



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 items 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 $X_1, X_2, \dots, X_p$, 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 not 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:

$$X_p = L_{p1} F_1 + L_{p2} F_2 + \dots + L_{pm} F_m + e_p \quad \text{----- (1)}$$

Where the following assumptions are made:

- 1- m is the number of common factors (typically this number is much smaller than P , where $P=1,2,\dots,i$).
- 2- $F_1, F_2, \dots, F_m$; 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- $e_1, e_2, \dots, e_p$ are unique factors, apiece associating to one of the original variables.



Since X_i is standardized, its 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: $\text{Var } X_i = 1 = h_i^2 + u_i^2$ ----- (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;

$$F_j = C_j / (\text{Var } C_j)^{1/2} \text{ ----- (3), where } C_j \text{ is the } j \text{ principal component.}$$

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:

$$C_1 = a_{11} X_1 + a_{12} X_2 + \dots + a_{1p} X_p$$

$$C_2 = a_{21} X_1 + a_{22} X_2 + \dots + a_{2p} X_p$$

.

.

.

$$C_p = a_{p1} X_1 + a_{p2} X_2 + \dots + a_{pp} X_p \text{ ----- (4)}$$

It may be shown mathematically that this set of equations can be inverted to express the X_i 's as functions of C_j 's, the result is:

$$X_1 = a_{11} C_1 + a_{21} C_2 + \dots + a_{p1} C_p$$

$$X_2 = a_{21} C_1 + a_{22} C_2 + \dots + a_{p2} C_p$$

.

.

.

$$X_p = a_{p1} C_1 + a_{p2} C_2 + \dots + a_{pp} C_p \text{ ----- (5)}$$

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 i th equation then could be expressed as:

$$X_i = a_{i1} F_1 (\text{Var } C_1)^{1/2} + a_{i2} F_2 (\text{Var } C_2)^{1/2} + \dots + a_{ip} F_p (\text{Var } C_p)^{1/2} \text{ ----- (6)}$$



This last equation is now modified in two ways:

- 1- Using the notation $L_{ij} = a_{ji} (\text{Var } C_j)^{1/2}$ for the first m components.
- 2- Combining the last $P-m$ terms and denote the result by e_i . That is,

$$e_i = a_{m+1,i} F_{m+1} (\text{Var } C_{m+1})^{1/2} + \dots + a_{Pi} F_P (\text{Var } C_P)^{1/2} \text{ ----- (7)}$$

With these manipulations each variable x_i is expressed now as

$$X_i = L_{i1} F_1 + L_{i2} F_2 + \dots + L_{im} F_m + e_i \text{ ----- (8) for } i = 1, 2, \dots, P.$$

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.

$$h_i^2 = L_{i1}^2 + L_{i2}^2 + \dots + L_{im}^2 \text{ ----- (9)}$$

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	1	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
Car Expenses	385	0	500	68.74	68.632	4710.372
Transportation exp.	385	0	300	74.74	57.313	3284.785
Children education exp.	385	0	450	52.13	57.014	3250.574
Cloths exp.	385	0	530	87.95	61.246	3751.130
House Equipment exp.	385	0	575	69.72	67.897	4610.036
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	23.273	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



Wheat exp.	385	0	15	1.11	2.417	5.840
Wheat grots exp.	385	0	20	4.39	3.492	12.196
Chicken meat exp.	385	0	150	38.77	16.651	277.255
Red meat exp.	385	0	100	29.47	15.704	246.620
Fish meat exp.	385	0	84	15.04	15.051	226.530
Sugar exp.	385	0	40	9.04	6.706	44.968
Flour exp.	385	0	58	7.09	8.364	69.955
Vegetables exp.	385	0	50	17.05	9.384	88.067
Fruits exp.	385	0	50	22.63	9.727	94.609
Beans exp.	385	0	70	14.69	8.431	71.090
Prepared meals exp.	385	0	200	19.99	27.558	759.419
prepared sweets exp.	385	0	75	12.80	14.344	205.740
Tea exp.	385	0	80	11.65	9.210	84.826
Nuts exp.	385	0	60	12.49	11.120	123.646
All expenses except food	385	115.00	1858.00	563.0156	238.11143	56697.052

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

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.



