 1976, Law No. 117 was issued to transform the Egyptian General Corporation for Agricultural and Cooperative Credit into a public institution under the name of the PBDAC. During this phase, credit extension was limited to providing short and medium-term loans. The bank's credit policy tended to provide loans either for small farmers in their capacity as individuals, or providing cooperatives with inputs for agricultural production. During this stage, the Bank has achieved rapid growth in investment and cooperative transactions increased by 32.2%. This stage is named the "Policy Packages Stage" as the Bank's policy was based on a refusal to grant loans to borrowers in arrears and thus closed the door of extending credit facilities for farmers delayed in debt repayment (PBDAC, 2012)
7. **The Phase of "Village Banks" (1977-1980): Regulated Credit Policy:** This is one of the most important phases in the course of credit application in Egypt, where village banks were established to perform the functions of credit investment and saving. Confidence in the developed credit system was restored during this stage thus savings were mobilized, agricultural loans were disbursed and tenant farmers were able to borrow against the value of anticipated harvests. Accordingly, the relationship between village banks and farmers became direct without the Mediation of cooperative societies (Khafagy, 1988)

8. **The Phase of "Credit Packages" (1980-1990):** In this stage The Bank's policy was focused on developing the agricultural sector through strengthening horizontal expansion and providing support for capital expansion programs and credit finance. New types of loans were introduced during this stage such as loans to businesses related to agriculture and loans for establishing poultry houses for young graduates (Hashesh, 2003)
9. **The Phase of Shifting to Banking Activity (1991-2015):** During this stage the implemented policy focused on raising farmers' awareness about saving, providing seasonal loans for agricultural production, financing all projects related to agriculture, expansion in credit granted to the development of rural women, modernization through introducing automated bank services, expansion in computerized accounting, and facilitating banking procedures. This phase is considered of the most important phases of the bank's history, where a joint-stock company was established as of July 1st, 2004, and owned to the bank and affiliated subsidiaries, with a paid-in capital of 50 million Egyptian Pounds. The stock company's responsibility focused on handling all commercial activities so that the bank focuses on performing only banking services.
10. **The Last Phase (2016 to date):** In 2016, PBDAC restructured to ABE Accordingly, the bank took the form of an Egyptian Joint Stock Company which capital is fully owned by the state .The bank's credit policy was defined under Article (2) of Law No. 84/2016 issued to stipulate transforming the PBDAC to be ABE. Article (2) defined the Bank's objectives as providing finance for various agricultural and rural development activities under the banking systems in force within the framework of the government's general policy and contributing to providing the finance required for production inputs, whether through imports or local sources, in addition to offering all banking activities (ABE, 2017)

Definition of Credit Policy

Credit policy can be defined as the set of guidelines that sets credit and payment terms for customers and establishes a clear course of action for late payments. This also means that credit policy is the general framework that includes a set of principles, rules, and procedures that regulate the process of granting and the follow up of extending credit facilities for all types of economic activities, in addition to the procedures followed in estimating credit amount, maturity date and main conditions in such a way that ensures achieving the balance between credit quality, expected profitability, associated risks and risk aversion(ABE, 2017).

Objectives of agricultural credit policy vary according to the economic conditions prevailing in the society. It has no longer specific objectives as in the past; rather, it became a part of the country's agricultural policy and associated strategy. Also, the goal of credit policy is no longer limited to the sole goal of increasing agricultural production, but has changed to become multiple goals, the most important of which are Increasing farm income, enhancing employment , providing job opportunities and elimination of unemployment, encouraging rural activities that aim at achieving rural development and self-sufficiency, increasing crops exports, and encouraging savings to support the sources of fund for agricultural banks to raise their capacity in terms of covering the required credit facilities (Yehia, 2009)

1. Changes in the Credit Policy of the Egyptian Agricultural Bank after Restructuring

The study seeks to compare the bank's credit policy before and after restructured. That is, to compare between the credit policy and executive procedures applied by PBDAC Bank during 2012 on the one side, and the credit policy applied by ABE during 2017 .

