

## Determination of Impact Size by Canonic Correlation Analysis of the Factors Affecting the Buying or Selling Agricultural Lands

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### ABSTRACT

The aim of this study is to determine the relationship between the influencing factors in the data set created with the help of canonical correlation in the factors affecting the purchase or sale of agricultural lands in certain neighborhoods in the Dulkadiroğlu district of Kahramanmaraş province and the most effective factor or factors compared to the others. For this, a survey was conducted with the parcel owners in the determined neighborhoods and a data set of 1000 people was created. As a result of the data obtained, the first data set of the study, in which the canonical correlation method was used, was the slope and irrigation status of the land, the average productivity rate of the land, and the presence of tractors and equipment used in the land, among the factors affecting the purchase or sale of agricultural lands; land parcel size, land purchase or sale price and for what purpose the land was bought or sold were also the second data set. The rate of canonical correlation coefficient in the data sets created according to the estimation results was found to be 40.32%. In the data set we compared, the average productivity of the land was determined in the first data set with the highest effect, while in the second data set it was determined as the purpose for which the land was bought or sold.

**Keywords:** Agricultural land, Factor, Survey and Land trading.

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## Introduction

Land within the factors of production; It is the part of the earth that affects the climate, soil, topography and living things in various sizes. The land, which is only a means of production without the possibility of increasing, as well as the plant production area; It is a source of livelihood for people in various fields such as beekeeping, greenhouse cultivation, sheep and cattle breeding. It is also known as the security guarantee and investment area of most people [1]. Due to the infrastructure and superstructure investments implemented by private and public areas in Turkey, the expropriation work is in the first place, and various areas such as consolidation works, the irrigation planning project of the land and making the land open to the zoning area are closely related to the determination of the current price of the land. However, the fact that studies such as taxation and guarantees in banks are related to the current market prices of the land increases the importance of the research applied to determine the land precedent value. Valuation; It is the real and complete presentation of the prices of business area parcels, agricultural enterprises and other rural goods and rights [2].

In this study, considering the geographical shape of the lands in the determined neighborhoods, it can be possible to scientifically analyze which degree of influence is dominant when buying or selling land in the survey conducted for our farmers. For this reason, the

factors that have had an impact on the sale or purchase of land and the effect sizes of these factors have been classified with each other, and it is necessary to determine the degree of impact of these factors in the sale or purchase of land. It is thought that what are the factors affecting the sale or purchase of land for various targets and it will be beneficial to reduce these factors.

The study is expected to be a guide in determining the current value in the sale or purchase of the land of the landowners in the selected areas and determining the extent of the effect of the factors affecting this activity. As a result of the results obtained in this study, the real and scientific appraisal of the valuation taken by the landowners in the land acquisition or sale of the land in the region, taking into account the factors such as the structure of the land, its roughness, wet-dry state, its location, productivity rate, and the distance to the nearest settlement area. will determine whether it is based on fundamentals. It is foreseen that it will also contribute to the investment planning in the region where the research is carried out.

The aim of the research is to try to determine the effect sizes of the factors affecting the sale or purchase of agricultural lands in the determined neighborhoods in the Dulkadiroğlu district of Kahramanmaraş province. For this, the effect sizes of the factors were classified from most to least with the help of the canonical correlation

method using the data obtained through the survey study.

## Materials and Methods

### Material

This research refers to the 27-year period when the land was sold or bought with the land owners in nine determined neighborhoods in the Dulkadiroğlu district of Kahramanmaraş between the years 1995-2021. The most important factor in determining the places where the research is applied is to consider that the general data on the purchase or sale of agricultural land in the region will be met.

In this research, a questionnaire was applied with a total of 1000 participants who sold or bought land in 9 neighborhoods, whose sole purpose of participation was determined. In the survey conducted with the land owners in question, it was determined that there is a total of 15913,000 m<sup>2</sup> of land that has been subject to purchase and sale. The total land parcel sizes of the neighborhoods are given in Table 1.

