Using Factor Analysis for Expenditure Patterns of Peshmerga Households in Erbil Governorate, with Focus on Food Items

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Abstract

Peshmerga is a military force in the Kurdistan Region of Iraq. This study elaborates on the expenditures of a sample of 385 Peshmerga households throughout two major sets of variables. The first set consists of 22 general expenditure patterns (variables) per month such as salary, years of service, military ranks, type of healthcare; public sector or private sector, transportation expenses in Iraqi Dinars, children education expenses, and so forth. And the second set consists of 22 food items (variables); bread expenses, meat expenses, sugar expenses... etc. For each of either set, the researcher conducted an exploratory factor analysis by adopting the method of Principal Component Analysis to reduce the number of variables to a fewer number of components. As a result, 8 components extracted from the first set with the total variance explained the ratio of % 64.085, and 6 components from the second set with the total variance explained of % 52.856.

Keywords: expenditure patterns, general household items, food items, factor analysis, principal component analysis.

1 - Introduction

Kurdistan region of Iraq has been targeted by hostile countries for more than a century make their highest benefit throughout trying to overpower and exploit its resources. The last threat on this region was by ISIS attacks in the year 2014, where Peshmerga faced them daringly. This study is about Peshmerga’s households’ expenditure patterns in the Governorate of Erbil in the year 2015. Throughout highlighting the most significant factors that may affect their living, by applying Factor Analysis over two sets of variables.

Factor analysis is used to find small number of original sizes, or factors, which can be used to represent relationships among interrelated variables. There are two major types of factor analysis exploratory analysis and Confirmatory analysis, each of them has many methods to conduct. In this study, the researcher conducts a Principal Component Analysis (PCA) method regarding Exploratory Factor Analysis. Too many variables influence any household’s total expenditures, therefore the analysis of data became dense, some of which possibly will produce the similar data. So it is better to use processes that reduce the number of the variables, for example, PCA with as fewer loss of data (Giri, 2004).

According to Deaton and Muellbauer (1980) assumption the utilities a household derives from various materials at different levels of expenditure would be affected by economic conditions. Therefore, consumption budget reduces in recession periods, consumers cut expenditures disproportionately more in less essential categories, and larger shares for the more essential. While in the economy’s growth time frames, consumers are relied upon to increment both aggregate utilization spending plan and offer dispensed to the less basic classifications (Kamakura, and Du, 2011).

Peshmerga and their families have been gone through difficult life due to severe war emphasis against ISIS forces, many of their children became orphans, many of
their wives became widows, as well as delaying and reducing of their monthly salaries due to economic and financial crises in the region. All of these reasons made the expenditure on households necessities affect their living adversely.

The most significant categories of Peshmerga’s households expenditures in this study diversified into two sets; general categories (items), and food categories, and each of them consists of many variables as the researcher reveals them in the following sections.

1-1 The Significance of the study:

Peshmerga force is considered an important group in Kurdistan region society, the significance of this study is to reveal the livelihood of their households, despite difficult conditions that they were through particularly after ISIS attacks. By showing the most significant expenditure patterns of their households and to provide an additional resource for the related institutions in order to improve this group’s living conditions in the future.

1-2 The Aims:

The aims of this study are to determine the significant factors that affect the Expenditures of Peshmerga Households in the Governorate of Erbil in the year 2015. And showing the most significant variables in each factor throughout reducing the magnitude number of general expenditure patterns (variables).

1-3 Hypotheses of the study:
1 - The amount of the variance of variables that is accounted for by the components “Communalities” are having higher values for some crucial variables of the first set, such as; salary, years of service, age. Also, other variables of the second set may take high “Communalities” such as; prepared meals and vegetable expenses.
2 - The ratio of the total variance explained by the extracted factors, of all expenditure patterns exceeds 60%, while for food items exceeds 50%.
3 - The correlation between the extracted components and both sets of the mentioned variables “loadings” or “Saturation” have higher values than the remaining variables.
4 - The resulting of extracted component score variables are representative and can be used in place of, the original variables.

1-4 The Methodology:

This study adopts numerical analysis via on exploratory factor analysis. In order to reduce the number of lots of variables that affect Peshmerga’s households expenditures to a fewer number of components. Therefore, the method of principal components has been chosen, including the most crucial tests concerning this method by the use of IBM SPSS 21 program for numerical calculations.

1-5 Data Descriptions:

A sample of 385 Peshmerga selected from a population of more than 200,000 Peshmerga (Wikipedia, 2016), which their names recruited in KRG-Ministry of Peshmerga. Peshmerga household’s expenditures patterns consisted of two main sets of variables; the first set is various patterns of household expenditures, and the second set consisted of food items expenditures.

The first set of variables consists of:

Salary per Month in 1000 Iraqi Dinars (IDs), Years of Service, Military Ranks (1 for Peshmerga or private, 2 for private first class, 3 for corporal, 4 for sergeant, 5 for first sergeant, 6 for non-commissioned officer, 7 first commissioned officer, 8 for lieutenant, …and 17 for major general), Age, Academic Certification (1 for non, 2 for the primary and 3 for preparatory, 4 for college), Wife Income in 1000 IDs, House Rent in 1000 IDs, delaying Salary (1 for yes, and 0 for no), Debts (0 for no, and 1 for yes), Installment...
per Month (0 for no, and 1 for yes), Extra Job income in 1000 IDs, Health Care type (1 for public and 0 for the private), Car Expenses in 1000 IDs, Transportation in 1000 IDs, Children Education in 1000 IDs, Clothes in 1000 IDs, House Equipment in 1000 IDs, Electricity in 1000 IDs, Water in 1000 IDs, Personal Expenses in 1000 IDs, War Effects (1 for very bad, 2 for bad, and 3 no), and Food Expenses in 1000 IDs.

While the second set of variables entails the following food items expenditures in 1,000 IDs: Bread, Edible Oil, Rice, Burghul, Wheat, Wheat Groats, Chicken Meat, Red Meat, Fish Meat, Sugar, Flour, Vegetables, Fruits, Beans, Prepared Meals, Prepared Sweets, Tea, Nuts, All items expenses except food, Salary, Wife income, and Extra job income.