2. Types of Credit Facilities Granted for Agricultural Activities

Loans and credit facilities granted by the bank can be classified in both policies according to their maturity dates as follows:

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- a. **Plant production loans:** These are short-term loans of one year or less. They are extended for crop production, in addition to crop service.
- b. **Investment loans:** can be divided into:
 - Short-term loans: these are operational loans for investment projects, the granting of which is subject to liquidity rates and customer's repayment ability, such as agricultural processing projects.
 - Medium-term loans: these are granted to finance agricultural and investment activities, such as animal and poultry production projects.
 - Long-term loans: such as land reclamation, the establishment of orchards, and mechanization.

3. General Conditions Regarding Credit Facilities Granted for Plant Production Activities

Finance Limits of Plant Production Loans of Credit Policy 2012, 2017

- a. Finance for plant production is granted in the form of seasonal loans proportionate to the actual cost of farm operations associated with each crop, at a rate of 100% of the value of crop budget approved by the bank.
- b. Crops produced under intercropping: financed at 25% of the value of credit category of the intercropped crop

Finance Limits in 2012

Finance limits are set as follows:

- For the establishment of fruit orchards and greenhouses finance is granted at a rate of 65% of the actual cost.
- For new lands which price has been paid in full, or on regular installments, owners can be granted a credit value ranging between LE 500,000 and a maximum of one million LE.
- Plant production loans are disbursed to clients who are entitled to investment loans, provided that the maturity date of the plant production loan before the investment loan.

Finance Limits in 2017

Finance limits are set as follows:

- For the establishment of orchards, nurseries finance is granted at a rate of 70% of the actual cost of establishing the activity.
- For new lands which price has not been paid in full, owners can be granted a credit value not exceeding LE 500,000; while those which price has been fully paid are granted more than LE 500,000.
- The fund is not extended to a person who has made a consensual settlement by waiving the interest, or part of them.

4. General Rules and Regulations Regarding Credit Facilities Related to Agricultural Activities (Investment Loans)

Short-Term Loans

Credit Policy of 2012

These are loans extended for operating livestock activities and projects:

1. Young breeders can get a maximum of 100 thousand pounds
2. Large breeders can get more than 100 thousand pounds
3. Poultry production loans are granted at a rate of 60% of the specified credit category
4. Fish production loans are granted at a rate of 50% of the specified credit category.

5. Rural and environmental development projects: funding is granted for the operation of small-scale rural development, craft, and occupational activities, and the marketing of the products thereof, as per the following categories:
 - The first category is specified at a maximum of LE 15000.
 - The second category is specified at a maximum of 30000 LE.
6. Financing agricultural marketing projects and related commercial activities: where financing is granted with a maximum of 50% of the activity's investment costs.
7. Financing the marketing of crops for farmers: where finance is granted by a maximum of 50% of the marketed crop's value.

Credit Policy of 2017:

They are called operating loans, the finance of which is granted at a rate of up to 70% of the total project operating costs.

Medium-term Investment Loans

Credit Policy of 2012

Credit is granted at a rate of 50-75% of the activities or project's investment cost as follows:

1. Financing the establishment of protected agriculture projects at a maximum rate of 50% of the actual cost.
2. Financing the establishment, development, and equipping of livestock projects at a maximum rate of 60% of the project's investment costs.
3. Loans for the purchase and repair of machinery and equipment at a rate of 60% of the value of the purchase invoice, and 50% of the repair cost.
4. Poultry production operation loans at a maximum rate of 60% of the project's investment cost.
5. Loans for fisheries projects, at a maximum rate of 50% of the total investment cost.
6. Financing the establishment of agricultural processing projects at a maximum rate of 60% of the investment cost.
7. Financing rural and environmental development projects, at a maximum rate of 60%.

Medium and Long-term Loans of Credit Policy of 2017:

Where finance is granted at a rate of 70% of the project's total investment cost excluding land, or according to the credit categories specified for each activity

- Financing agricultural machinery and equipment at a maximum rate of 75% of the purchase invoice value.

Long-term Loans of Credit Policy of 2012:

1. Financing land reclamation projects, at a maximum rate of 50% of the project's investment cost.
2. Financing the purchase and repair of machinery and equipment, at the rate of 75% of the purchase value and 60% of the repair value.

5. Determining Interest Rate on Credit Facilities

Credit Policy of 2012

Loans are granted for plant production at subsidized interest rates, except for nurseries of all kinds, in addition to administrative and banking fees.