Table 4 Suitability test of the second set of data for factor analysis. KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.736
Bartlett's Test of Sphericity	Approx. Chi-Square	1592.825
	df	231
	Sig.	0.000
Correlation matrix Det.		0.014

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 15.657% 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									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.445	15.657	15.657	3.445	15.657	15.657	2.364	10.746	10.746
2	2.108	9.580	25.237	2.108	9.580	25.237	1.969	8.951	19.697
3	1.925	8.752	33.989	1.925	8.752	33.989	1.750	7.956	27.654
4	1.727	7.850	41.839	1.727	7.850	41.839	1.723	7.832	35.486
5	1.528	6.946	48.785	1.528	6.946	48.785	1.677	7.622	43.107
6	1.231	5.594	54.378	1.231	5.594	54.378	1.649	7.497	50.604
7	1.096	4.983	59.361	1.096	4.983	59.361	1.518	6.898	57.502
8	1.039	4.724	64.085	1.039	4.724	64.085	1.448	6.583	64.085
9	0.956	4.344	68.430						
10	0.890	4.044	72.474						
11	0.853	3.879	76.353						
12	0.751	3.413	79.766						
13	0.701	3.188	82.953						
14	0.603	2.742	85.695						
15	0.564	2.562	88.257						
16	0.516	2.347	90.604						
17	0.481	2.185	92.789						
18	0.399	1.815	94.604						
19	0.395	1.796	96.400						
20	0.328	1.491	97.891						
21	0.279	1.266	99.157						
22	0.185	.843	100.000						

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.



Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.574	16.248	16.248	3.574	16.248	16.248	2.576	11.710	11.710
2	2.489	11.312	27.560	2.489	11.312	27.560	2.367	10.758	22.468
3	1.779	8.085	35.645	1.779	8.085	35.645	2.185	9.931	32.399
4	1.508	6.854	42.499	1.508	6.854	42.499	1.791	8.142	40.541
5	1.230	5.592	48.091	1.230	5.592	48.091	1.465	6.661	47.201
6	1.048	4.765	52.856	1.048	4.765	52.856	1.244	5.655	52.856
7	0.998	4.536	57.392						
8	0.952	4.328	61.720						
9	0.872	3.964	65.683						
10	0.812	3.691	69.374						
11	0.776	3.527	72.902						
12	0.738	3.355	76.257						
13	0.697	3.166	79.423						
14	0.659	2.995	82.418						
15	0.596	2.711	85.129						
16	0.563	2.561	87.690						
17	0.557	2.534	90.224						
18	0.487	2.215	92.439						
19	0.478	2.174	94.614						
20	0.439	1.996	96.610						
21	0.401	1.822	98.432						
22	0.345	1.568	100.000						

3-2-3 Scree Plot:

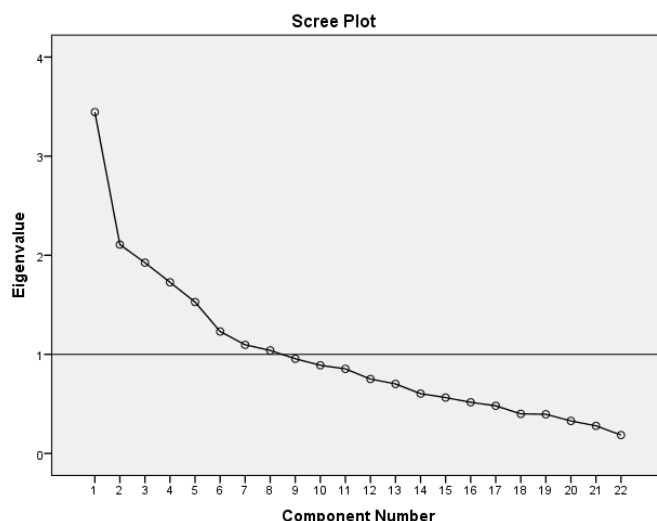


Figure 1 the Scree plot for the first set variables

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.