2 - The Theoretical and Conceptual Frame of Factor Analysis:

Factor analysis is a statistical technique used to identify a fairly small number of factors, which can be used to represent relationships among interrelated variables. Factor analysis is the identification of core “factors,” that might explain the dimensions associated with data variability (Bartholomew et al., 2008). The main objectives of using Factor Analysis, which construed by (Gorsuch, 2015) are:

1. Introducing the patterns of “Interdependency.”
2. Describing data economically.
3. Hypothesis testing.
4. Data transformation.
5. Exploratory uses.
6. Treating with multicollinearity problems.

2-1 Types of factor analysis (FA):

There are two common types of factor analysis (FA): exploratory, confirmatory. Exploratory factor analysis is utilized to estimate the hidden components influencing the factors in an information structure without setting any predefined structure to the result, while confirmatory factor analysis is executed for reconfirming the impacts and conceivable connections existing between an arrangement of foreordained elements and factors (Dennis, 2006, p.52).

For a set of standardized variables like \( X_1, X_2, \ldots, X_p \), their variances are each equal to one and their covariance is the correlation coefficients. \( X_i \) is a standardized variable, i.e., \( X_i = (x_i - \bar{x})/S_i \). The correlation matrix must be intercorrelated, but no too powerfully, i.e. no strong correlation between the variables. In SPSS the Bartlett’s test of Sphericity used to check for variables intercorrelation. The null hypothesis assumes the original correlation matrix is an identity matrix. This test must be significant, i.e. there would be no relationships between the variables. Also, we can check for Multicollinearity by SPSS throughout the determinant of the correlation matrix, if the determinant is more than 0.00001, at that point, there is no multicollinearity (Field, 2000, pp.445).

The objective of factor analysis is to represent the variables as a linear arrangement of a smaller set of common factors plus a unique factor. We express this representation mathematically as:

\[
X_P = L_{p1}F_1 + L_{p2}F_2 + \ldots + L_{pm}F_m + e_P \quad ------ (1)
\]

Where the following assumptions are made:

1. \( m \) is the number of common factors (typically this number is much smaller than \( P \), where \( P=1,2,\ldots i \ ) .
2. \( F_1, F_2, \ldots, F_m; \) are the common factors.
3. \( L_{ij} \) is the coefficient of \( F_j \) in the linear combination describing \( x_i \). This is known as the loading of the \( i \)th variable on the \( j \)th factor.
4. \( e_1, e_2, \ldots, e_P \) are unique factors, apiece associating to one of the original variables.
Since $X_i$ is standardized, it is variance is equal to one and is composed of the following two parts:

1. The Communality, i.e., the part of the variance that is due to the common factors.
2. The Specificity, i.e., the part of the variance that is due to the unique factor $e_i$.

We can write the variance of $X_i$ as: \[ \text{Var} X_i = h_i^2 + u_i^2 \quad (2) \]

Where; $h_i^2$ is the Communality, and $u_i^2$ is Specificity.

### 2-2 Methods of Factor Analysis:

Two main steps have to be achieved in order to do factor analysis:

- Estimating the factors loadings which called the initial solution.
- Rounding the factors to reveal their meanings and achieving the Final Solution.

There are many approaches for estimating factors loadings matrix in order to get the initial solution, according to Child (2006) below are the main approaches:

1. Principal Component method exploratory.
2. Principal Axis method.
3. Image method.
4. Maximum Likelihood method Confirmatory.
5. Alpha method.
6. Unweighted Least Square.
7. Generalized least method.
8. The Centered method.
9. Rao method.

In this study, the method of Principal Component is applied due to its accuracy in estimations.

### 2-3 Principal Components Analysis:

Principal components are uncorrelated, therefore, they are presenting an attractive choice as factors. The greatest proportion of variance is explained by the first principal component, therefore it is the most important.

To satisfy the assumption of unit variances of the factors, each principal component is divided by its standard deviation. That is, the $j$ common factor $F_j$ is defined as:

\[ F_j = C_j / (\text{Var} C_j)^{1/2} \quad (3) \]

where $C_j$ is the $j$ principal component.

To express each variable $X_i$ in terms of $F_j$’s, first the relationship between the variables $X_i$ and the principal components $C_j$ should be reminded, (Afifi, et al., 2004, pp. 393-396) derive these relationships as:

\[
C_1 = a_{11} x_1 + a_{12} x_2 + \ldots + a_{1P} x_P \\
C_2 = a_{21} x_1 + a_{22} x_2 + \ldots + a_{2P} x_P \\
\vdots \\
C_P = a_{P1} x_1 + a_{P2} x_2 + \ldots + a_{PP} x_P \quad (4)
\]

It may be shown mathematically that this set of equations can be inverted to express the Xi’s as functions of Cj’s, the result is:

\[
x_1 = a_{11} C_1 + a_{21} C_2 + \ldots + a_{P1} C_P \\
x_2 = a_{21} C_1 + a_{22} C_2 + \ldots + a_{P2} C_P \\
\vdots \\
x_P = a_{P1} C_1 + a_{P2} C_2 + \ldots + a_{PP} C_P \quad (5)
\]

Note that the rows of the first set of equations becomes the columns of the second set of equations. Now since $F_j = C_j / (\text{Var} C_j)^{1/2}$, it follows that $C_j = F_j (\text{Var} C_j)^{1/2}$, and the ith equation then could be expressed as:

\[
X_i = a_{i1} F_1 (\text{Var} C_1)^{1/2} + a_{i2} F_2 (\text{Var} C_2)^{1/2} + \ldots + a_{iP} F_P (\text{Var} C_P)^{1/2} \quad (6)
\]
This last equation is now modified in two ways:

1- Using the notation \( L_{ij} = a_{ii} (\text{Var } C_j)^{1/2} \) for the first \( m \) components.