Table 1. The total parcel size of the lands in the determined neighborhoods in Dulkadiroğlu district.

Neighbourhood	1995-2021 In Trading Parcel Size
Çınarlı	1395.000 m <sup>2</sup>
Çiğli	2838.000 m <sup>2</sup>
Sivricehüyük	1100.000 m <sup>2</sup>
Kapıçam	1964.000 m <sup>2</sup>
Abbaslar	1241.000 m <sup>2</sup>
Alibeyuşağı	2680.000 m <sup>2</sup>
Kocalar	936.000 m <sup>2</sup>
Yeniyurt	2266.000 m <sup>2</sup>
Tevekkeli	1493.000 m <sup>2</sup>
Total	15913.000 m <sup>2</sup>

A survey was conducted randomly and by reaching as many people as possible and it was determined that 91.07% of the people who participated in the survey were male and 8.93% were female. In addition, the average number of children in the family was determined as 4, and their education level was determined to be 97.48% primary school or literate.

Table 2. Wet and dry parcel sizes of the lands in the determined neighborhoods in Dulkadiroğlu district.

Neighbourhood	AQUEOUS Land Size	ANHYDROUS Land Size
Çınarlı	1286.000 m <sup>2</sup>	109.000 m <sup>2</sup>
Çiğli	2486.000 m <sup>2</sup>	352.000 m <sup>2</sup>
Sivricehüyük	1100.000 m <sup>2</sup>	0 m <sup>2</sup>
Kapıçam	1964.000 m <sup>2</sup>	0 m <sup>2</sup>
Abbaslar	1241.000 m <sup>2</sup>	0 m <sup>2</sup>
Alibeyuşağı	2680.000 m <sup>2</sup>	0 m <sup>2</sup>
Kocalar	936.000 m <sup>2</sup>	0 m <sup>2</sup>
Yeniyurt	1866.000 m <sup>2</sup>	400.000 m <sup>2</sup>
Tevekkeli	1493.000 m <sup>2</sup>	0 m <sup>2</sup>
Total	15052.000 m <sup>2</sup>	861.000 m <sup>2</sup>

As a result of the answers given by the land owners whose lands were the subject of the survey between 1995-2021, it was determined that there were 15052.000 m<sup>2</sup> of irrigated land and 861.000 m<sup>2</sup> of non-watery land. In addition, while Yeniyurt has the highest amount of waterless land in the determined neighborhoods, Alibeyuşağı District has the highest amount of wet land. The products planted in this region; barley, cotton, beet, wheat, cucumber, corn, watermelon, pepper and chickpea. In addition, per 1000 m<sup>2</sup> in neighborhoods: The average productivity of irrigated lands in Çınarlı District; beet=7000-12000 kg, corn=1000-1500 kg, cotton=500-700 kg, wheat=500-600 kg, barley=400-500 kg, cucumber=350-400 kg, pepper=400-500 kg and chickpeas =300-400 kg of land productivity without water; wheat=300-400 kg, barley=250-300 kg and chickpeas=200-300 kg; Average productivity of irrigated lands in Çiğli District; beet=6000-12000 kg, corn=1000-1500 kg, cotton=500-700 kg, wheat=500-600 kg, barley=400-500 kg and chickpeas=300-400 kg, while the land productivity without water; wheat=300-400 kg, barley=250-300 kg and chickpeas=200-300 kg; Average productivity of irrigated lands in Sivricehüyük District; beet=4000-7000 kg, corn=800-1000 kg, cotton=300-500 kg, wheat=500-600 kg, barley=400-500 kg, cucumber=300-400 kg and pepper=250-400 kg; Kapıçam District average irrigated land productivity; beet=4000-8000 kg, corn=700-1000 kg, cotton=300-500 kg, wheat=400-500 kg, barley=300-400 kg and cucumber=300-500 kg; Average productivity of irrigated lands in Abbaslar District; beet=10000-13000 kg, corn=1000-1700 kg, cotton=400-600 kg, wheat=700-800, barley=400-500 kg and chickpeas=300-400 kg; Average productivity of irrigated lands in Alibeyuşağı Mahallesi; beet=6000-12000 kg, corn=1000-1500 kg, cotton=500-700 kg, wheat=500-600 kg, barley=400-500 kg, cucumber=300-400 kg and pepper= 450-500 kg; Average productivity of irrigated lands in Kocalar Mahallesi; beet=6000-12000 kg, corn=1000-1500 kg, cotton=500-900 kg, wheat=600-700 kg, barley=500-600 kg, cucumber=400-700 kg and pepper=300-500 kg; Average productivity of irrigated lands in Yeniyurt Mahallesi; beet=4000-8000 kg, corn=800-1000 kg, cotton=400-600 kg, wheat=400-500 kg, barley=300-400 kg, cucumber=300-500 kg, pepper=250-300 kg and chickpeas = 250-300 kg, while the average productivity of the lands without water; wheat=300-400 kg, barley=200-300 kg and chickpeas=200-300 kg and average productivity of irrigated lands in Tevekkeli District; beet=4000-8000 kg, corn=700-1000 kg, cotton=300-500 kg, wheat=400-500 kg, barley=300-400 kg and cucumber=300-500 kg.

