

Rural Unemployment, the Problems which it Generates and Strategies to Reduce it: A Case-Study from Rural Turkey

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1. Introduction

In the economic field in general, unemployment means the lack of exploitation of potential production strength by keeping inactive the scarce production factor of labour (Bicerli, 2004). The Poverty Commission identified unemployment as the main cause of poverty (Gregory and Sheehan, 1998). Unemployment is a central problem because when it is high, resources are wasted and people's incomes are depressed; during such periods, economic distress also spills over to affect people's emotions and family lives (Khalil and Saleem, 1999).

The problem of unemployment in developing economies is conceptually very different in urban-industrial and rural-agricultural areas. Urban unemployment relates to problems of appropriate growth strategies in the framework of an increasingly integrated world economy where relatively high labour productivity levels are required. On the other hand, unem-

Abstract

Rural unemployment is on top of the unsolved problems of developing nations; so far there have been no significant developments towards its solution. The importance of the present work is to show the causes and effects of unemployment experienced in rural areas, and to give suggestions for its solution. An evaluation was made of the reasons for rural unemployment by means of empirical analysis at micro- and macro-level. The macro-level analysis was based on data from the Turkish Statistical Institute for the period 1989-2006. In this analysis, the causal relationship between rural unemployment and national and urban unemployment levels, GNP, and rates of growth in the agricultural, industrial and service sectors is investigated by time series analysis. The results showed a uni-directional causal relationship towards rural unemployment between urban and rural unemployment, and between national and rural unemployment. The micro-level analysis was performed with data obtained from a survey carried out in 2007. In micro-analysis, the factors influencing rural unemployment were estimated by the probit analysis model. According to the results obtained, the reasons for increasing rural unemployment were found in the size of households, longer distance between villages and the provincial capital, and poor income and social security. It is thought that this study, taking Turkey as an example for the problems and suggested solutions of rural unemployment, can serve as a guide for similar studies in other countries.

Keywords: unemployment, employment, rural, agriculture, Granger Causality Tests, Probit.

Résumé

Le chômage en milieu rural est parmi les principaux problèmes qu'on observe dans les pays en développement et jusqu'à présent, il n'y a eu aucun progrès significatif vers sa solution. Le but de ce travail était de montrer les causes et les effets du chômage dans l'espace rural et d'envisager des actions possibles pour y faire face. A cette fin, on s'est appuyé sur une analyse empirique à micro- et macro-échelle. L'analyse de macro-niveau a été basée sur des données fournies par l'Institut Turc des Statistiques pour la période 1989-2006. Les relations causales entre le chômage rural et les niveaux de chômage national et urbain, le PIB et les taux de croissance dans les secteurs agricole, industriel et des services ont été approfondies à travers une analyse des séries temporelles. Les résultats ont mis en évidence une relation causale unidirectionnelle vers le chômage rural entre le chômage urbain et rural, et entre le chômage national et rural. L'analyse de micro-niveau a été réalisée en utilisant les données issues d'une enquête de 2007. Dans la microanalyse, les facteurs qui influent sur le chômage rural ont été estimés à l'aide d'un modèle probit. Sur la base des résultats obtenus, on a identifié les raisons de l'accroissement du chômage rural, à savoir la taille des ménages, la distance entre les villages et la capitale régionale, le faible revenu et la sécurité sociale limitée. En conclusion, cette étude qui propose la Turquie comme un cas d'école pour le problème du chômage rural et les solutions envisagées pourrait servir de modèle pour des enquêtes similaires à réaliser dans d'autres pays.

Mots-clés: chômage, emploi, rural, agriculture, Test de causalité de Granger Tests, Modèle Probit.

ployment in rural areas takes the form of serious under-employment of either wage labourers or self-employed farmers, with very low productivity levels. This results in an often dramatic rural poverty, which can be considered the most effective indicator of actual rural unemployment. Urban and rural unemployment, however, interrelates strongly, especially in developing countries with a large share of the labour force concentrated in rural areas. Inadequate rural development limits its labour absorption capacity and may lead to rural-urban migration with negative effects on labour productivity in urban modern sectors (Pianta and Vivarelli, 1997). Determining the reasons for the unemployment experienced in rural areas is important when developing proposals for the solution of this problem. In this study, the causes and effects of rural unemployment were shown in a survey carried out in Turkey, and evaluation was made on various aspects. Empirical analysis of the rea-

sons for rural unemployment provided an opportunity for a wider evaluation.

