# AN ECONOMETRIC ANALYSIS OF THE RELATIONSHIPS BETWEEN ECONOMIC GROWTH AND AGRICULTURAL CREDITS FOR PRO-POOR GROWTH in TURKEY

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**─Abstract ─**

The agricultural sector is important for Turkey for many reasons such as high rate of rural population, a large share of employment in the agricultural sector, the sector's contribution to the formation of national income, and production capacity of sector. In recent years, although the share of agriculture sector in GDP and in foreign trade has declined, the share of it in employment is still protected. The agricultural sector is the backbone of the rural economy.

Although there is a common view that agriculture is an important sector for an economy, there is no consensus about preference of agricultural growth in reducing poverty as the best remedy. Some researchers advocates that primarily this sector should bear of the importance in reducing poverty because the majority of the poor live in rural areas and are employed in the agricultural sector. Another view is that non-agricultural activities provide capital accumulation and thus more rapid development. Many studies in the literature, suggest that investments in the areas like rural infrastructure, health and education with agricultural development in developing countries are pro-poor.

The objective of this study is to examine whether there is a relationship between agricultural growth and economic growth in the long-term and to analyze whether there is a relationship between agricultural credits as an agricultural support and agricultural growth in the long term. In addition, it is aimed to investigate if the agricultural credits is effective on the number of people employed in agriculture. Empirical findings of the study reveals that agricultural credits has a direct effect on agricultural income and employment, on the other hand it also shows that agricultural credits has indirect effect on the agricultural income due to the impact of agricultural credits on agricultural income and the impact of agricultural income on agricultural employment.

**Key Words:** Pro-poor growth, agricultural credits, agricultural growth,

**JEL Classification:** Q4, Q10, D31

## 1. INTRODUCTION

In recent years, the primary objective of public policies in Turkey as in many developing countries is to reduce poverty. The agricultural sector has great importance for Turkey for many reasons such as the high rate of rural population in the total population in the same way large share of employment in the agricultural sector, the sector's contribution to the formation of national income. In recent years, eventhough the share of the agricultural sector has declined in GDP and in foreign trade, its important role in employment is still protected. The agricultural sector is the backbone of the rural economy. Not only in Turkey but also in the world most of the poor people live in rural areas and are employed in the agricultural sector.

The share of the agriculture sector in GDP has decreased steadily. while the share of agriculture in Turkey was 43.1% of GDP in 1923, this ratio stood at 11.4% as of 2005. It is known that the share of agriculture in GDP has been gradually decreasing while development increases, but protection of the size of the rural sector in Turkey, providing livelihood mostly from agricultural activities and are employed 27.3% of total employment indicates a major issue in the industry. There is hidden unemployment in the agricultural sector that has a significant share of total employment. On the other hand, the vast majority of those employed in the sector have low education levels and unskilled limits the mobility of labor across sectors. This situation increases poverty.

While contraction of the agricultural sector lead to increase unemployment and interference income distribution, on the other hand leads to an increase in both rural and urban poverty by accelerating rural-urban migration. Poverty more affected the rural sector that the vast majority of it are landless peasants and small agricultural businesses. The poor people in rural areas even deeper feel poverty as they benefit fundamental rights and services like education and health services with limited and difficultly. On the other hand, the lack of alternative source of income of the poor people outside the agricultural sector increases the gravity of the problem.

### 1.1. The Relationship between poverty and agricultural-economic growth

Although, there is a general view that agriculture is an important sector in the economies of countries there is no consensus about if it is the best remedy of preference of agricultural economic growth for poverty reduction. Some researchers claims that this sector should have priority in reducing poverty as the majority of the poor live in rural areas and are employed in the agricultural sector.

Another view is that the non-agricultural activities provide capital accumulation, and thus faster development (Öztürk, 2008).

There is a lot of work in the literature and the theory demonstrating that agricultural growth is a prerequisite for economic growth. Mundlak, Cavallo, and Domenech (1989), Hupp and Ravallion (1991), Datt and Ravallion (1998), Gallup, Radelet and Werner (1997), Timmer (2002), Thirtle et al (2003), Sabur (2004), Chabbi and Lachool (2007), Suryahadi, Suryadarma and Sumarto (2009) can be given as a few of many examples emphasizes the importance of increase in agricultural productivity and production in reducing poverty.