While it is possible to produce all of them in irrigated agricultural lands, wheat, barley and chickpea production is common in non-irrigated agricultural lands. In line with the answers given by the landowners who participated in the survey, there is a production of once a year in the irrigated lands, while this production is carried out twice in the irrigated agricultural lands. Since the structural

shape is not uneven in the region where the land is located, it was determined that the soil is stony in lands without water and normal in wet lands. In addition, the distance range to the nearest residential area; Average 19-21 km in Tevekkeli district, 19-22 km in Çınarlı district on average, 16-18 km in Kapiçam district, 20-22 km in Kocalar district on average, 16-18 km in Çiğli district on average, 25-27 km in Abbaslar district on average, Yeniuyurt district on average It has been determined as a result of the answers given by the landowners in the survey that it is 19-20 km on average, 20-23 km on average in the Sivricehüyük district and 24-25 km on the Alibeyuşağı district.

**Table 3. The presence of tractors and equipment in the designated neighborhoods in Dulkadiroğlu district.**

Region	Number of People Who Participated in the Survey	Number of Own Tractors and Equipment	Number of Those Without Tractors and Equipment
Çınarlı	179	113	66
Çiğli	138	90	48
Sivricehüyük	40	40	0
Kapiçam	178	104	74
Abbaslar	71	71	0
Alibeyuşağı	110	100	10
Kocalar	44	34	10
Yeniuyurt	120	80	40
Tevekkeli	120	60	60
Total	1000	692	308

As a result of the survey conducted with the landowners in the sale or purchase of land between 1995-2021, it was determined that 69.20% of the land owners included in the survey had tractors and equipment, while 30.80% did not have tractors and equipment.

While the factors affecting the land owners who were included in the survey by buying or selling land within the specified years were investigated with the help of the survey, 19.23% of them became landowners in Çınarlı Mahallesi with the aim of animal husbandry activities and 80.77% of them with the aim of having an investment relationship; 83.02% of them sold their lands due to expropriation of the land, 1.30% of them quitting agriculture, 2.61% of them due to migration and 13.07% of them due to financial insufficiency. In Çiğli Neighborhood, 12% becomes land owner with the aim of relations between heirs, 4% of the transfer of the land from the treasury to private property, 12% of livestock activities and 72% of investment relations; , 52.30% of them sold their lands due to expropriation of the land, 6.81% due to relations between heirs, 6.81% due to migration, 4.54% to quit agriculture and 29.54% due to financial insufficiency. In Sivricehüyük Neighborhood, 30% becomes the owner of land with the aim of relations between heirs, 10% of livestock activities and 60% of investment relations; 50% of them sold their lands due to relations between heirs, 10% due to immigration and