Interest Rate:

- The subsidized interest rate on plant production loans is 5.5%.
- The interest rate on investment loans is 12.5%.

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Credit Policy of 2017

The interest rate on the granted loan is determined according to the following criteria:

1. Lending and discount rate announced by Central Bank of Egypt (CBE).
2. CBE's policies and trends regarding reserve and liquidity management.
3. Interest rates at competing banks.
4. Interest rates for customers wishing to obtain subsidized loans for plant production facilities are determined by the regulations and decisions that have been issued and approved by the concerned authorities.

In regards to the interest rate on plant productions loans:

- **The subsidized interest rates:** short-term loans are granted for plant production purposes .Interests are calculated at subsidized interest rates until the last maturity date, then at rates similar to the interest rates on investment loans as of the day following the maturity date.
- **Interest Rate on Investment Loans:**
Loans granted for crops of investment nature, such as nurseries' budgets, the establishment of orchards of all kinds are treated the same as investment loans in terms of interest rate and loan duration.

Measuring the Change in the Credit Policy of the Bank

Table (1) reveals that the total investment loans directed to the agricultural sector by the bank have been increased gradually over the first period (2009/2010-2015/2016) from 5.86 billion L.E to 6.2 billion L.E with an annual average of 6.4 billion L.E, and an increase of about 4.4% from the base year. While there was decrease slightly in the period following the bank's restructuring, where Total agricultural investment loans reached about 4 billion L.E in 2016/17 and increased to 4.7 billion L.E in 2019/20 and an increase of about 18.4% from the base year 2016/17. Despite the increase in the volume of agricultural investment loans during the study period, however, this value is small compared to the economic and social importance of the agricultural sector and the importance of agricultural finance in promoting investment and achieving sustainable rural and agricultural development.

Time Trend of Total Fixed Agricultural Investment Loans using Dummy variable Approach over the period (2009/10-2019/20)

$$\hat{Y}_t = 6.49 - 0.033 X - 2.04 D + 0.203 DX \quad \dots\dots (1)$$

$t \quad (-0.25) \quad (-2.1) \quad (1.59)$

F = 5.2 R-sq (adj) = 0.56

Where:

\hat{Y}_{t1} = Estimated value of total agricultural investment loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 6.49 - 0.033 X \quad \dots\dots (2)$$

\hat{Y}_{t2} = Estimated value of total agricultural investment loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 4.45 + 0.17 X \quad \dots\dots (3)$$

The aforementioned results indicated that total agricultural investment loans increased at an annual rate of 0.17 billion L.E after restructuring (2016/17-2019/20) compared to - 0.033 billion L.E before restructuring (2009/10-2015/16) where it was decreased.

Concerning the distribution of agricultural investment loans according to their terms, it shows a small gradual increase in short-term investment loans aimed at operation and production, in the first period .Compared to the

second period, which witnessed a decline in the volume of short-term loans from about 4.4 billion L.E to 2.1 billion L.E in 2019/20.

By comparing the rate of change in the value of short-term loans to the agricultural sector from the bank, it was found that the rate of change in medium-term loans was about to 3.2 % before restructuring, while it becomes about 53 % after restructuring. While medium-term loans saw an increase in the annual change rate estimated at 58 % after restructuring compared to about 3.2 % over the period (2009/10 -2015/16).

Time Trend of Fixed Agricultural Investment Loans according to their terms

1. Short-term loans:

$$\hat{Y}_t = 4.35 - 0.022 X - 1.53 D - 0.105 DX \dots\dots (4)$$

$t \qquad (-1.29) \qquad (-2.7) \qquad (-2.53)$
 $F = 18.7 \qquad R\text{-sq (adj)} = 0.84$

Where:

\hat{Y}_{t1} = Estimated value of total agricultural short-terms loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 4.35 - 0.22 X \dots\dots (5)$$

\hat{Y}_{t2} = Estimated value of total agricultural short-terms loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 2.82 - 0.13 X \dots\dots(6)$$

**Table 1: Total Fixed Agricultural Loans (With Fixed Price)
According to Their kinds & Time over the period (2009/10-2019/20)**