Lewis (1954) and Johnston and Meller (1961) are the first working economists in the theory on the multiplier effect of agricultural sector. They claimed that as a labor-intensive sector, agriculture provide labor employment and the supply of cheap food and raw materials in countries where capital accumulation is insufficient, and provide the demand for non-agricultural goods by the savings. Therefore, they depicted agricultural growth as the key of food security, poverty reduction and political stability (transferring Bezemer and Headey, 2008).

Ravallion and Datt (1996); Datt and Ravallion (2008), have demonstrated in their studies that India's agricultural growth reduced in both rural and urban poverty. Agricultural growth at the macro level may be beneficial for the poor than growth in other sectors. The rural-urban connections with many factors are particularly important in this regard.

The most important point here is that agricultural growth is more pro-poor growth. Because usually there is not a barrier to entry in the labor-intensive agricultural sector, aggricultural growth will increase employment in the agricultural sector. Increasing agricultural productivity relief both rural and urban poor by reducing food prices. Increase in agricultural production especially in small-scale family enterprises are more effective in reducing poverty (Bezemer and Headey, 2008). In addition, the increase in agricultural production can help an increase in non-agricultural activities in rural areas.

Thirtle and others (2001) investigated the hypothesis agricultural growth, especially productivity growth in the agricultural sector plays an important role in reducing poverty. Their study showed that agriculture can reduce poverty through a multiplier effect on the economy. For example, in the event of an increase of 1% of labor productivity in agriculture the number of people living on less than $ 1 a day will decrease by between 1.2% to 6%.

Datt and Ravallion (2002) identified in their study on India that the flexibility of the non-agricultural sectors is higher in the states where the level of education is high, agricultural productivity is more, landless peasants is less and child mortality rates are low.

Sabur (2004), in his study analyzed the impact of agricultural growth on rural poverty in Pakistan found that an increase of 1% of income decreases 0.25% of rural poverty.

Katırcıoğlu (2006), examined the relationship between agricultural sector and the economic growth between 1975-2002 in North Cyprus with cointegration analysis in his study and found the long-term bi-directional causality as a result of analysis. The study revealed that the agriculture sector is still affecting the economy despite the political problems in the country.

Chabbi and Lachaal (2007) have analyzed the contribution of agriculture to economic growth and the ties between other sectors in Tunisia. The findings show that economic sectors tend to move together in the long term, however in the short term, the role of agriculture leading to other sectors of the economy is the extremely limited.

Many studies in the literature reveals that rural infrastructure, health and education investments with agricultural sector investment in developing countries are pro-poor. However, in the last 30 years, a trend observed in the allocation of resources against the agricultural and rural economy. Bezemer and Headey (2008) revealed the impact of agricultural growth on economic development and poverty reduction. They showed in their study that the agricultural sector has highly neglected especially in the last 10 years both by lenders and the governments of developing countries in spite of the importance of it.

Suryahadi, Suryadarma and Sumarto (2009) analyzed the relationship between economic growth and poverty by means of separation of industrial and residential areas in their studies. They found that sectoral growth affect poverty in different ways, rural agricultural development in Indonesia reduce poverty effectively in rural areas.

OECD's 2006 report draws attention to the role economic growth on reducing poverty and the contribution of agriculture to the economic growh. In many developing countries, agriculture is the main a source of employment, national income and foreign exchange revenues. Agricultural growth reduce poverty especially in rural poverty by reducing and stabilizing food prices, providing employment to the rural population, increasing demand for consumption of goods

and services, and transferring the economic grtoth to the non-agricultural sectors. However, in recent years, this relationship is threatened. the new global foreign trade conditions have disadvantages for poor producers. Governments in many developing countries cut or significantly reduce their support to the agricultural sector, the share of public investment in the agricultural sector steadily decrease, but this gap does not substitute by the private sector as expected(OECD, 2006).