40% due to financial insufficiency. In Kapiçam Neighborhood, 48.07% becomes land owner with the aim of transferring the land from the treasury to private property, 13.47% with the aim of relations between heirs, 1.93% with livestock activities and 36.53% with the aim of investment relationship; 8.10% of them sold their lands due to relations between heirs, 21.62% due to expropriation of the land, 2.70% due to migration and 67.56% due to financial insufficiency. In Abbaslar Neighborhood, 11.42% becomes land owner with the aim of relations between heirs, 5.71% of livestock activities and 82.87% of investment relations; 8.33% of them left the agriculture, 11.11% of them sold their lands due to relations between heirs, 16.16% due to changes in land productivity and 63.90% due to financial insufficiency. While 26.67% of them become landowners in Alibeyuşağı Mahallesi with livestock activities and 73.33% with the target of investment relationship; 13.21% of them sold their lands due to quitting agriculture, 13.21% due to immigration and 73.58% due to financial insufficiency. While 36.37% of them become landowners in Kocalar Mahallesi with the aim of animal husbandry activities and 63.63% of them with the aim of investment relationship; 9.10% of them left the agriculture, 27.27% of them migrated and 63.63% of them sold their lands due to financial insufficiency. In Yeniuyurt Mahallesi, 17.85% becomes land owner with the aim of relations between heirs, 17.85% of livestock activities and 64.30% of investment relations; 14.25% of them sold their lands due to relations between heirs, 12.50% due to immigration, 12.53% due to quitting agriculture and 60.72% due to financial insufficiency. In Tevekkeli Neighborhood, 50% will become landowners with the aim of relations between heirs, 5.88% with livestock activities and 44.12% with the aim of investment relations; 23.12% of them sold their lands due to relations between heirs, 15.35% to quit agriculture, 15.38% to immigration and 46.15% to financial insufficiency reasons.

The survey was applied in 9 neighborhoods determined in Dulkadiroğlu District of Kahramanmaraş Province in 2021. Dulkadiroglu District; A survey was conducted with 1000 landowners whose only condition of participation was the purchase or sale of agricultural lands in the neighborhoods of Çınarlı, Çiğli, Sivricehüyük, Kapiçam, Abbaslar, Alibeyuşağı, Kocalar, Yeniuyurt and Tevekkeli between the years 1995-2021 and for all parcels where the survey was conducted in the periods covering this research. It is assumed that agricultural technology does not change.

### Methods

The aim of this study is to determine the factors that are effective in the region and the degree of impact of these factors, in line with the information obtained from the land owners who were included in the survey by purchasing or selling land between the years 1995-2021 in 9 selected neighborhoods in the Dulkadiroğlu district of Kahramanmaraş province. In this, the canonical

correlation method, which is a statistical analysis method, was used.

### Canonical Correlation Analysis

Canonical correlation analysis, which is the most basic and most complex interaction analysis, deals with the connections between two-way datasets taken from a multi-dimensional population. A method related to the general problems of the connection between the two-way dataset taken from it is envisaged. In this method, which is called canonical correlation analysis, the highest level correlation of the variables in each class and combination pairs with unit variances are found at the beginning, and the process continues by finding the second linear combination pair. Canonical correlation analysis is a special part of multiple regression analysis [3]. While multiple regression analysis examines the relationship between one dependent and more than one independent variable, canonical correlation analysis examines the relationship between  $p$  dependent and  $q$  independent variables [4]. In canonical correlation analysis, the goal is not to develop or derive a model for the variables, but to analyze the connection between the variable sets [5].

Canonical correlation analysis can be shown in general as follows [6]:

$$Y_1 + Y_2 + \dots + Y_p = X_1 + X_2 + \dots + X_k \quad (1)$$

In the above equation, the variables can take measured or unmeasured values. In the first group ( $Y_p$ )  $p(1-p)/2$  among the variables, whereas in the second group ( $X_k$ ) there are  $q(1-q)/2$  correlations between the variables and  $p.q$  correlations between the two variable groups. When the number is large, it is very difficult to analyze the correlation coefficients one by one. For this, canonical correlation analysis aims to minimize these correlation coefficients [7].