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Table 1. *The Labour Market in Turkey.*

	1988	2000	2008
TURKEY			
Population (000)	53.284	67.420	71.517
Active population (15-64) (000)	31.462	42.613	45.963
Labour force (15-64) (000)	18.893	22.329	23.242
Participation rate of the active population to labour force (%)	60.05	52.40	50.57
Employed (15-64) (000)	17.264	20.836	20.636
Employment rate of active population (%)	54.87	48.90	44.92
Unemployed (15-64) (000)	1.629	1.493	2.606
Unemployment rate (%)	8.62	6.69	11.21
URBAN			
Population (000)	26.481	38.661	53.612
Active population (15-64) (000)	16.345	25.988	32.981
Labour force (15-64) (000)	8.241	12.063	15.931
Participation rate of the active population to labour force (%)	50.42	46.42	48.30
Employed (15-64) (000)	7.158	10.994	13.883
Employment rate of active population (%)	43.79	42.30	42.09
Unemployed (15-64) (000)	1.083	1.069	2.048
Unemployment rate (%)	13.14	8.86	12.86
RURAL			
Population (000)	26.803	28.759	17.905
Active population (15-64) (000)	15.117	16.625	12.983
Labour force (15-64) (000)	10.652	10.267	7.311
Participation rate of the active population to labour force (%)	70.46	61.76	56.31
Employed (15-64) (000)	10.106	9.842	6.754
Employment rate of active population (%)	66.85	59.20	52.02
Unemployed (15-64) (000)	546	425	557
Unemployment rate (%)	5.13	4.14	7.62

Source: TurkStat. (2008a), Labour Force Statistics, (<http://www.tuik.gov.tr/isgucuapp/isgucu.zul?dil=2>)

2. Employment and Unemployment in Rural Areas in Turkey

In countries with a high rate of population increase, serious problems are encountered with regard to employment, and Turkey is one such country in terms of its population and employment structure. It has a young population: the active population between the ages of 15 and 64 showed a 46.09% increase between 1988 and 2008, but there was only a 19.53% increase in the population in employment (Table 1). At the same time, the proportion of the active population who forms part of the work force is declining from year to year. This proportion was 60.05% in 1988; it fell down to 50.57% by 2008. This is very low in comparison with the average in the European Union and OECD countries. Thus, participation in the workforce in 2008 in the EU was reported to be 72.54%, and 72.16% in the OECD countries (OECD, 2008). It is reported that there are many possible reasons for this low participation level in the workforce. Some of these reasons are loss of hope of finding work so that the individual is no longer seeking employment, unwillingness to work for low pay and a lack of social security, migration from the rural areas to the cities resulting in women being withdrawn from the workforce, a preference for early retirement, an extension of the average

length of education, and the low level of education of the workforce (Sapanca, 2008). Alongside the level of participation of the active population in the workforce, its participation level in employment is low and is showing a reduction from year to year. The employment level in the active population was 54.87% in 1988; it fell down to 44.92% in 2008. At the same time, the employment level of the active population is reported as 67.52% for the EU, and 67.99% for the OECD countries (OECD, 2008).

When rural and urban employment levels in Turkey are examined, it is seen that there has been a significant decline in employment, especially in rural areas. In the period 1988-2008, employment levels in rural areas of Turkey fell from 66.85% to 52.02%, unemployment rate increased from 5.13% to 7.62% (Table 1). This reduction in employment levels in rural areas of Turkey springs basically from the agricultural sector, which is an important field of activity. The total share of rural employment in the region taken by agriculture was 76.8% in 1990; it fell down to 60.8% by 2008 (Table 2). In Turkey overall, the total share of employment taken by agriculture declined over the same period from 46.9% to 23.7%. There are many reasons for this decline in agricultural employment. Some of these are the small amount of land available for agriculture given the rising population, a lack of sufficient investment which would produce an increase in agricultural and non-agricultural employment, problems in the agricultural market, and inadequate support for agriculture. At the same time, a lengthening of the time spent in compulsory education has resulted in a proportional reduction in agricultural employment levels.

In spite of this, when Turkey is compared with other countries, it can be seen that agriculture still occupies a large share of total employment. For example, the share of agriculture in total employment in the EU (27) in 2007 was 5.6% (Eurostat, 2008). Even though the proportion of employment in agriculture in Turkey is high, the education level in the sector is low, and there is an excess of unskilled labour. This results in a problem of underemployment and unemployment. The underemployment level throughout Turkey is 3.5%, and in rural areas it stands at 4.3% (TurkStat, 2008).

While the level of unemployment in rural areas of Turkey is increasing, approximately one out of three of those actually in employment work unpaid within the family. This situation is more widespread in agriculture, where 48 % of the workforce works unpaid within the family (Table 3). A significant proportion of these unpaid family workers are women. This proportion is 75.5% in rural areas, and 78.1% in agriculture (TurkStat, 2008). Even if the long-standing share in employment of unpaid family members is declining, it is still very significant. However undesirable this situation may be for the sector, it nevertheless helps to mitigate the bad effects of unemployment, especially in times of economic crisis. Thus, the search for work of 2.224 million employed unpaid people in rural areas in 2008 (2.099 in the agricultural sector) would cause serious problems for the sector, and for the economy in general.