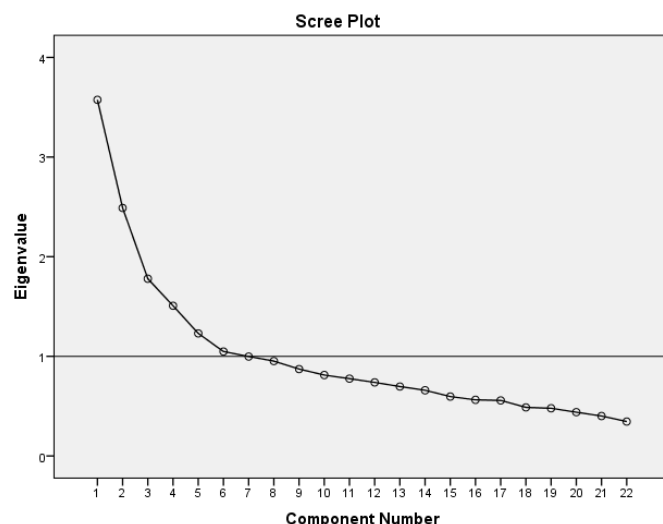


Figure 2 the scree plot for the second set variables

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.

**Table 9 Rotated Component Matrix for the first set variables**

Rotated Component Matrix									“Communalities”
	Component								hi ²
	1	2	3	4	5	6	7	8	
Years of service	0.822	-0.118	-0.047	0.109	0.066	0.036	-0.228	0.106	0.773
Military ranks	0.718	-0.058	0.040	0.094	0.118	-0.071	0.347	-0.274	0.743
Age	0.697	-0.016	0.135	-0.126	-0.031	0.157	-0.161	0.338	0.686
Salary	0.584	-0.097	0.003	-0.020	0.168	0.552	0.177	-0.263	0.784
Installment	-0.045	0.714	-0.131	0.007	-0.024	-0.028	-0.047	0.106	0.543
War effect	0.027	-0.686	0.015	-0.149	0.062	0.022	-0.136	0.095	0.525
Debts	-0.139	0.664	-0.136	0.043	-0.017	-0.131	-0.260	-0.274	0.640
House rent	-0.038	0.518	0.201	-0.308	-0.192	0.118	0.276	-0.145	0.553
Car Expenses	0.085	-0.147	0.783	0.191	0.190	-0.061	0.108	-0.031	0.731
Transportation exp.	-0.001	0.000	-0.733	0.296	0.015	-0.024	0.065	0.148	0.651
Personal exp.	-0.061	-0.057	0.148	0.777	-0.093	-0.063	0.108	-0.240	0.715
Health care type	-0.029	-0.082	0.192	-0.631	-0.189	-0.113	0.251	-0.045	0.557
Total of food exp.	0.266	0.252	0.021	0.544	0.300	0.021	0.131	0.192	0.575
House Equipment exp.	0.078	-0.097	0.125	0.110	0.820	0.029	0.088	0.064	0.728
Cloths exp.	0.194	-0.111	0.122	0.123	0.620	0.346	-0.074	0.229	0.642
Children education exp.	0.302	0.012	0.421	0.170	-0.455	0.198	-0.007	0.418	0.719
Electricity exp.	0.236	-0.119	-0.060	0.089	-0.031	0.839	-0.059	-0.120	0.804
Water supply exp.	-0.157	0.063	0.044	-0.067	0.160	0.607	0.256	0.145	0.516
Certification	-0.004	0.127	0.044	-0.103	-0.047	0.146	0.730	-0.139	0.604
Wife income	-0.100	-0.170	-0.102	0.162	0.174	0.018	0.621	0.358	0.620
Delaying salary	-0.050	0.096	0.142	0.105	-0.108	0.067	-0.029	-0.574	0.389
Extra job income	-0.115	-0.253	0.444	0.168	0.289	0.023	-0.122	0.447	0.602

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, Foul 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.