If there is only one dependent variable in canonical correlation analysis, multiple regression analysis is used instead of canonical correlation analysis. Since ANOVA and two-class discriminant analysis are special cases of multiple regression analysis, these two methods are also special cases of canonical correlation analysis. If the dependent variable is a versatile nominal variable, canonical correlation analysis refers to multiple discriminant analysis [8].

In canonical correlation analysis, one of the variable groups can be called the independent variable group and the other the dependent variable group. If it is a group of independent and dependent variables, the goal in canonical correlation is to analyze whether and to what extent the independent variable group affects the dependent variable group [9]. However, there is no obligation to define this in variable groups. In this analysis, it is aimed to maximize the correlation between variable groups, and towards this goal, canonical variable dichotomies are derived from linear combinations of variables in both variable groups [10].

The objectives of canonical correlation analysis are as follows [11]:

- Testing that two classes of variables obtained from identical individuals are statistically free from each other,
- Identifying the variables in both variable classes that provide the greatest benefit among the classes,
- Determining the linear combination that maximizes the correlation in the classes of dependent and independent variables,
- Determining the extent to which variable sets can explain each other among themselves,
- Determining how much a canonical variable benefits the explanatory power of its class in the variable class,
- Determining the relative power of various canonical factors to predict or explain relationship size.

### Canonical Correlation Analysis Assumptions

Results of canonical correlation analysis; covariance, multiple normal distribution, multiple linear relationship assumptions and linearity should be analyzed. The linear assumption affects canonical correlation analysis in two ways. First, the link between the two variables is assumed to be linear, and if the link between the two variables is nonlinear, analysis is performed until it becomes linear. Second, the canonical correlation coefficients show the linear relationship of the two canonical variables. For this reason, nonlinear connections between variables cannot be explained [12]. The multiple normal distribution condition must be minimized or provided, the variables must meet a normal distribution condition and there must be no multicollinearity problem. The minimum number of data variables is 20

It should be solid and the data should not have extreme values [13]. There should be no unnecessary variables in variable groups [14]. Since identical variance reduces the covariance between variables, it should also be analyzed in canonical correlation analysis [15].

### Significance of Canonical Correlation Coefficients

As a result of canonical correlation analysis, it should be decided how important the canonical variable dichotomies are [16]. In this method, the goal is to analyze how many of the obtained canonical correlation binaries are significant. While it is predicted that all canonical correlations are equal to zero in Wilk's Lambda method, the  $H_0$  hypothesis is analyzed against the  $H_1$  hypothesis, which predicts that the lowest canonical correlation coefficient is different from zero [17]. The hypotheses to be written to determine the meaning levels of the coefficients are as follows [18].

$$H_0 : P_1 = P_2 = P_3 = \dots P_n = 0 \quad (2)$$

$$H_1 : P_1 \neq P_2 \neq P_3 \neq \dots P_n \neq 0 \quad (3)$$

Wilk's Lambda analyzes canonical correlation coefficients together and in identical time. Failure to accept the null hypothesis suggests that the lowest first canonical correlation coefficient is significant, while the remaining  $n-1$  canonical correlation coefficients may be meaningless or significant. The significance of the second canonical correlation coefficient can be analyzed independently of the first. In the calculation of the first canonical correlation coefficient, the significance level of Wilk's Lambda statistic conforms to the  $p \times q$  degrees of freedom  $\chi^2$  distribution. Secondly,  $(p \times q) \times (q - 1)$  degrees of freedom  $\chi^2$  distribution and  $i$ . Inside  $(p \times i) \times (q - i)$  degrees of freedom  $\chi^2$  fits the distribution. If the probability value is less than 0.05 at the 5% confidence level, the null hypothesis is rejected. That is, the correlation coefficients are found to be significant and significant. The second canonical correlation coefficient is analyzed independently of the first canonical correlation coefficient. This process is continued until we find the insignificant one in the canonical correlation coefficient [19].