Value: Billion L.E

Year	Total Agricultural Investment Loans				Planet production loans	The Agrarian Reform Societies Loans (Million L.E)	
	Short term	Medium term	Long term (Million L.E)	Total		Loans in kind	Loans in Cash
2009/2010	4.297	1.465	8.69	5.859	6.25	549.51	170.605
2010/2011	4.716	2.707	79.48	7.511	5.85	399.48	101.310
2011/2012	4.397	2.117	101.63	6.637	5.54	446.42	43.322
2012/2013	3.709	1.484	143.18	5.341	4.75	304.15	55.668
2013/2014	3.702	2.057	370.22	6.170	4.87	281.30	75.972
2014/2015	4.555	1.970	317.60	6.832	4.55	139.72	62.042
2015/2016	4.429	1.512	253.83	6.157	3.35	407.76	44.886
Average	4.26	1.90	182.09	6.36	5.02	361.19	79.12
2016/2017	2.330	1.457	193.92	3.995	2.414	25.593	25.843
2017/2018	2.802	2.256	88.43	5.167	1.929	24.927	27.878
2018/2019	2.098	2.369	234.04	4.670	1.726	15.804	12.863
2019/2020	2.140	2.329	258.11	4.728	1.574	17.753	13.670
Average	2.34	2.10	193.63	4.64	1.91	21.02	20.06
General Average	3.56	1.97	186.28	5.73	3.89	237.49	57.64

Source: Statistical Davison, (ABE), Unpublished Data, Fixed prices based on the 2008/09 Household Expenditure Survey

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According to equation (6) short-term loans directed to the agricultural sector have increased at a decreasing annual rate of 0.22 billion L.E over the period (2016/17-2019/20) after restructuring compared to 0.13 billion L.E in (2009/10-2015/16) before restructuring.

2. Medium-term loans:

$$\hat{Y}_t = 2.10 - 0.05 X - 0.33 D + 0.323 DX \dots\dots (7)$$

t	(-1.60)	(-1.54)	(1.5)
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F = 0.93 R-sq (adj) = 0.28

Where:

\hat{Y}_{t1} = Estimated value of total agricultural medium -terms loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 2.10 - 0.05 X \dots\dots (8)$$

\hat{Y}_{t2} = Estimated value of total agricultural medium-terms loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 1.77 + 0.273 X \dots\dots (9)$$

Studying the impact of the bank's restructuring on the total medium-term loans to the agricultural sector has increased to 0.273 billion L.E over the period (2016/17-2019/20) after restructuring. But this increase was non significant impact.

Despite increase in volume of long-term loans from 8.7 million L.E in 2009/10 to 258 million L.E in 2019/20 with general annual average of about 186.3 million L.E. This is a small value that indicates that the bank has not played an active role in financing long-term investment activities, Such as land reclamation and agricultural industrialization projects. Where the volume of long-term loans accounted for about 5.5% of total agricultural investment loans and about 4% of total agricultural loans in 2019/20. And this is consistent with what(Sabaa, 2019). Have mentioned in their study “The number of loans provided by the bank for investment projects went mostly to livestock projects, it is the most activity to circumvent borrowing without the actual existence of projects. In addition, poultry and fisheries and land reclamation activities have not received the attention commensurate with their importance in bringing about agricultural development and achieving food security”.

3. Long-term loans

$$\hat{Y}_t = -29.4 + 52.9 X - 232 D - 19 DX \dots\dots (10)$$

t	(3.7)**	(-2.2)**	(-0.52)
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F = 5 R-sq (adj) = 0.54

Where:

\hat{Y}_{t1} = Estimated value of total agricultural long-terms loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = -29.4 + 52.9 X \dots\dots (11)$$

\hat{Y}_{t2} = Estimated value of total agricultural long-terms loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = - 261 + 33.9 X \dots\dots (12)$$

The model showed that there was an increasing at a decreasing rate estimated at 33.9 million L.E over the period (2016/17-2019/20), Compared to 52.9 million L.E over the period (2009/10-2015/16) before restructuring

Plant Production Loans

These loans are provided for basic activities such as the production of crops or economic activities related to agriculture, such as loans for operating livestock and poultry production, and the entitlement of this type of loan is usually linked to the date of crop maturity and marketing or to obtain income from the project (Yehia, 2009). By studying the plant production loans these are short-term production loans was found that Plant production loans show increased to 4.9 billion L.E in 2014/15, then it gradually decreased, especially in the period following the restructuring, and up to about 1.6 billion L.E in 2019/20. Estimates indicate that the rate of change in plant production loans before restructuring was about 46%, and about 35% after the restructuring(Sabaa, 2019). Indicates that the percentage of areas benefiting from short-term loans for plant production to the total cropped area was low, and in a way that is inconsistent with the bank's objectives as a specialized source in agricultural lending.