Table 2 - *Employment in Turkey and in Rural Areas (%)*.

	Agricultural (%)	Non-Agricultural (%)	Agricultural (%)	Non-Agricultural (%)
1990	46.9	53.1	76.8	23.2
2000	36.0	64.0	70.1	29.9
2004	34.0	66.0	67.5	32.5
2005	29.4	70.6	61.4	38.6
2006	27.3	72.7	59.1	40.9
2007	23.5	76.5	61.2	38.8
2008	23.7	76.3	60.8	39.2

Source: TurkStat. (2008b), The Results of Household Labour Force Survey. (http://www.turkstat.gov.tr/VeriBilgi.do?tb_id=25&ust_id=8)

Table 3. *Employment Structure of Rural Areas and the Agricultural Sector in Turkey.*

Years	Regular employee and casual employee	Own-account worker and employer	Unpaid family worker	Regular employee and casual employee	Own-account worker and employer	Unpaid family worker
1990*	19.2	34.3	46.5	3.9	36.3	59.8
2000	23.7	36.4	39.9	4.5	41.3	54.2
2004	25.5	37.1	37.4	5.3	42.0	52.7
2005	30.0	38.4	31.6	6.2	45.2	48.6
2006	32.4	37.6	30.0	7.1	45.6	47.3
2007	30.7	38.2	31.1	6.0	46.2	47.8
2008	31.4	37.6	31.0	5.9	46.1	48.0

* October;
Source: TurkStat. (2008b), The Results of Household Labour Force Survey. (http://www.turkstat.gov.tr/VeriBilgi.do?tb_id=25&ust_id=8).

3. Data

The evaluations in this study are based on analyses of primary and secondary data. The primary data were obtained from a survey carried out in 2007, and the secondary data are from the Turkish Statistical Institute. The survey work performed for this study was carried out in the Aegean Region of Turkey, which occupies an important place in the country in terms of agricultural and non-agricultural production (Gumus et al., 2008). The three provinces in the region with the lowest, medium and highest socio-economic development index (İzmir, Manisa and Kütahya) were chosen as representative of the region as a whole.

Then, in choosing the districts within these provinces where the study would be performed, the development indexes of those districts were taken into account. Thus, the three districts with the lowest development indexes were chosen from each province, together with the one district with the highest development index, making a total of four. In this way, the districts of Kinik, Beydag, Kiraz and Torbali were chosen in Izmir province, Koprubasi, Gordes, Selendi and Turgutlu were chosen in Manisa, and Altintas, Cavdarhisar, Aslanapa and Tavsanlı were chosen in Kutahya. The villages in each district were chosen by the judgment sampling method. For this purpose, the villages in each district were divided into three groups: those at a high, medium and low state of development. From among these villages, two were chosen from the low-income group, one from the medium-income group and one from the high-income group, a total of four. By the use of the quota sampling method in the study, a total of 386 farmers were interviewed in 48 villages in 12 provincial districts.

4. Methodology

Analysis of the primary data comprised an estimation of the factors affecting rural unemployment using probit model analysis. To this end, probit analysis was carried out on the binary preference model. In the model, unemployment was taken as the dummy dependent variable, with farmers' families with unemployment given the value 1, and those without the value 0. In this model, the state of employment or unemployment of the i 'th farm is dependent on an unobservable utility index I_i . As the size of the index I_i increases, the probability of

unemployment also rises. Index I_i is given below (Kutlar, 2005):

$$I_i = \beta_1 + \beta_2 X_i$$

A number of independent variables were used in the model with the idea that they could have an effect on rural unemployment. These were land area, whether the land was owned (dummy variable: owned: 1; not owned: 0), size of household, total income, distance of the village from the district and provincial capitals, ease of transport (dummy variable: difficult transport: 1; easy transport: 0), social security (dummy variable: social security: 1; no social security: 0), and plant or animal products as a share of agricultural income.

In addition, rural unemployment was examined using the time series data for 1989-2006 from the Turkish Statistical Institute. The aim was to establish by analysis a causal relationship between rural unemployment and a number of selected macro variables. These variables were national and urban unemployment levels, GDP, and rates of growth of the agricultural, industrial and service sectors.