2- Combining the last \( P-m \) terms and denote the result by \( e_i \). That is,
\[
e_i = a_{m+1,i} F_{m+1} (\text{Var } C_{m+1})^{1/2} + \ldots + a_{Pi} F_p (\text{Var } C_p)^{1/2} \quad \ldots \ldots (7)
\]

With these manipulations each variable \( x_i \) is expressed now as
\[
x_i = L_{i1} F_1 + L_{i2} F_2 + \ldots + L_{im} F_m + e_i \quad \ldots \ldots (8)
\]
for \( i = 1, 2, \ldots, P \).

Each variable is linked with the principal factor, this link is known as factor loading.

The principal component model has been transformed to produce the factor model. Note that when the original variables are standardized, the factor loading \( (L_{ij}) \) turns out to be the correlation between \( X_i \) and \( F_j \).

The sum of the squared factor loadings for all factors for a given variable is the variance in that variable accounted for by all the factors, and this is called the Communality.
\[
h_i^2 = L_{i1}^2 + L_{i2}^2 + \ldots + L_{im}^2 \quad \ldots \ldots (9)
\]

**2-4 Factors Extraction Criteria**

The number of factors to be extracted applying factor analysis is determined by keeping the factors that record for the most variances. Suhr (2006) shows the criteria for factor number determination are:

**2-4-1 Kaiser's constraint:**
According to Kaiser if the studied variables are having different measurement units, common factors of eigenvalue greater than one should be extracted (Nunnally, 1978).

**2-4-2 The Scree test of Cattell's (1966):**
This plot looks somewhat like describe of an inclination. The piece past the elbow relates to the debris, or Scree, that gathers. Cattell's rule bring for holding factors over the elbow and removing those underneath it.

**2-4-3 Interpretability criteria all through noting these inquiries:**

A- No under 3 factors with essential loadings (> 0.30).
B- Factors that load on a factor share significant rank.
C- Variables that load on various components measure diverse models.
D- The rotated factor matrix shows a simple structure. There are relatively high loadings on one factor or low loadings on others.

**2-5 Rotation of Axes:**
As we know the main purpose of factor analysis is to derive from the data easily interpretable common factors. The initial extracted factors are habitually difficult to interpret, but we can find new factors loadings, which are easier to interpret. These new factors called the Rotated Factors, which are selected so that some of the loadings are very large near +1 and the remaining loadings are very small near zero. Then again, we would preferably wish, for some random variable, it has a high loading on just a single factor. If so, it is simple to give each factor an understanding emerging from the variables which is extremely correlated (high loadings).

The orthogonal rotation techniques are: Equamax, Quartimax, Promax, and Varimax which is adopted in this study. While other techniques such as Direct Quartimin, Promax, and Direct Oblimin are applied upon Oblique rotations.

The Varimax rotation is attained by enlargement the total of the variances of the squared factor loadings inside each factor. Harman (1976) says that these factor loadings are balanced by dividing every single one of them by the Communality of the corresponding variable, which saw as the systematization of Kaiser.

**3- The Practical Part:**
As mentioned previously the subject of this study is about Peshmerga’s households expenditures patterns in the Governorate of Erbil in the year 2015. The practical part showed throughout two main sections, the first is about the descriptive statistics of expenditures of
Peshmerga households and the most important variables affecting them. While the second section elaborates factor analysis of these households expenditures items. Throughout highlighting the most significant factors that may affect their living during the course of applying Factor Analysis over two sets of variables. The method of Principal Component is used, and then interpret the results from an economic perspective for each set of the outcomes.

3-1 Expenditures of Peshmerga Households and the Variables Affecting Them:

By implementing the software of SPSS 21 the descriptive statistics results of the first set of variables are illustrated in table (1). The minimum salary of Peshmerga is 500 000 Iraqi Dinars (ID) while the maximum is 3 950 000 ID; but the average salary is about 788 000 ID. Their average expenditures on food items are 284 000 ID while clothes take about 88 000 ID of their income. The maximum amount of money they might receive from an extra job despite being Peshmerga is 1000 000 ID.

Table (1) Descriptive Statistics for the Expenditure Patterns of Peshmerga Households (First Set of Variables)

| Variables            | N   | Minimum | Maximum | Mean   | Std. Deviation | Variance     |
|----------------------|-----|---------|---------|--------|----------------|--------------|
| Salary               | 385 | 500     | 3950    | 788.29 | 265.449        | 70462.982    |
| Years of service     | 385 | 1       | 40      | 9.49   | 6.603          | 43.600       |
| Military ranks       | 385 | 1       | 14      | 3.38   | 2.601          | 6.763        |
| Age                  | 385 | 0       | 78      | 34.52  | 8.510          | 72.417       |
| Certification        | 385 | 1       | 4       | 2.09   | 0.874          | 0.763        |
| Wife income          | 385 | 0       | 815     | 41.31  | 126.008        | 15878.104    |
| House rent           | 385 | 0       | 600     | 124.17 | 184.832        | 34162.790    |
| Delaying salary      | 385 | 0       | 1       | 0.95   | 0.211          | 0.045        |
| Debts                | 385 | 0       | 2       | 0.72   | 0.449          | 0.201        |
| Installment          | 385 | 0       | 2       | 0.68   | 0.474          | 0.225        |
| Extra job income     | 385 | 0       | 1000    | 115.83 | 205.240        | 42123.328    |
| Health care type     | 385 | 0       | 1       | 0.72   | 0.449          | 0.201        |
| Transportation exp.  | 385 | 0       | 500     | 68.74  | 68.632         | 4710.372     |
| Children education exp. | 385 | 0     | 450     | 52.13  | 57.014         | 3250.574     |
| Car Expenses         | 385 | 0       | 530     | 87.95  | 61.246         | 3751.130     |
| Electricity exp.     | 385 | 0       | 935     | 40.35  | 50.319         | 2532.019     |
| Water supply exp.    | 385 | 0       | 30      | 5.84   | 3.531          | 12.470       |
| Personal exp.        | 385 | 0       | 400     | 39.37  | 37.224         | 1385.646     |
| War effect           | 385 | 1       | 3       | 1.38   | 0.546          | 0.298        |
| Total of food exp.   | 385 | 101     | 769     | 283.84 | 91.586         | 8388.040     |

Source: calculated by the researcher using a random sample data of 385 survey forms/ Ministry of Peshmerga-KRG/2015.