Time Trend of Fixed Plant Production Loans according to their terms

$$\hat{Y}_t = 6.73 - 0.427 X - 1.15 D + 0.155 DX \dots\dots (13)$$

t (-8.5) (-3.1) (1.2)

F = 142 R- sq (adj) = 0.98

Where:

\hat{Y}_{t1} = Estimated value of total plant production loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 6.73 - 0.427 X \dots\dots (14)$$

\hat{Y}_{t2} = Estimated value of total plant production loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 5.58 - 0.09 X \dots\dots (15)$$

The aforementioned results indicated that total plant production loans decreased at an annual rate of 0.09 billion L.E after restructuring compared to 0.43 billion L.E before restructuring (2009/10-2015/16) where it was decreased .

The Bank's portfolio also included a section addressed to agrarian reform agricultural cooperatives, this allowed the small farmer's members of these associations to obtain all the credit facilities necessary to carry out their agricultural activity from the bank under the umbrella of the association in kind or cash. Loans in kind are short-term production loans granted by the bank to agrarian reform associations only and include fertilizers, seeds, pesticides, and other materials. The total in kind loans granted decreased significantly before the restructure, with the volume of in-kind lending falling to about 140 million L.E in 2014/15. And continued after the restructure with a total in-kind loan of about 18 million L.E in 2019/20. And that at the rate of change estimated about -30.6 % after the restructure, compared to about -26 % before restructuring. This indicates that the bank has moved away from its service role in providing for the needs of farmers. Loans in Cash are the total short- and medium-term investment loans for operating expenses. If it cannot be provided in-kind according to the need of each project. Provided that the percentage of cash loans does not exceed 25% of the total costs of the project. Similarly, the portfolio of loans in cash directed to agrarian reform associations aimed at develop agricultural production has declined sharply at a rate of -74% before restructuring, and about -47% after restructuring, which confirms the bank's departure from its development role following the restructuring.

Total Loans in Kind

$$\hat{Y}_t = 520 - 39.6 X - 213 D + 36.4 DX \dots\dots (16)$$

t (-2.3) (-1.63) (1.8)

F = 13 R- sq (adj) = 0.78

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Where:

\hat{Y}_{t1} = Estimated value of total loans in kind **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 520 - 39.6 X \dots\dots (17)$$

\hat{Y}_{t2} = Estimated value of total loans in kind **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 307 - 3.2 X \dots\dots (18)$$

According to equation (18) loans in kind directed to the agricultural sector has increased at a decreasing statistically significant annual rate of 3.2 billion L.E over the period (2016/17-2019/20) compared to 39.6 billion L.E in (2009/10-2015/16) before restructuring.

Total Cash Loans

$$\hat{Y}_t = 140 - 15.1 X - 0.8 D + 10 DX \dots\dots (19)$$

$$t \quad (-2.8) \quad (-102.) \quad (0.71)$$

$$F = 6.2 \quad R\text{-sq (adj)} = 0.61$$

Where:

\hat{Y}_{t1} = Estimated value of total cash loans **before** restructuring over the period (2009/10 - 2015/16)

$$\hat{Y}_{t1} = 140 - 15.1 X \dots\dots (20)$$

\hat{Y}_{t2} = Estimated value of total cash loans **after** restructuring over the period (2016/17 - 2019/20)

$$\hat{Y}_{t2} = 139.2 - 5.1 X \dots\dots (21)$$

Equation (21) reveals that total cash loans decreased at an estimated annual rate of EGP 5.1 billion over the period (2016/17-2019/2020) following the restructuring