Identification of these causal relationships was performed with the use of Granger Causality Analysis. This was done by means of the two equations below (Karaca, 2003).

$$Y_t = \alpha_0 + \sum_{i=1}^{k1} \alpha_i Y_{t-i} + \sum_{i=1}^{k2} \beta_i X_{t-i} + \varepsilon_t \quad (1)$$

$$X_t = \chi_0 + \sum_{i=1}^{k3} \chi_i X_{t-i} + \sum_{i=1}^{k4} \delta_i Y_{t-i} + v_t \quad (2)$$

In the Granger Causality Analysis, a test was made to find whether the coefficients of the lag values of the independent variables before the error terms in the above models were collectively equal to zero. If the β_i coefficients in equation 1 are found to be appreciably different from zero, the result is reached that X is the cause of Y. In the same way in equation 2, if the coefficients δ_i are significantly different from zero, it shows that Y is the cause of X. This means that Y and X are in a mutually causal relationship. According to the results of the hypothesis test, unidirectional causality and the lack of a causal relationship are other possibilities (Yavuz, 2006).

5. Results and Discussion

5.1. Reasons for Rural Unemployment

In this section, the factors causing rural unemployment are assessed from the findings of research work carried out in the Turkish provinces of İzmir, Manisa and Kütahya (Gumus et al., 2008), in which the extent of and basic reasons for unemployment were determined in interviews with 386 farmers. Here it was found that in the families of 110 of the 386 interviewed (28.5%) there were unemployed persons. In these 110 farms there was an average of 1.52 unem-

Causes of Unemployment	%
Restricted market for agricultural produce and low product prices	19.7
Insufficient agricultural and non-agricultural resources	17.5
Lack or insufficiency of non-agricultural employment opportunities	14.5
Insufficient investment by the public and private sectors	14.2
Insufficient government help and support	12.8
Low level of regional development (province, district).	10.7
Other	10.6

employed persons per farm; 61.1% had one person unemployed and 29.6% had two.

The reasons for the unemployment seen in rural areas and especially in the agricultural sector of developing countries are broadly similar everywhere. For example, among the reasons for unemployment in India are the rapid rise in population, the insufficient enlargement of the economy, the lack of opportunities for employment in areas outside agriculture, seasonal employment, a joint family system, and the lack of absorption of the agricultural labour force excess by the slowly-expanding industrial sector (Gopal et al., 2007). In the case of Turkey, it can be seen that the reasons are not very different. According to the farmers interviewed in the course of the survey, there are other reasons for rural unemployment. These reasons are summarized in Table 4. According to this, the first basic reason for rural unemployment are the limitations of the market in agricultural produce, and the low producers' prices of these products. The main reason for this can be seen in the fact that the organization of the rural sector in Turkey into cooperatives is inadequate, and the space is filled with a large number of middle-men. The inability of farmers to sell their produce at its true value means that they have to seek for alternative employment.

A second basic reason for rural unemployment is that resources in and outside agriculture are insufficient. The biggest problem in terms of agricultural resources is the insufficiency of land per farm. The rapid increase in population in rural areas and Turkey's inheritance laws are the biggest reasons for the breakup of agricultural land. For example, the average landholding of 386 interviewed farmers was 3.67 hectares, which is well below the average for Turkey of 6.10 ha. Considering that average farm size in the EU (27) in 2007 was 12.6 ha (16.8 ha in the EU-25), it can be said that average farm size in Turkey is generally very small (Anonymous, 2009). The differences in climate, topography and ecology of the geographical region which Turkey occupies have an effect on agricultural activities. This can be seen in a concrete way in the provinces of Izmir, Manisa and Kutahya, where the research was carried out. In particular in the areas where unemployment was greater, the land was rough, the fields were unlevelled and water sources were inadequate, making farming more difficult for the people living there. This has an adverse effect in rural employment. The availability or unavailability of resources outside agriculture can have an effect on rural unemployment. Thus, in the survey it was found that rural

communities with mining (coal, marble, iron, perlite, etc.), water resources or forests were significantly more developed in terms of employment, while in rural areas which were poor in non-agricultural resources, the magnitude of unemployment was much greater.

According to the farmers interviewed, a third reason for rural unemployment was the lack or inadequacy of non-agricultural employment. This could be clearly seen in villages which were in mountain areas and far from the district centre. At the same time it was seen that some district centres were not well developed in terms of industry, whether related to agriculture or not. Some farmers were of the opinion that unemployment was greater in rural areas where there was little or no public or private investment. This view is closely related to the fact that at the same time the possibility of non-agricultural employment is low.

A proportion of the farmers interviewed (12.8%) thought that rural unemployment was rising as a result of the insufficiency of government help and support. Even though the amount in the budget reserved for agriculture increases year after year, agriculture's share of GDP does not change. In 2008, the amount in the budget set aside for agriculture in Turkey, including rural development, was 2.84 billion Euros (5.4 billion TRY-Turkish Lira), or a 2.48% share of a total budget of 217 billion TRY, while in the EU, 42.60% of a budget of 129.1 billion Euros was given for agriculture, including direct aids, market-related expenditures, rural development, the environment, fisheries, etc. (Anonymous, 2008). Thus, it can be said that the support given to Turkey's rural areas is quite inadequate.