In table (2) notice that on average nearly 23000 ID spent providing bread monthly, nearly 27 000 ID spent for Rice, 39 000 ID for chicken meat, 29 000 ID for red meat, 20 000 ID for prepared meals, and the lowest amount of money spent for providing wheat grain which is about 1000 ID.

Table (2) Descriptive Statistics for the Expenditures of Peshmerga Households on Food Items (Second Set of Variables)

| Variables          | N   | Minimum | Maximum | Mean   | Std. Deviation | Variance   |
|--------------------|-----|---------|---------|--------|----------------|------------|
| Bread exp.         | 385 | 0       | 90.0    | 23.237 | 13.6521        | 186.381    |
| Edible oil exp.    | 385 | 0       | 45      | 12.49  | 7.204          | 51.902     |
| Rice exp.          | 385 | 0       | 85      | 26.51  | 13.798         | 190.391    |
| Burghul exp.       | 385 | 0       | 28      | 5.34   | 4.115          | 16.937     |
3-2 Factor Analysis Results throughout the following steps:
There are four basic steps that have to be considered for a Factor Analysis experiment:
1- Collecting and creating data of the correlation matrix.
2- Extracting the initial factor solution.
3- Rotation and interpretation.
4- Measuring factor scores to use in further analyses.

3-2-1 Kaiser - Meyer – Olkin test (KMO- test):
In order to measure the sampling adequacy Kaiser - Meyer – Olkin test (KMO- test) is adopted. If KMO > 0.5 then the sample size is adequate. Using SPSS the anti-image matrix of covariance and correlations could be calculated, where for the adequate sample size the entire elements of the diagonal matrix must be greater than 0.5 (Field, 2000, p. 446).
Applying for the SPSS 21 program the Kaiser-Meyer- Olkin (KMO-test) Measure of Sampling Adequacy for the first set variables of this study is 0.613 > 0.5. It means that the sample meets adequacy measurement. This measure varies between 0 and 1, and values closer to 1 are better.
The result of this factor analysis is rather satisfactory: the correlation matrix was ‘positive definite’, and the determinant was 0.004 > 0.00001, note appendix 4. The Bartlett’s test of Sphericity is significant 0.000, as it is shown in table 3. The validity of the previous measurements directs us to conclude that our data is appropriate to start applying factor analysis.

| Table 3 Suitability test of the first set of data for factor analysis |
|---------------------------------|-----------------|-----------------|-----------------|
| KMO and Bartlett’s Test         | Kaiser-Meyer-Olkin Measure of Sampling Adequacy  | 0.613           |
|                                 | Bartlett’s Test of Sphericity Approx. Chi-Square | 2034.513        |
|                                 | df               | 231             |
|                                 | Sig.              | 0.000           |
|                                 | Correlation matrix Det. | 0.004          |

Concerning the second set variables in this study Kaiser-Meyer-Olkin (KMO-test) Measure of Sampling Adequacy is displayed in table 4 which is 0.736 > 0.5 meaning the sample meets adequacy measurement. The correlation matrix was ‘positive definite’, and the determinant was 0.014 > 0.00001, means the significance of Bartlett’s of Sphericity test, see appendix 5. The researcher concludes that the data is appropriate for a factor analysis for the second set variables as well.
3-2-2 Extraction of Significant Principal Components:

The shaded parts with blue of table 7 shows the eight significant principal components that affect expenditure patterns of Peshmerga households in the Governorate of Erbil (first set of variables) extracted because each component is having an eigenvalue greater than one. The first component explains 4.65% of total variance, the second explains 9.580%... and the eighth component explains 4.724% of total variances. These eight factors interpret 64.085 % of total variances of the variables. These factors are important to distinguish the most significant variables in Peshmerga households’ expenditures items.

Table (7) Factor Analysis of the first set of variables by using PCM for Expenditure Patterns of Peshmerga Households

| Total Variance Explained | Extraction Sums of Squared Loadings | Rotation Sums of Squared Loadings |
|--------------------------|-------------------------------------|-----------------------------------|
| Component                | Initial Eigenvalues | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1                        | 3.445                 | 15.657        | 3.445 | 15.657        | 15.657        | 2.364 | 10.746        | 10.746        |
| 2                        | 2.108                 | 9.580         | 2.108 | 9.580         | 25.237        | 1.969 | 8.951         | 19.697        |
| 3                        | 1.925                 | 8.750         | 1.925 | 8.750         | 33.989        | 1.750 | 7.956         | 27.654        |
| 4                        | 1.727                 | 7.850         | 1.727 | 7.850         | 41.839        | 1.723 | 7.832         | 35.486        |
| 5                        | 1.528                 | 6.946         | 1.528 | 6.946         | 48.785        | 1.677 | 7.622         | 43.107        |
| 6                        | 1.231                 | 5.594         | 1.231 | 5.594         | 54.378        | 1.649 | 7.497         | 50.604        |
| 7                        | 1.096                 | 4.983         | 1.096 | 4.983         | 59.361        | 1.518 | 6.898         | 57.502        |
| 8                        | 1.039                 | 4.724         | 1.039 | 4.724         | 64.085        | 1.448 | 6.583         | 64.085        |

As for the second set variables, the extraction of principal components is shown in table 8 the significant components extracted which are demonstrated in the yellow shaded area. Since each component is having eigenvalue greater than one, 6 significant principal components have been extracted. These six components interpret 52.856% of total variances of the variables.

Table (8) Factor Analysis of the second set of variables by using PCM of Food Items consumed by Peshmerga Households.
3-2-3 Scree Plot:

Figure 1 the Scree plot for the first set variables

Figure 1 shows the 8 significant components their eigenvalues greater than one. The elbow of the Scree plot breaks at component 8, which means the extraction of 8 components their eigenvalues greater than one. So 8 components show 64.085% of variances in the first set variables.