Table (2) reveals that the total value of in kind and in cash loans granted in all agricultural seasons and the benefited areas over the period (2009/10-2019/20) by the bank were the actual area of farmland covered by credit in various agricultural seasons over the study period were decreased gradually from 1.97 billion acres in 2009/10 to 1.07 billion acres in 2019/20 with an annual average of 1.6 billion acres, and decrease the rate of about 46 % from the base year .While there was a decrease in the rate of change in the area covered by agricultural credit was estimated over the period (2009/10-2015/16) to reach about -38% compared to -5.5% after restructuring. This means the rate of decline in credit-covered areas during the first period is greater than the rate of decline after the bank's restructuring. By studying the total credit directed to these areas, whether in the form of loans in kind or cash over the period (2009/10-2019/20) show that there was a decrease in credit volume from 4.72 billion L.E in 2009/10 to 1.57 billion L.E in 2019/20 with change rate of about -67 % from the base year. Concerning the rate of change in total in-kind and cash loans provided to the agricultural sector during the pre-structuring period, the rate of change was found to be -29% compared to -34% in the second period. This means that the change in the bank's credit policy has led to a decline in the volume of credit directed to the agricultural sector and a decrease in the areas covered by credit. According to table (2), it is evident that the relative importance of the Area covered by credit to total cropped area has decreased from 13% in 2009/10 to 7.8% in 2015/16. This indicates a significant decline in the volume of credit directed to the agricultural sector before the bank's restructuring and a decrease of about 40% from the base year. The decrease continued in the second period at a rate of change estimated at -8%

Table 2: The value of fixed in kind and in cash loans granted in all agricultural seasons over the period (2009/10-2019/20)

Value: Billion L.E

Area: Million Acre

Year	Benefited Area	Total of Cropped Area	% Benefited Area	Total loans in Kind and cash
2009/2010	1.973	15.2	13	4727.6
2010/2011	2.204	15.4	14.3	5466.6
2011/2012	2.1	15.3	13.7	5571.5
2012/2013	2.498	15.4	16.2	4738.9
2013/2014	1.63	15.5	10.5	4853.7
2014/2015	1.596	15.5	10.3	4587.3
2015/2016	1.217	15.6	7.8	3355.9
Average	1.89	15.4	12	4757.4
Rate of Change	-38%	-	-40	-29%
2016/2017	1.127	15.8	7.1	2393.2
2017/2018	1.085	16	6.8	1919.7
2018/2019	1.154	16.1	7.2	2004.7
2019/2020	1.065	16.2	6.6	1573.8
Average	1.1	16	6.9	1972.9
Rate of Change	-5.5%	-	-8	-34%

Source: Statistical Davison, ABE, Unpublished Data, fixed price based on the 2008/09 Household Expenditure Survey

Consequently, ABE has retreated from its role since its inception in the form of an agricultural credit bank that provides the farmer with all the needs of various types of agricultural lending and services. End by providing subsidized financial loans, whether plant production loans or investment loans to facilitate the establishment of small agricultural projects to increase farmers' incomes and improve their standard of living. In addition, the credit policy is in conflict with the state's plans to horizontally expand the 1.5 million-acre reclamation project, which needs a new type of credit and credit portfolio with diverse and flexible credit lines to provide credit to small farmers and investors in these new spaces as well as old spaces inside and outside the valley, which indicates the negative effects of the bank's structure on the agricultural sector

4. Conclusion

Based on previous findings, research recommends a review of the bank's credit policy.

The bank should have strategies to deal with target groups within the agricultural sector to serve the role of the agricultural sector in achieving economic and social development by:

- 1- It is necessary to review the credit policy issued after the restructuring as it included reducing the financing ratios of some agricultural projects compared to the previous policy before restructuring, which limits farmers' demand for borrowing
- 2- Due to Egypt's interest in development projects and attracting investment to the agricultural sector, the bank should increase the credit portfolio of medium- and long-term investment loans because of their importance in advancing the development of the agricultural sector such as land reclamation and

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cultivation projects and agricultural manufacturing, which motivates individuals and investors to carry out these projects as much as possible.

- 3- The bank should take a package of measures to encourage the credit process, such as reviewing the credit facilities granted and the constraints facing the credit process in terms of facilitating the procedures, reducing interest rates on long and medium investment loans to encourage many who wish to borrow.
- 4- It is necessary to study the geographical distribution of lending areas by the cultivated areas and the target for cultivation and by Egypt's 2030 agricultural development strategy.

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