Some farmers (10.7%) felt that rural unemployment was high in the area where they lived because it was less developed. In Turkey, a region with a high index of socio-economic development such as Izmir will include villages such as the villages in the district of Kınık with a low development index. It was seen that there was no spending plan for villages in such locations. On the other hand, in the European Union, it is reported that some less-developed regions benefit from greater rural development expenditures. For example, the per capita rural development budget in € is 96.1 for Ireland, 66.8 for Lithuania, 67.2 for Latvia, 66.1 for Greece, 37.1 for Spain and 5.9 for the UK (Juvančič, 2006).

10.6% of farmers thought that rural unemployment came from various other causes. One of these reasons was that various rural products which were labour-intensive such as sugar beet were subject to government production quotas. Because of these quotas, the labour force could not be properly exploited. Another reason was that there was no suitable grazing land around the villages for those wishing to keep animals. This was a reason why workers who were not occupied could not be employed. In addition, some farmers pointed out that the family workforce could not be employed all year round because it performed agricultural activities at certain times of the year.

Table 5. *The Effects of Unemployment According to Interviewed Farmers.*

Difficulty in Earning a Living	34.10
Depression	21.10
Trouble within the Family	16.70
Tendency to Criminal Activities	5.90
Health Problems	5.10
Undernourishment	5.00
Disruption of Social Life	4.80
Inability to Get a Good Education	3.50
Laziness from Giving up Hope of Finding Work	2.80
Tendency to Migrate to the Cities	1.00

5.2. Effects of Rural Unemployment

It can be seen that rural unemployment is a basic cause of economic problems and these eventually show themselves in social problems. A number of studies on the results of rural unemployment performed in different parts of the world have been found.

In a study by Saunders and Taylor (2002), unemployment was examined from a number of different aspects, and a study was made on the effects of unemployment on poverty, inequality, social exclusion, health, psychological state and crime. According to this study, the first results of unemployment are limited to low income and an increase in the risk of poverty. However, with time these can lead to effects such as depression and poor health, and this in turn leads to family and social problems. The study also showed that crime levels were higher in areas of high unemployment, and this was found to create difficulties for local services which were playing a key role in potential work and in the struggle against unemployment. In this study, it was emphasised that, in order to fight the personal crises related to unemployment, families are far from the normal channels of interaction which constitute their social life and become socially withdrawn.

The effects of unemployment in the rural areas of Turkey have been revealed in a survey in which 386 farmers were interviewed. The results obtained showed similarity with the findings of Saunders and Taylor (2002). According to a large proportion of the farmers interviewed (71.90%), there were three main effects of unemployment. These were, in order of importance, difficulty in earning a living, depression, and trouble within the family (Table 5). 5.90% of the farmers thought that unemployment increased the likelihood of such crimes as theft, robbery, participation in terrorist activities, and murder. Some of them (5.10%) felt that unemployment increased health problems. In particular it was reported that farmers and their families who had no social security were faced with serious health problems. Indeed, it was found that a large proportion of farmers involved in the study – 37.05% – had no social security. Those who had a low income could not solve their health problems because they could not pay the premiums of the social security systems they belonged to. According to 5% of farmers, unemploy-

ment led to undernourishment in people living in rural areas. According to some (4.80%), unemployment caused disturbances in social life. It was reported that unemployed individuals lost respect in society and in their families, and that their status in society was reduced. 3.50% of farmers were of the opinion that unemployed individuals could not pay for their children's education, thus causing an increase in the number of uneducated people in rural areas. According to 2.80% of the farmers, one cause of unemployment was the lazy individuals in society who had given up hope of finding work. Indeed, in the course of the survey, such people who were making no effort to find work were reported. Also, it was observed that people in this position tended to play more games of chance. A very small proportion of around 1% of the farmers reported that unemployment increased the tendency of migration from the rural areas to the cities. In fact, this result was seen as a problem causing the above-mentioned bad effects.

5.3 Empirical Results

In this section rural unemployment is examined both at the macro level by time series analysis and by cross-sectional data at the micro level.

At the macro level, the 19-year time series from 1988 to 2006 was considered, and a number of variables were found to have a causal relationship with rural unemployment in Turkey. These variables were urban unemployment, national unemployment, GDP, and the growth rates of the agricultural, industrial and service sectors. In order to show causal relationships, the Granger Causality Test was used. When using this test, the x and y variables must be stationary. If the average and variance of a series are not temporally constant and the series covariant is not temporally variable, the series is stationary (Enders, 1995). The use of non-stationary data in causality tests can produce false causality results (Granger-Newbold, 1974). It is necessary to first take the difference of variables which have been identified as not stationary by any of the tests, and to apply the causality test to the new series from which the difference has been taken (Yavuz, 2006). For this purpose, the stationary status of the variables under consideration was examined by ADF (the Augmented Dickey-Fuller) test, and the results are shown in Table 6. As can be seen from the table, all variables came out stationary in the first differences.