While for the second set variables the breaking point of the scree plot is at component 6, as it’s shown in figure 2 next.
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Figure 2 the scree plot for the second set variables

3-2-4 Rotated Component Matrix

We select the orthogonal rotation in favor of oblique rotation because the factor scores in oblique rotation correlate rather low less than the absolute value of 0.3. After applying orthogonal rotation “Varimax” technique, the significance of factor loadings determined for each factor on the base of factor loadings comparisons. Afterward, we need to search of factor loadings greater than 0.4 and select the highest loading for each component. Then, compared with other components loadings for the same variable. If this value is greater than the remaining components loadings then the value of this variable in this particular component is significant. And so on for the remaining components loadings, but if its value was less than the other loadings then the value of this variable is not significant. In such a case we test another component comes after this one, and so on concerning the remaining component loadings.

The Interpretation of the First Set Variables:

If Communalities are high indicate that the extracted components representing the variables well. Table 9 shows that variables like “Salary, Years of service, and Military ranks” are explaining the proportion of highest variances by the factors among other variables with Communalities of 0.784, 0.773, and 0.743 respectively. While the variable of “Delaying salary” explains the lowest variance proportion with Communality of 0.389.

The shaded variables with blue of component 1, like; “Years of service, Military ranks, Age, and Salary” are having the highest loadings of; 0.822, 0.718, 0.697, and 0.584 respectively, i.e. these variables are having a most significant impact on Peshmerga’s household’s expenditures per month. While the absolute values of loadings of the 18 remaining variables are not significant in component 1. As for the component 2 variables; “Installment, War effect, Debts, and House rent” are having the second highest loadings (in absolute values) of; 0.714, -0.686, 0.664, and 0.518 respectively. This means that “Installment, War effect, Debts, and House rent” are having a significant impact on Peshmerga household’s expenditures per month. Meanwhile, the loadings of 18 remaining variables are not significant in component 2. And so on for the loadings of remaining variables shaded in blue and their corresponding extracted components.
The Interpretation of the Second Set Variables:

Concerning the second set variables, i.e. food items expenditures, table 10 shows that the variable of “Prepared meal expenses” has the highest Communality among the other 21 variables which is 0.669 then the second highest Communality goes to variable “Vegetable expenses” which is 0.665, while variable “Tea expenses” explains the lowest Communality of 0.375.

The shaded cells with yellow in the rotated component matrix show that component 1 consists of most significant variables affecting food expenditures of Peshmerga households such as; “prepared meals expenses, Fish meat expenses, prepared sweets, and Nut expenses”. The absolute value of their loadings; 0.780, 0.734, 0.711, and 0.671 respectively. Next comes component 2 with significant variables affecting food expenditures like; “Burghul expenses, Fouler expenses, sugar expenses, Wheat groats expenses, and Beans expenses”, with loadings of; 0.681, 0.661, 0.636, 0.631, and 0.401 respectively. The same interpretation concerning the remaining components.

| Rotated Component Matrix   | “Communali-  
| Component          | eties”  |
|---------------------|--------|
| Years of service   | 0.822  |
| Military ranks     | 0.718  |
| Age                | 0.697  |
| Salary             | 0.584  |
| Installment        | -0.045 |
| Family income      | 0.000  |
| Children education | 0.302  |
| Total of food exp. | 0.266  |
| house exp.         | 0.078  |
| cloths exp.        | 0.194  |
| Health care type   | -0.029 |
| Total of food exp. | 0.266  |
| House rent         | -0.038 |
| Car Expenses       | 0.085  |
| Personal exp.      | -0.001 |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |
| War effect         | 0.027  |
| Debts              | -0.139 |
| House rent         | -0.038 |
| Transportation exp.| -0.001 |
| Total of food exp. | 0.266  |
| age exp.           | 0.078  |
| children educ exp. | 0.302  |

The shaded cells with yellow in the rotated component matrix show that component 1 consists of most significant variables affecting food expenditures of Peshmerga households such as; “prepared meals expenses, Fish meat expenses, prepared sweets, and Nut expenses”. The absolute value of their loadings; 0.780, 0.734, 0.711, and 0.671 respectively. Next comes component 2 with significant variables affecting food expenditures like; “Burghul expenses, Fouler expenses, sugar expenses, Wheat groats expenses, and Beans expenses”, with loadings of; 0.681, 0.661, 0.636, 0.631, and 0.401 respectively. The same interpretation concerning the remaining components.
For each item and each component, the component score is computed by multiplying the item’s standardized variable values (computed using listwise deletion) by the component's score coefficients (IBM Knowledge Center). The bring about 8 component score variables are used in place of the 22 original variables with only a 36% losses of information for the second set variables and % 47 losses of information for the first set variables and % 47 losses of information for the second set variables. Depending on component score coefficient matrix in appendix 2, component score variable representing the first component for the first set variables and % 47 losses of information for the second set variables. And so forth concerning the other seven remaining components.

3-2-5 Component Score Coefficient:

Table 10 Rotated Component Matrix for the second set variables

| Rotated Component Matrix |
|--------------------------|
| Component | 1 | 2 | 3 | 4 | 5 | 6 |
| Prepared meals exp. | 0.780 | 0.005 | 0.087 | -0.057 | 0.098 | 0.199 |
| Fish meat exp. | 0.734 | 0.111 | -0.023 | 0.217 | 0.049 | -0.171 |
| prepared sweets exp. | 0.711 | -0.043 | 0.006 | -0.144 | 0.044 | 0.294 |
| Nuts exp. | 0.671 | 0.020 | 0.189 | -0.027 | 0.066 | -0.067 |
| Burghul exp. | -0.003 | 0.681 | 0.086 | 0.101 | 0.227 | -0.014 |
| Flour exp. | 0.085 | 0.661 | 0.008 | 0.015 | -0.193 | 0.018 |
| Sugar exp. | -0.071 | 0.636 | -0.006 | 0.186 | -0.357 | 0.088 |
| Wheat grots exp. | -0.025 | 0.631 | -0.101 | 0.166 | 0.304 | -0.023 |
| Beans exp. | 0.349 | 0.401 | 0.361 | -0.145 | 0.046 | -0.251 |
| Rice exp. | -0.028 | 0.053 | 0.701 | -0.020 | 0.073 | -0.077 |
| Tea exp. | -0.057 | 0.036 | 0.569 | -0.017 | 0.119 | 0.179 |
| Chicken meat exp. | 0.172 | 0.035 | 0.569 | 0.244 | -0.038 | 0.081 |
| Red meat exp. | 0.342 | -0.184 | 0.530 | 0.169 | 0.078 | -0.046 |
| Edible oil exp. | 0.327 | 0.413 | 0.455 | -0.083 | 0.030 | 0.056 |
| Salary | -0.041 | 0.199 | 0.002 | 0.689 | -0.042 | -0.052 |
| All expenses except food | -0.040 | 0.209 | 0.052 | 0.687 | -0.017 | 0.337 |
| Bread exp. | 0.014 | -0.101 | 0.137 | 0.663 | 0.194 | -0.078 |
| Vegetables exp. | 0.083 | 0.023 | 0.259 | 0.061 | 0.765 | -0.023 |
| Fruits exp. | 0.163 | -0.162 | 0.444 | -0.049 | 0.489 | 0.050 |
| Wheat exp. | 0.178 | 0.334 | -0.203 | 0.332 | 0.479 | 0.125 |
| Wife income | 0.056 | 0.177 | -0.010 | -0.045 | 0.085 | 0.709 |
| Extra job income | 0.095 | -0.267 | 0.193 | 0.157 | -0.079 | 0.565 |

Component 1 = 0.187 salario -0.051 wife income -0.121 extra job income + 0.382 years of service +0.372 military ranks + 0.311 age + 0.010 certification +0.011 house rent – 0.041 delaying salary –0.014 debts +0.024 installment +0.047 healthcare type- 0.004 car expenses+ 0.022 transportation + 0.091 children education -0.007 clothes - 0.002 house equipment - 0.050 electricity -0.183 water supply -0.070 personal expenses -0.025 war effect + 0.103 total of food expenses.

And so forth concerning the other seven remaining components.

The resulting variables which represent each component are then commonly normalized. Using the saved components is also preferable to using the original variables such as; salary in 1000 IDs, years of service, military ranks, healthcare type, food expenses, certification,... etc., because the components are representative of all 22 original variables.
variables despite their different measurement units, and the components are not linearly correlated with each other.

4- Conclusions:
The most important conclusions achieved in this study are:
1- The descriptive statistics showed that the average salary of 385 Peshmerga was 788000 IDs per month, the minimum salary was 500000 IDs, and the maximum salary was 3950000 IDs. The average of their service period was 9 years, the military ranking average was “Sergeant” in the year 2015, the food expenditures average was 283000 IDs per month, while the average of various types of household’s expenditures except food items was around 563000 IDs, see table 1, and 2.

2- The amount of the variables variances that is accounted for by the components “Communalities” are having higher values for some crucial variables of the first set, such as: salary, years of service, and age by; 0.784, 0.773, and 0.743 respectively. While the highest Communalitys for the second set variables “Prepared meal expenses, Vegetable expenses, and All expenses except food” by; 0.669, 0.665, and 0.634 respectively.

3- Throughout factor analysis compliance using the principal component method, 8 significant components extracted from the first set of variables. Observing the breaking point of the Scree- plot, was in the eighth factor. And 6 significant components extracted from the second set variables. Detecting the breaking point of the Scree- plot, was in the sixth factor. These extracted components (factors) are responsible for determining most of the variations may occur in expenditures of any Peshmerga’s household.

4- After applying Varimax rotation and suppressing the results of loadings by size, the most significant variables that are having impact on various patterns of expenditures of Peshmerga’s households according to their priorities are: “Years of service, Military ranks, Age, and Salary” are in the first rank of importance (component 1), and variables like: “Installment, War effect, Debts, and House rent” in the second rank of importance (component 2). And so on till the least significant variables like: “Delaying salary, and Extra job income” in the eighth rank of importance (component 8), see table 9.

5- The most significant variables that are having an impact on food items expenditures of Peshmerga’s households according to their priorities are: “Prepared meals exp., Fish meat exp., prepared sweets exp., and Nuts exp.” in the first rank (component 1). Variables such as: “Burghul expenses, Flour expenses, Sugar expenses, Wheat grots expenses, and Beans expenses” in the second rank of importance (component 2). And so on until the least significant variables of “Wife income, and Extra job income” in the sixth rank of importance, see table 10.

6- The results revealed that the ratio of the total variance explained by the eight extracted factors of all expenditure patterns of Peshmerga households (first set variables) is equal to 64.085 %. While the total variance explained by the six extracted factors of expenditures on food items (second set variables) is equal to 52.856 %.

7- The resulting 8 component score variables are representative of and can be used in place of, the 22 original variables with only a 36 % loss of information for the first set variables and % 47 loss of information for the second set variables. Depending on the component score coefficient matrix.
5- Limitations and Further Studies:

This study is the first of the kind in assessing the most essential expenditure patterns of Peshmerga households, though it is limited to the extraction of the most significant factors (components) affecting the expenditure patterns. The researcher tried to apply parallel analysis in order to reduce the 8 extracted components to 5 extracted components. But the total ratio of variation explained by the 5 factors declined to 48.785% for the first set variables. Concerning the second set variables the 6 extracted components reduced to 4 components. The total ratio of variation explained by the factors declined to 42.499%. Therefore, the researcher sees not to reduce the number of extracted components throughout applying parallel analysis.

It is possible to build a linear regression model for the extracted factors in order to diagnose and fix the problem of multicollinearities between variables. In this study, the researcher found that there isn’t such a problem for both sets of variables. Also, the researcher suggests applying confirmatory factor analysis to confirm the factor structure of observed variables in further studies.

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Appendix (1): Survey Form

- The following information is for married Peshmerga only and is used for university research purposes.
- With the help of your family, please complete this form for a period of not more than one week.