## Results

The purpose of this research is to determine the land that is thought to affect the landowners while buying or selling land in line with the answers given by the landowners as a result of the data obtained from the survey, where the only participation condition was the sale or purchase of land within the specified period in 9 neighborhoods determined in the Dulkadiroğlu district of Kahramanmaraş province. The aim of this study is to analyze the relationship and effect sizes between the factors that affect the slope and roughness of the land, the average productivity of the land, the presence of tractors and equipment of the land owners, the size of the land parcel and the reason why the land owners sell or sell the land, with the help of the canonical correlation method.

The main goal is to determine the degree of influence and size of the factors that affect the land owners while buying or selling land, by scientific methods, within the specified period. The sample of the research was obtained with the help of a questionnaire, which was the purchase or sale of land by landowners between the years 1995-2021 in 9 neighborhoods in the Dulkadiroğlu district of Kahramanmaraş province, where the only participation condition was determined. As a result of the data obtained from the questionnaire, the canonical correlation method was used to indicate the relationships between the factors and their degree of influence. According to the estimation results obtained in the research, the average productivity of the land in the first data set, which is thought to be under the influence of the landowners while purchasing or selling the land within the specified years and the degree of impact was determined as the purpose for which the land was bought or sold in the second data set. The rate of canonical correlation coefficient in the data sets created

according to the estimation results was found to be 40.32%. It has been determined by the scientific analysis that the impact factors obtained with the help of the survey covering the years 1995-2021 and the only participation condition is the purchase or sale of land by the landowners during these years.

[20], [21], [22], [23], [24], [25], [26], [27], [28], ' is in harmony with their work.

In 9 neighborhoods selected from the Dulkadiroğlu district of Kahramanmaraş, the only condition of participation was specified. The fact that landowners do not buy or sell land each year has led to disruptions in the analysis. In future articles or thesis research, in order to avoid these and similar problems, villages or neighborhoods that have been subject to land sales or purchases every year or where there are land owners who bought or sold land in the same years should be preferred, land expropriation and transition assets from treasury to private property should be considered. should not be overlooked.

## Discussion and Conclusion

In this research, first of all, data groups were created as a result of the data obtained from the land owners who bought or sold land between the years 1995-2021 with the sole participation condition in 9 determined neighborhoods in the Dulkadiroğlu district of Kahramanmaraş province. Ranking in the obtained data set;

X1: The slope and unevenness of the lands of the surveyed landowners

X2: Average productivity of the lands of the surveyed landowners involved in the land purchase and sale between 1995-2021.

X3: Tractor and equipment availability of surveyed landowners between 1995-2021. X4: Parcel sizes of the lands of the surveyed land owners that were included in the land purchase and sale between 1995-2021.

X5: The current value of the land purchase and sale of the land owners included in the survey between the years 1995-2021.

X6: The reason why the land owners included in the survey sold or bought land.

is in the form.

Table 4. Spss pearson correlation probability value.

	X1	X2	X3	X4	X5	X6
X1	1	-0,4	-0	0,03	0,098	0,004
X2	-0,4	1	0,163	0	0,232	-0,16
X3	-0	0,163	1	0,15	-0,01	0,246
X4	0,027	0,002	0,15	1	-0,01	-0,08
X5	0,098	0,232	-0,01	-0,01	1	-0,15
X6	0,004	-0,16	0,246	-0,08	-0,15	1
	0,893	0	0	0,01	0	

However, for the canonical correlation analysis, the first data set was X1, X2 and X3, while the second data set was analyzed as X4, X5, X6.

In Table 4., the pearson probability values are given between the determined values.

Table 5. Spss canonical correlation result.