If two variables have a common trend, for there to be a long-term balance relationship, it can be said that two or

Table 6. *Augmented Dickey-Fuller Unit Root Test.*

Variables	1st difference (t-statistic)*	Probability
Rural Unemployment	-4.781672	0.0017
Urban Unemployment	-4.919811	0.0013
National Unemployment	-3.473308	0.0225
Growth of GNP	-8.670563	0.0000
Agricultural Growth	-16.76287	0.0000
Growth of Industry	-8.499365	0.0000
Growth of Services	-7.912545	0.0000
1 % level: -3.886751, 5 % level : -3.052169, 10 % level : -2.666593		

Table 7. Johansen Cointegration Test Results (rural, urban, national unemployment).

Hypothesize	Eigenvalue	Max-Eigen Statistic	0,05 Critical Value	Prob.
Trace Test				
r=0	0.881297	53.20684	29.79707	0.0000*
r≤1	0.601920	19.10875	15.49471	0.0136*
r≤2	0.239055	4.371117	3.841466	0.0365*
Maximum Eigenvalue Test				
r=0	0.881297	34.09809	21.13162	0.0005*
r≤1	0.601920	14.73763	14.26460	0.0421*
r≤2	0.239055	4.371117	3.841466	0.0365*

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level.

Table 7. Johansen Cointegration Test Results (rural, urban, national unemployment).

Hypothesize	Eigenvalue	Max-Eigen Statistic	0,05 Critical Value	Prob.
Trace Test				
r=0	0.999388	231.0273	69.81889	0.0000*
r≤1	0.991772	112.6440	47.85613	0.0000*
r≤2	0.701925	35.84059	29.79707	0.0089*
r≤3	0.532626	16.47403	15.49471	0.0355*
r≤4	0.235858	4.304027	3.841466	0.0380*
Maximum Eigenvalue Test				
r=0	0.999388	118.3833	33.87687	0.0000*
r≤1	0.991772	76.80345	27.58434	0.0000*
r≤2	0.701925	19.36656	21.13162	0.0867
r≤3	0.532626	12.17000	14.26460	0.1044

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level.

Table 9. Granger Causality Tests.

Causality	F-Statistic	Prob.	
Agricultural growth	Rural unemployment	2.26817	0.1543
Rural unemployment	Agricultural growth	0.92740	0.3519
Growth of GNP	Rural unemployment	0.17237	0.6843
Rural unemployment	Growth of GNP	0.55207	0.4698
Growth of Industry	Rural unemployment	0.01624	0.9004
Rural unemployment	Growth of Industry	0.68561	0.4216
Growth of services	Rural unemployment	0.07477	0.7885
Rural unemployment	Growth of services	0.61294	0.4467
Urban unemployment	Rural unemployment	10.5081	0.0059*
Rural unemployment	Urban unemployment	0.23553	0.6350
National unemployment	Rural unemployment	11.3637	0.0046*
Rural unemployment	National unemployment	0.01218	0.9137
Urban unemployment	National unemployment	0.00079	0.9779
National unemployment	Urban unemployment	0.34408	0.5668

more variables are cointegrated. According to this method, if two variables are cointegrated, not finding a causal relationship between them makes one of the possibilities of the standard Granger (1969) or Sims (1972) tests impossible. The existence of cointegration between the variables removes the spurious regression relationship (Pazarlıoğlu and Çevik, 2007). For this reason, cointegration relationship analysis was carried out for rural unemployment and other variables. VAR model estimates were carried out to find the lag number in the cointegration analysis, and a lag value was found. The results of cointegration are given in Tables 7 and 8.

According to the results of cointegration analysis, the basic hypothesis that there was a cointegrational relationship

between the variables was accepted. This shows the existence of long-term stable relationship between rural unemployment and the other variables. This result at the same time enabled the Granger test to be used to show a causal relationship. Table 9 shows the results of the analysis from the Granger test. The results of Granger causality analysis show that there is a uni-directional causal relationship towards rural unemployment between urban and rural unemployment on the one hand, and national and rural unemployment on the other. According to this analysis, unemployment in urban areas and generally at a national level affects rural unemployment. Thus, the existence of employment opportunities in urban areas provides an opportunity for people migrating from rural areas in order to look for work. However, in an opposite result, it was seen that the number of people leaving the countryside for the cities was falling, and even that some people who had previously migrated to the cities were returning. This leads the dimensions of rural unemployment to increase further.