1. Salary in Iraqi Dinar:
   - Mark × in the circle you choose. Thanks for your cooperation.

2. Years of service as Peshmerga:

3. Military rank:

4. Age:

5. Do you carry an academic certification? Yes No

6. If your wife earns income, how much she gets per month in Iraqi Dinar?

7. If you live in a house you pay rent, how much you pay?

8. Does the government delay paying your salary? Yes No

9. If you fall under the influence of loans most months of the year? Yes No

10. When you and your family get sick, what kind of hospital do you go to? Public Private

11. If you own a car how much you pay for fuel and maintenance monthly?

12. If you don’t own a car how much is your and your family transportation expenses monthly?

13. Doing any extra job other than the work of Peshmerga, how much is your monthly income in Iraqi Dinars?

14. When you and your family get sick, what hospital do you go to? Public Private

15. How much is your children education expenses per month in Iraqi Dinars?

16. How much does it cost to buy home equipment per month?

17. How much is clothed family, please complete this form in a period of not more than one week.

18. How much is your children education expenses per month in Iraqi Dinar?

19. How much is the electricity expenditures and generators per month in Iraqi Dinars?

20. How much is water expenditures in Iraqi Dinars per month?

21. How much is your personal expenses like cigarettes and other stuff per month?

22. How much is your children education expenses per month in Iraqi Dinars?

23. How much is your children education expenses per month in Iraqi Dinars?

24. How much is your children education expenses per month in Iraqi Dinars?

25. How much is your children education expenses per month in Iraqi Dinars?

26. How much does it cost to buy home equipment per month?

27. How much is water expenditures in Iraqi Dinars per month?

28. How much is your personal expenses like cigarettes and other stuff per month?

29. How much is your personal expenses like cigarettes and other stuff per month?

30. How much is your personal expenses like cigarettes and other stuff per month?

31. How much is your personal expenses like cigarettes and other stuff per month?

32. How much is your personal expenses like cigarettes and other stuff per month?

33. How much is your personal expenses like cigarettes and other stuff per month?

34. How much is your personal expenses like cigarettes and other stuff per month?

35. How much is your personal expenses like cigarettes and other stuff per month?

36. How much is your personal expenses like cigarettes and other stuff per month?

37. How much is your personal expenses like cigarettes and other stuff per month?

38. How much is your personal expenses like cigarettes and other stuff per month?

39. How much is your personal expenses like cigarettes and other stuff per month?

40. How much is your personal expenses like cigarettes and other stuff per month?

Appendix 2

The Component Score Coefficient Matrix of all expenditures patterns (first set variables)

| Component | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|
| Salary    | .187  | -.037 | -.041 | -.049 | .071  | .250  | .057  | -.229 |
| Wife income | -.051 | -.072 | -.116 | .092  | .005  | -.054 | .450  | .269  |
| Extra job income | -.121 | -.035 | .239  | .067  | .100  | -.021 | -.093 | .250  |
| Years of service | .382  | -.006 | -.069 | .004  | -.006 | -.107 | -.121 | .039  |
| Military ranks | .372  | -.030 | -.023 | .008  | .062  | -.233 | .254  | -.216 |
| Age        | .311  | .087  | .039  | -.122 | -.064 | -.005 | -.092 | .242  |
| Certification | .010  | .039  | .002  | -.037 | -.041 | .025  | .475  | -.042 |
| House rent | .011  | .279  | .152  | -.163 | -.042 | .075  | .146  | -.010 |
| Delaying salary | -.041 | -.020 | .120  | .100  | -.026 | .078  | -.065 | -.422 |
| Debts      | -.014 | .333  | .001  | .009  | .112  | -.022 | -.196 | -.134 |
| Installment | .024  | .410  | -.023 | -.019 | .052  | .007  | -.037 | .174  |
| Health care type | .047  | -.046 | .096  | -.359 | -.033 | -.110 | .172  | -.002 |
| Car Expenses | -.004 | -.016 | .450  | .098  | .075  | -.092 | .040  | -.090 |
| Transportation exp. | .022  | -.049 | -.446 | .175  | -.048 | -.012 | .101  | .137  |
| Children education exp. | .091  | .056  | .232  | .174  | -.436 | .126  | .015  | .350  |
| Cloths exp. | -.007 | .050  | .039  | -.034 | .352  | .165  | -.106 | .075  |
### Appendix 3
The Component Score Coefficient Matrix of Food items Expenditures (second set variables)

| Component                                | 1     | 2     | 3     | 4     | 5     | 6     |
|------------------------------------------|-------|-------|-------|-------|-------|-------|
| Salary                                   | 0.008 | 0.007 | -0.007 | 0.409 | -0.095 | -1.07 |
| Wife income                              | -0.042 | 0.101 | -0.037 | 1.126 | 0.085 | 0.598 |
| Extra job income                         | 0.004 | -1.133 | 0.090 | 0.078 | -1.04 | 0.437 |
| Bread exp.                               | 0.006 | -0.127 | 0.028 | 0.407 | 0.062 | -1.133 |
| Edible oil exp.                          | 0.059 | 0.180 | 0.196 | 0.109 | -0.058 | 0.034 |
| Rice exp.                                | -0.111 | 0.021 | 0.074 | -0.039 | -0.038 | -0.070 |
| Burgul exp.                              | -0.062 | 0.297 | 0.008 | -0.043 | 0.163 | 0.002 |
| Wheat exp.                               | 0.055 | 0.068 | -0.214 | 0.130 | 0.356 | 0.078 |
| Wheat grots exp.                         | -0.049 | 0.270 | -0.103 | 0.001 | 0.245 | -0.011 |
| Chicken meat exp.                        | 0.009 | -0.025 | 0.281 | 0.133 | -1.148 | 0.020 |
| Red meat exp.                            | 0.097 | -0.123 | 0.227 | 0.123 | -0.067 | -0.092 |
| Fish meat exp.                           | 0.348 | -0.014 | -0.121 | 0.163 | -0.055 | -0.212 |
| Sugar exp.                               | -0.025 | 0.265 | 0.044 | 0.061 | -0.277 | 0.067 |
| Flour exp.                               | -0.025 | 0.291 | 0.014 | -0.051 | 0.151 | 0.019 |
| Vegetables exp.                          | -0.069 | 0.007 | 0.021 | -0.042 | 0.544 | -0.018 |
| Fruits exp.                              | -0.031 | 0.070 | 0.152 | -0.070 | 0.036 | 0.035 |
| Beans exp.                               | 0.100 | 0.174 | 0.148 | -0.112 | -0.036 | -0.216 |
| Prepared meals exp.                      | 0.317 | -0.022 | -0.072 | -0.036 | 0.003 | 0.117 |
| prepared sweets exp.                     | 0.294 | -0.027 | 0.098 | -0.089 | -0.016 | 0.209 |
| Tea exp.                                 | -0.128 | 0.023 | 0.295 | -0.063 | 0.025 | 0.149 |
| Nuts exp.                                | 0.277 | -0.021 | 0.006 | 0.003 | -0.404 | -0.140 |
| All expenses except food                 | -0.029 | 0.021 | 0.009 | 0.363 | -0.074 | -0.218 |