	1	2	3
Correlation	,403	,250	,012
Eigenvalue	,194	,067	,000
Wilk's statistic	,785	,937	1,000
F	28,113	16,363	,139
Number D.F.	9,000	4,000	1,000
Name D.F.	2419,285	1990,000	996,000
Probability	,000	,000	,710

Table5. In addition, 3 different correlational relationships were determined. Among them, it was found that the correlational relationship of the first and second in probability values was significant and the third was insignificant. It was determined that the first correlation in the eigenvalues was probably higher than the others. In Wilk's statistics, the relationship of the first correlation is closer to 0.05, so it is probably more significant than the others. It can be said that two of the three correlation scores that occur together are statistically significant. Canonical correlation value is 40.3%.

Table 6. Standardized canonical correlation coefficient in the spss first dataset.

Values	1	2	3
X1	,466	-,601	-,787
X2	,906	-,549	,330
X3	-,715	-,693	,204

Since the first correlation scores are found to be more significant, a model can be written over the first scores that are significant in Table 6 and more statistically significant models can be established.

$$0.466 \times X1 + 0.906 \times X2 - 0.715 \times X3 \quad (4)$$

form a meaningful model.

Table 7. Standardized canonical correlation coefficient in the spss second dataset.

Values	1	2	3
X4	-,283	-,531	,803
X5	,540	-,798	-,310
X6	-,733	-,505	-,489

Since the first correlation scores are found to be more significant, a model can be written over the first scores that are significant in Table 7 and more statistically significant models can be established.

$$-0.283 \times X4 + 0.540 \times X5 - 0.733 \times X6 \quad (5)$$

form a meaningful model.

Table 8. Result of canonical loads in spss first dataset.

Values	1	2	3
X1	,105	-,380	-,919
X2	,602	-,421	,679
X3	-,568	-,781	,260

In the first data set in Table 8., it was determined that the perceived safety was 0.602, which has the highest effect among the first canonical scores values. Therefore, in the first data set, X2 (the average productivity of the land owners included in the survey included in the land purchase and sale between the years 1995-2021) is the perceived reliability, which has the strongest explanatory power.

Table 9. Result of canonical loads in spss second dataset.

Values	1	2	3
X4	-,230	-,483	,845
X5	,655	-,715	-,242
X6	-,793	-,341	-,505

In the second data set in Table 9, it was determined that the perceived security was the highest with -0.793 among the first canonical scores values. Therefore, in the second data set, X6 (the reason why the land owners in the survey sell or buy land) is the perceived reliability, which is negative but has the strongest explanatory power.

Table 10. Cross-correlation result in spss first dataset.

Values	1	2	3
X1	,042	-,095	-,011
X2	,243	-,105	,008
X3	-,229	-,195	,003

The variable showing the strongest canonical effect in the first data set in Table 10. was X2 with -0.243. In other words, the variable X2 (the average productivity of the land owners involved in the land purchase and sale between the years 1995-2021) that established the strongest relationship with the second data set in the first data set.

Table 11. Cross-correlation result in spss second dataset.

Values	1	2	3
X4	-,093	-,121	,010
X5	,264	-,179	-,003
X6	-,320	-,085	-,006

The variable showing the strongest canonical effect in the second data set in Table 11 was -0.320 to X6. In other words, the variable X6 (the reason why the land owners included in the survey sold or bought land) had the strongest relationship with the first data set in the second data set.

In Table 12., the strongest explanation value for the first data set was 0.458, the second data set for the first data set was found to be 0.038, the second data set for

the first data set was found to be 0.370, and the first data set for the second data set was found to be 0.060

Table 12. Explained rate of variance of canonical correlation in spss.

Canonical Variable	Set 1 to set 1	Set 1 to set 2	Set 2 sets to 2	Set 2 sets to 1
1	,232	,038	,370	,060
2	,310	,019	,287	,018
3	,458	,000	,343	,000

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## Conflicts of interest

The authors of the article declare that there is no conflict of interest between them

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