The market mechanism, by providing competition, and by encouraging more efficient use of resources and innovation plays a key role for economic development. The belief that shaping supply and demand according to market signals such as prices, interest rates, and profits instead of state intervention in the economy will accelerate economic growth has led to the illusion that the state should take up less space in the agricultural sector. However, the state should take a greater role and in the agricultural sector to reduce production costs and help to increase productivity. Market liberalization policies aimed at creating a more efficient agricultural market was a well-intentioned policy actually but has not produced very good results especially for the agricultural sector in developing countries. The role of the state has been reduced with Neo-liberal policies by rapidly reducing supports such as credit and input supply provided to the farmers. It is assumed that the private sector will successfully undertake the task of the public sector. However, this has not been, to reduce the role of the state in agriculture adversely affected agricultural production in the short term (Kimenyi, 2002).

### 1.2. Agricultural Credits and Agricultural Growth

The agricultural sector in Turkey including both traditional and modern production technologies exhibits a dual structure. Traditional small family businesses are disadvantaged compared to modern businesses about input supply and product marketing. Production technologies show significant differences according to region. The average size of 1.6 ha of agricultural businesses is significantly behind the EU countries. Labor productivity in the sector is quite low (Tanrıvermiş and Bülbül, 2007). Turkey gradually lose the distinction of being the country self-sufficient in agriculture. Dependence on foreign sources, especially for certain agricultural products is increasing.

The amount and of quality resources allocated to agriculture, the amount of capital employed and the level of technical knowledge and equipment of manufacturers must be improved in order to increase agricultural production. Lack of capital is one of the most important problems of the agricultural sector in Turkey (Çelik, 2000).

The neo-liberal economic policies causes a decrease in the total public investments in the agricultural sector. On the other hand, due to the global economic policies and international agricultural agreements, significant changes in agricultural support policies have been made since 2001 in Turkey and support payments in GDP dropped to below 1%.

In addition to these developments, as mentioned earlier, agricultural structure's being mainly small-scale enterprises worsens of capital accumulation in the sector, therefore increases the need for loans to meet the capital requirements. The state supports agricultural sector with agricultural loans due to provide the required input and investment goods of agriculture in the development.

The most important source of agricultural credit in Turkey are TR. General Directorate of Agricultural Bank and the Central Union of Agricultural Credit Cooperatives largely funded by Agricultural Bank. In addition, even if other banks give agricultural credits their share in total credits is very small.

There is a limited number of empirical study in the literature have been analyzed the relationship between agricultural loans and agriculture and economic growth. Çelik carried out a study to determine the relationship between quantities of plant production inputs and the values of crop production covering the years 1963-1992. as a result of regression analysis in the case of 100% increase in crop production credits, 12% increase in crop production value would be set. In the same study, it was found that 100% increase in animal production credits will lead to an increase in the value of animal production 503'% (Çelik, 2000).

Tomasz (2008), investigated the role of agricultural credit in the development of the agricultural sector in Poland. He found that the agricultural credit that the majority of them funded by co-operative banks have statistically significant positive impact on agricultural growth of only two regions among country's 16 regions (voivodship). He concluded that most the most impotant factors affecting agricultural development in Poland are average farm size and agricultural employment.

Akram et all (2008) used a macro model (time series analysis) in their study to avaluate and analyze the impact of institutional credşt on farm productivity, agricultural growth and alleviation of poverty. They found that the agricultural credit has a positive impact on GDP and the impact of agricultural credit in reducing poverty was significant both in the short run and the long run.

Anthony (2010) did an emprical analysis of the impact of agricultural credit on economic growth in Nigeria. Findings revealed that agricultural variables have

impact on economic growth. It suggest that agricultural credits is an effective instrument for counter-cyclical agricultural output, non-oil export and GDP stabilization in Nigerian economy.

Khan, Naushad et all (2011), after the review of past literature on agricultural credit in rural area of Pakistan concluded that agricultureal credit not only developed the farming but also effected every sector of the economy positively.

### 1.3. The econometric analysis of the relationship between agricultural credits and agricultural and economic growth

The purpose of this study is to test whether there is a relationship between agricultural growth and economic growth in the long-term and to analyze whether there is a relationship between agricultural credits as an agricultural support and agricultural growth in the long term. In addition, it is aimed to explore if the agricultural credits is effective on the number of people employed in agriculture.