In this study, it was found that there is cointegration between agricultural growth and rural unemployment, that is, there is a long-term stable relationship. However, a causal relationship was not found between them. It was seen that the same conclusion was reached in a study carried out in Nigeria (Ayinde, 2008).

In order to find the factors at a micro level which affected rural unemployment, a probit model was used in the study. In this model, the Quadratic Hill Climbing Algorithm was used as a maximum likelihood algorithm. The equation model formed is given below.

$$I = \beta_0 + \beta_1 \text{farmland} + \beta_2 \text{landowner} + \beta_3 \text{households} + \beta_4 \text{totalincome} + \beta_5 \text{distcounty} + \beta_6 \text{distprovince} + \beta_7 \text{transportation} + \beta_8 \text{socsecurity} + \beta_9 \text{vegrates} + \beta_{10} \text{animrates} + u$$

According to the results of the probit model as seen in Table 10, the coefficients of the variables obtained generally came out as expected. However, variables such as land size (farmland), the owner of the land (landowner), distances between the village and the district centre (distcounty), transport facilities (transportation), and the share in agricultural income of plant and animal products (vegrates and animrates) did not have a significant relationship with rural unemployment. On the other hand, size of household (households), total income (totalincome), distance between the village and the provincial capital (distprovince) and so-

Table 10. *The results of the probit model.*

Dependent Variable: UNEMPLOYMENT				
Method: ML - Binary Probit (Quadratic hill climbing)				
Sample: 1 386				
Included observations: 386				
Convergence achieved after 5 iterations				
Covariance matrix computed using second derivatives				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.110469	0.412575	-2.691555	**0.0071
FARMLAND	-0.001168	0.001086	-1.075436	0.2822
LANDOWNER	-0.017244	0.165466	-0.104213	0.9170
HOUSEHOLDS	0.209769	0.045579	4.602344	*0.0000
TOTALINCOME	-4.90E-05	1.14E-05	-4.310876	*0.0000
DISTCOUNTY	-0.003861	0.007175	-0.538102	0.5905
DISTPROVINCE	0.002739	0.001540	1.778174	**0.0754
TRANSPORTATION	0.035983	0.156493	0.229936	0.8181
SOCSECURITY	-0.359784	0.151008	-2.382550	**0.0172
VEGRATES	6.57E-05	0.002660	0.024711	0.9803
ANIMRATES	0.002972	0.003051	0.974223	0.3299
Mean dependent var	0.284974	S.D. dependent var		0.451988
S.E. of regression	0.424368	Akaike info criterion		1.086887
Sum squared resid	67.53307	Schwarz criterion		1.199618
Log likelihood	-198.7693	Hannan-Quinn criter.		1.131592
Restr. log likelihood	-230.6697	Avg. log likelihood		-0.514946
LR statistic (10 df)	63.80098	McFadden R-squared		0.138295
Probability(LR stat)	6.87E-10			

* %1, **% 5, *** %10 düzeyinde anlamlı.

cial security (socsecurity) did have a significant relationship with rural unemployment. Thus, rural unemployment was increased by an increase in household size and the distance between the village and the provincial capital. As can be seen from the descriptive statistics in Table 11, the size of farming households with unemployment (4.84) was greater than the size of those without (4.05). The fact that the growth of the population of rural areas in Turkey is large but that employment possibilities are limited supports this result. The distance to the provincial capital from villages with farms where there was unemployment (110.96 km) was greater than for farms where there was no unemployment (95.44 km). The fact that employment opportunities are generally to be found in provincial capitals is a handicap for people living in rural areas. Thus, distance from a village to the provincial capital generally has a negative effect on its people.

In addition, it is clearly shown that rural unemployment increases in connection with a reduction in total income and social security. In farms where there was unemployment, average annual income was \$4.887,41, while in those where there was no unemployment it was \$10.222,22. In farms where there was unemployment, the proportion of households with social security was 50%, while in farms where there was no unemploy-

ment the figure was 68.12% (Table 11). In recent years especially, an increase in input prices, inadequate government support and problems on the agricultural market have meant a large reduction in the incomes of people living in rural areas. These people cannot obtain a sufficient income from the practice of agriculture, and so they seek a different work. The fall in income of rural people also means that they cannot pay their social security premiums. It was observed that people faced with this problem look for jobs in which their social security is paid for them.

6. Conclusions

Rural unemployment can be seen as a significant problem for developing countries, but there has been little progress towards finding a solution. Here, the basic reasons for unemployment which occurs in rural areas have been set out, and this study has provided the opportunity to identify these reasons in a concrete way by examining the rural areas of Turkey.