### Appendix 4
The Correlation Matrix of the First Set Variables

| Correlation | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11      |
|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Salary       | 1.000   | 0.434   | 0.384   | 0.003   | -0.006  | -0.125  | -0.002  | -0.114  | 0.501   | 0.229   | -0.017  |
| Years of service | 0.434   | 1.000   | 0.605   | 0.229   | 0.002   | 0.062   | 0.004   | 0.135   | 0.006   | 0.037   | 0.060   |
| Military rank | 0.384   | 0.605   | 1.000   | 0.501   | 0.229   | 0.004   | 0.135   | 0.006   | 0.037   | 0.060   | 0.006   |
| Age          | 0.003   | 0.002   | 0.004   | 1.000   | 0.434   | 0.384   | 0.003   | -0.006  | -0.125  | -0.002  | -0.114  |
| Certificat ion | -0.006  | 0.062   | 0.004   | 0.135   | 1.000   | 0.434   | 0.384   | 0.003   | -0.006  | -0.125  | -0.002  |
| Wife income  | -0.125  | 0.004   | 0.135   | -0.006  | -0.125  | 1.000   | 0.434   | 0.384   | 0.003   | -0.006  | -0.125  |
| House rent   | -0.002  | 0.002   | 0.004   | -0.006  | -0.006  | -0.125  | 1.000   | 0.434   | 0.384   | 0.003   | -0.006  |
| Delaying salary | -0.114  | -0.017  | -0.114  | -0.002  | -0.114  | -0.002  | -0.114  | 1.000   | 0.434   | 0.384   | 0.003   |
**Appendix 5**

**The Correlation Matrix of the Second Set Variables**

|                  | Bread exp | Bread exp | Bread exp | Bread exp | Bread exp | Bread exp | Bread exp | Bread exp | Bread exp |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bread exp        | 1.00      | 0.96      | 0.87      | 0.75      | 0.75      | 0.75      | 0.75      | 0.75      | 0.75      |
| Bread exp        | 0.96      | 1.00      | 0.97      | 0.98      | 0.98      | 0.98      | 0.98      | 0.98      | 0.98      |
| Bread exp        | 0.87      | 0.97      | 1.00      | 0.98      | 0.98      | 0.98      | 0.98      | 0.98      | 0.98      |
| Bread exp        | 0.75      | 0.98      | 0.98      | 1.00      | 0.99      | 0.99      | 0.99      | 0.99      | 0.99      |
| Bread exp        | 0.75      | 0.98      | 0.98      | 0.99      | 1.00      | 0.99      | 0.99      | 0.99      | 0.99      |
| Bread exp        | 0.75      | 0.98      | 0.98      | 0.99      | 0.99      | 1.00      | 0.99      | 0.99      | 0.99      |
| Bread exp        | 0.75      | 0.98      | 0.98      | 0.99      | 0.99      | 0.99      | 1.00      | 0.99      | 0.99      |
| Bread exp        | 0.75      | 0.98      | 0.98      | 0.99      | 0.99      | 0.99      | 0.99      | 1.00      | 0.99      |

**Correlation**

|                  | Total exp | Total exp | Total exp | Total exp | Total exp | Total exp | Total exp | Total exp | Total exp |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Total exp        | 0.95      | 0.94      | 0.92      | 0.87      | 0.87      | 0.87      | 0.87      | 0.87      | 0.87      |
| Total exp        | 0.94      | 1.00      | 0.96      | 0.93      | 0.93      | 0.93      | 0.93      | 0.93      | 0.93      |
| Total exp        | 0.92      | 0.96      | 1.00      | 0.95      | 0.95      | 0.95      | 0.95      | 0.95      | 0.95      |
| Total exp        | 0.87      | 0.93      | 0.95      | 1.00      | 0.99      | 0.99      | 0.99      | 0.99      | 0.99      |
| Total exp        | 0.87      | 0.93      | 0.95      | 0.99      | 1.00      | 0.99      | 0.99      | 0.99      | 0.99      |
| Total exp        | 0.87      | 0.93      | 0.95      | 0.99      | 0.99      | 1.00      | 0.99      | 0.99      | 0.99      |
| Total exp        | 0.87      | 0.93      | 0.95      | 0.99      | 0.99      | 0.99      | 1.00      | 0.99      | 0.99      |
| Total exp        | 0.87      | 0.93      | 0.95      | 0.99      | 0.99      | 0.99      | 0.99      | 1.00      | 0.99      |

**Determinant = 0.004**
در بحث‌های دیگر نیز، تعداد افرادی که در مطالعه حضور دارند، به‌طور گیرانی در جدول‌ها و نمودارها نشان داده شده است. بیشتر افراد تنها در یک سطح اجتماعی مشاهده شده‌اند.

در سطح بالای سوم، بیش از ۲۴٪ از افراد در این سطح واقع شده‌اند و در سطح پایین‌ترین سطح، بیش از ۱۶٪ افراد در آن به‌طور مشابه مشاهده شده‌اند. این نتایج نشان‌دهنده می‌باشد که بسیاری از افراد در سطح بالای سوم واقع شده‌اند.


described above. This demonstrates that the study is important.