Models used in this study;

(1) $LGSMH = \alpha 0 + \alpha 1\ LTGELİR + \varepsilon t$

(2) $LTGELİR = \alpha 0 + \alpha 1\ LTKREDİ + \alpha 2 LTİSTİHDAM + \varepsilon t$

t=1970-2008

α in models shows the parameters to be estimated; LGSMH is real gross national product (million TL); LTGELİR is real agricultural income (million TL); LTKREDİ is agricultural loans (thousand TL); LTİSTİHDAM is agricultural employment (thousand people); εt shows the error term. The natural logarithm of all the variables has been taken to interpret flexibility. Data used in this study (GNP, TGELİR and TİSTİSDAM series) were taken from TURKSTAT, TKREDİ series was compiled from a variety of years of the annual reports of the Association of the Bank of Turkey. Eviews-5 package program was used for the analysis.

| Linear Regression Equation: lnGSMH=f(lnTGELİR) | | |
|---|---|---|
| Variables | Coefficients | t-stat |
| Constant | -33.08266 | -18.59309 |
| lnTGELİR | 3.121863 | 28.77972 |
| R2: 0.959457 | | |
| $\overline{R}^2$: 0.958298 | | |
| DW: 2.001546 | | |
| F-stat: 828.2720 | | |

The results of the model estimated linear regression for 1. equation proves that there is a positive correlation between agricultural income and GDP.

| Linear Regression Equation: lnTGELİR=f(lnKREDİ, lnİSTİHDAM) | | |
|---|---|---|
| Variables | Coefficients | t-stat |
| Constant | 17.50229 | 29.13154 |
| lnKREDİ | 0.026659 | 21.82115 |
| LnİSTİHDAM | -0.148302 | -2.239093 |

R2: 0.944085
$\overline{R}^2$ : 0.940796
DW: 1.918388
F-İstatistik: 287.0343
LM Test: 0.549
White Heteroskedasticity Test: 0.460246

The results of the model estimated linear regression for 2. equation is revealed that there is a positive correlation between agricultural income and agricultural loans, whereas a negative correlation between agricultural employment and agricultural income.

The result of Granger causality analysis causal relationships between variables was tested is given in the table below.

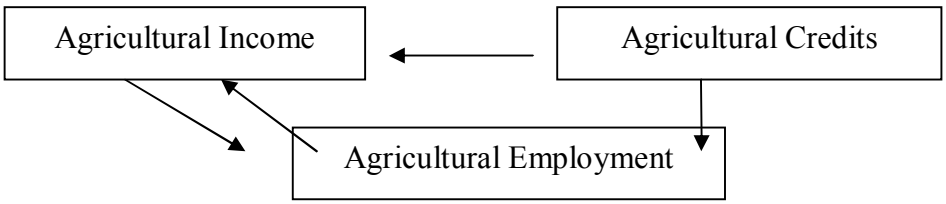
Pairwise Granger Causality Tests

| Null Hypothesis: | Obs | F-Statistic | Probability |
|---|---|---|---|
| LKREDİ does not Granger Cause LTGELİR | 35 | 3.51659 | 0.04246 |
| LURETIM does not Granger Cause LKREDI | | 0.72479 | 0.49271 |
| LISTIHDAM does not Granger Cause LURETIM | 35 | 0.46760 | 0.63100 |
| LURETIM does not Granger Cause LISTIHDAM | | 1.91386 | 0.16509 |
| LISTIHDAM does not Granger Cause LKREDI | 35 | 3.93760 | 0.03030 |
| LKREDI does not Granger Cause LISTIHDAM | | 2.37565 | 0.11022 |

## 2. CONCLUSION

Empirical findings of the study reveals that agricultural credits has a direct effect on agricultural income and employment, on the other hand it also shows that agricultural credits has indirect effect on the agricultural income due to the impact of agricultural credits on agricultural income and the impact of agricultural income on agricultural employment.

**Figure: Relationships between agricultural income, credits and employment**




Studies in the literature show that the agricultural sector has played an important role in reducing poverty in developing countries. It is not possible to test econometrically the impact of the agricultural sector on poverty due to lack of statistical data. However, it can be said that the increase in agricultural income reduce rural poverty in Turkey by making a generalization depending on similar feature of developing countries,

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