According to results obtained at a micro level, the size of households (households), total income (totalincome), the distance between the village and the provincial capital (distprovince) and social security (socsecurity) were in a significant relationship with rural unemployment. At macro level, it was found that urban unemployment and unemployment at a national level had a uni-directional effect on rural unemployment. For this reason, it would not be always correct to assert that the unemployment which occurs in cities is attributable to migration from the countryside to the cities. In fact, areas of employment in cities are gradually becoming more limited, and there exists a large population of educated young people who are unemployed. This has started a flow from the cities, where it is difficult to make a living, back towards the countryside.

In order to find a solution to the problem of rural unemployment, it is necessary to consider both internal and external factors. One important factor is that a significant proportion of farmers in the rural areas of Turkey are working too little land, and household sizes are large, thus affecting unemployment and worker productivity. In this regard, it is important to bring land which is currently not in use into a suitable condition for agriculture by such methods as levelling and terracing. In this way, those in rural areas who have little or no land, especially young people, will be enabled to obtain land (Olgun et al., 2009).

Agriculture maintains its predominance as an important activity in the rural areas of Turkey. However, there are serious problems with regard to the marketing of agricultural products. The low prices obtained have a negative effect on income, and this increases the drift to work outside agriculture. The inadequacy of the organization of the rural sector into cooperatives and the filling of the vacuum by a large number of middlemen is seen as the main cause of this situation. At the same time, the fact that a large proportion of farmers have a low education level and therefore a lack of information about the market has a negative effect on the prices they can command. For this reason, it would be beneficial to hold short vocational education courses, with a view to raising the educational level of farm-

Table 11. *Descriptive Statistics.*

	Variables	Mean		Std. Deviation	
Farms without Unemployed People	Size of Land (ha) (farmland)	5.13	5.95		
	Proportion of Land Ownership (%) (landowner)	71.01	45.45		
	Size of Household (n)	4.05	1.71		
	Total Annual Income (\$) (totalincome)	10.222,22	15.955,29		
	Distance from Village to District Centre (km) (distcounty)	17.66	10.08		
	Distance from Village to Provincial Capital (km) (distprovince)	95.44	46.05		
	Transport Facilities (%) (transportation)	54.71	49.87		
	Social Security (%) (socsecurity)	68.12	46.69		
	Share of Agricultural Income Obtained from Crops (%) (vegrates)	60.74	39.00		
	Share of Agricultural Income Obtained from Animal Products (%) (animrates)	30.76	35.37		
	Farms with Unemployed People	Size of Land (ha) (farmland)	4.65	7.73	
Proportion of Land Ownership (%) (landowner)		71.82	45.19		
Size of Household (n)		4.84	1.91		
Total Annual Income (\$) (totalincome)		4.887,41	4.226,75		
Distance from Village to District Centre (km) (distcounty)		18.99	10.60		
Distance from Village to Provincial Capital (km) (distprovince)		110.96	53.35		
Transport Facilities (%) (transportation)		49.09	50.22		
Social Security (%) (socsecurity)		50.00	50.23		
Share of Agricultural Income Obtained from Crops (%) (vegrates)		55.92	39.81		
Share of Agricultural Income Obtained from Animal Products (%) (animrates)		34.08	36.94		

ers regarding the market. These courses would also provide important help in the choice of suitable crops for the region, and in production techniques.

Important contributions to solving the problem of rural unemployment can be made by producing an inventory of non-agricultural natural resources and potential resources, both underground and on the surface. In this regard, such potential resources as minerals (coal, marble, iron, perlite, etc.) or water and forest areas (agro-tourism) were identified, which could provide employment in some rural areas.

Another factor which increases rural unemployment is a general lack of non-agricultural employment opportunities in the villages and even in the district centres. Such available employment opportunities are centred in the provincial capitals, so that excessive distance of a village from the provincial capital plays a negative role in this regard. The empirical analysis performed in this study bore this out. Thus, it is important to establish light industry complexes in the centres of districts to which the villages belong. This approach would increase employment opportunities and provide flexibility to the economy.

The direction taken by government support for agriculture can have an effect on rural unemployment. It is thought that support given in the form of price, premium or direct income support cannot be a fundamental solution to the problem of rural unemployment. The main reason for this is that the support given is not aimed at small farming businesses, and that it provides only a short-term solution. It would be more beneficial for the supports and incentives to be given in the form of investment which would create more employment opportunities. The Programme for the Support of Rural Development Investment which is currently being operated in Turkey should be organized in that direction.

Finally, rural unemployment affects adversely the unemployed individuals, their families, the society they live in, and the economy. For this reason, wherever there is rural unemployment, the reasons for it must be identified and suggestions for solutions to these problems must be developed. With this study, an attempt was made using the example of Turkey to move towards this goal. It is thought that the present study can serve as a guide to further studies in other countries on the subject of rural unemployment.

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