Table 10 Rotated Component Matrix for the second set variables
Rotated Component Matrix

	Component						"Communalities" hi ²
	1	2	3	4	5	6	
Prepared meals exp.	0.780	0.005	0.087	-0.057	0.098	0.199	0.669
Fish meat exp.	0.734	0.111	-0.023	0.217	0.049	-0.171	0.630
prepared sweets exp.	0.711	-0.043	0.006	-0.144	0.044	0.294	0.616
Nuts exp.	0.671	0.020	0.189	-0.027	0.066	-0.067	0.496
Burghul exp.	-0.003	0.681	0.086	0.101	0.227	-0.014	0.533
Flouer exp.	0.085	0.661	0.008	0.015	-0.193	0.018	0.483
Sugar exp.	-0.071	0.636	-0.006	0.186	-0.357	0.088	0.579
Wheat grots exp.	-0.025	0.631	-0.101	0.166	0.304	-0.023	0.530
Beans exp.	0.349	0.401	0.361	-0.145	0.046	-0.251	0.499
Rice exp.	-0.028	0.053	0.701	-0.020	0.073	-0.077	0.507
Tea exp.	-0.057	0.036	0.569	-0.017	0.119	0.179	0.375
Chicken meat exp.	0.172	0.035	0.569	0.244	-0.038	0.081	0.423
Red meat exp.	0.342	-0.184	0.530	0.169	0.078	-0.046	0.468
Edible oil exp.	0.327	0.413	0.455	-0.083	0.030	0.056	0.495
Salary	-0.041	0.199	0.002	0.689	-0.042	-0.052	0.521
All expenses except food	-0.040	0.209	0.052	0.687	-0.017	0.337	0.634
Bread exp.	0.014	-0.101	0.137	0.663	0.194	-0.078	0.513
Vegetables exp.	0.083	0.023	0.259	0.061	0.765	-0.023	0.665
Fruits exp.	0.163	-0.162	0.444	-0.049	0.489	0.050	0.495
Wheat exp.	0.178	0.234	-0.203	0.332	0.479	0.125	0.484
Wife income	0.056	0.177	-0.010	-0.045	0.085	0.709	0.547
Extra job income	0.095	-0.267	0.193	0.157	-0.079	0.565	0.467

3-2-5 Component Score Coefficient:

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 can be used in place of the 22 original variables with only a 36 % 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 of the original variables is computed as:

Component 1 = 0.187salary- 0.051wife 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.

Relying on component score coefficient matrix in appendix 3 the component score variable that represents the first component for the second set of original variables is:

Component 1= 0.008 Salary -0.042 Wife income + 0.004 Extra job income + 0.006 Bread + 0.059 Edible oil – 0.111 Rice – 0.062 Burghul +0.055 Wheat – 0.049 Wheat groats +0.009 Chicken meat +0.097 Red meat +0.348 Fish meat -0.025 sugar + 0.025 Flour – 0.069 Vegetables – 0.031 Fruits + 0.100 Beans + 0.317 Prepared meals + 0.294 Prepared sweets - 0.128 Tea + 0.277 Nuts - 0.029 All expenses except food

And the same way concerning the other five 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 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 Communalities 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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Appendices

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.
- Mark × in the circle you choose. Thanks for your cooperation.

- 1- Salary in Iraqi Dinar:
- 2- Years of service as Peshmerga:
- 6- Military rank:
- 7- Age:
- 8- Do you carry an academic certification? No Primary Prep ☒ College ☐
- 9- If your wife earns income, how much she gets per month in Iraqi Dinars? ☐
- 10- If you live in a house you pay rent, how much you pay? ☐
- 11- Does the government delay paying your salary? Yes No ☐
- 12- Do you fall under the influence of loans most months of the year? Yes No ☐
- 13- Do you have to pay monthly installments? Yes No ☐
- 14- If you do any extra job other than the work of Peshmerga, how much is your monthly income in Iraqi Dinars? ☐
- 15- When you and your family get sick, what kind of hospital do you go to? Public. Private ☐
- 16- If you own a car how much you pay for fuel and maintenance monthly? ☐
- 17- If you don't own a car how much is your and your family transportation expenses monthly? ☐
- 18- How much is your children education expenses per month in Iraqi Dinar? ☐
- 19- How much is clothed expenses for you and your family, per month? ☐
- 20- How much does it cost to buy home equipment per month? ☐
- 21- How much are the public electricity expenditures and generators per month in Iraqi Dinars? ☐
- 22- How much is water expenditures in Iraqi Dinars per month? ☐
- 23- How much are your personal expenses like cigarettes and other stuff per month? ☐
- 24- How is the war effect on your psychology and your family's members? Very bad Bad No ☐
- 25- Please write down the monthly expenses to purchase the following food patterns accurately and in Iraqi Dinars:
 - 1- Bread:
 - 2- Edible oil:
 - 3- Rice:
 - 4- Burghul:
 - 5- Wheat:
 - 6- Wheat groats:
 - 7- Chicken meat:
 - 8- Red meat:
 - 9- Fish meat:
 - 10- Sugar:
 - 11- Flour:
 - 12- Vegetables:
 - 13- Fruits:
 - 14- Beans:
 - 15- Prepared meals outside the home:
 - 16- Prepared sweets outside the home:
 - 17- Tea:
 - 18- Nuts:

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



House Equipment exp.	-.002	.044	.044	-.075	.541	-.077	.017	-.060
Electricity exp.	-.050	-.068	-.054	.078	-.113	.569	-.126	-.112
Water supply exp.	-.183	.070	.011	-.041	.051	.419	.095	.111
Personal exp.	-.070	-.096	.103	.526	-.185	-.014	.083	-.193
War effect	-.025	-.364	-.044	-.087	-.006	.005	-.078	-.025
Total of food exp.	.103	.192	.006	.268	.106	-.058	.096	.137

Appendix 3

The Component Score Coefficient Matrix of Food items Expenditures (second set variables)

	Component					
	1	2	3	4	5	6
Salary	.008	.007	-.007	.409	-.095	-.107
Wife income	-.042	.101	-.037	-.126	.085	.598
Extra job income	.004	-.133	.090	.078	-.104	.437
Bread exp.	.006	-.127	.028	.407	.062	-.133
Edible oil exp.	.059	.180	.196	-.109	-.058	.034
Rice exp.	-.111	.021	.374	-.039	-.038	-.070
Burghul exp.	-.062	.297	.008	-.043	.163	-.002
Wheat exp.	.055	.068	-.214	.130	.356	.078
Wheat grots exp.	-.049	.270	-.103	.001	.245	-.011
Chicken meat exp.	.009	-.025	.281	.133	-.148	.020
Red meat exp.	.097	-.123	.227	.123	-.067	-.092
Fish meat exp.	.348	-.014	-.121	.163	-.055	-.212
Sugar exp.	-.025	.265	.044	.061	-.277	.067
Flour exp.	.025	.291	.014	-.051	-.151	.019
Vegetables exp.	-.069	.007	.021	-.042	.544	-.018
Fruits exp.	-.031	-.070	.152	-.070	.306	.035
Beans exp.	.100	.174	.148	-.112	-.036	-.216
Prepared meals exp.	.317	-.022	-.072	-.036	-.003	.117
prepared sweets exp.	.294	-.027	-.098	-.089	-.016	.209
Tea exp.	-.128	.023	.295	-.063	.025	.149
Nuts exp.	.277	-.021	.006	.003	-.040	-.102
All expenses except food	-.029	.021	.009	.363	-.074	.218

Appendix 4

The Correlation Matrix of the First Set Variables

The Correlation Matrix of the First Set Variables																							
	Salary	Years of service	Military ranks	Age	Certification	Wife income	House rent	Delaying salary	Debts	Installment	Extra job income	Health care type	Car Expenses	Transportation exp.	Children education exp.	Clothes exp.	House Equipment exp.	Electricity exp.	Water supply exp.	Personal exp.	War effect	Total of food exp.	
Correlation	Salary	1.000	.400	.505	.292	.135	.018	.105	.002	-.232	-.086	-.076	-.014	.125	-.002	.114	.301	.229	.617	.163	.020	.019	.091
	Years of service	.400	1.000	.405	.599	-.193	-.057	-.189	-.069	-.114	-.084	.016	-.136	.087	.049	.205	.255	.105	.234	-.066	.026	.172	.233
	Military ranks	.505	.405	1.000	.234	.252	-.018	.034	.061	-.128	-.068	-.037	.038	.148	-.005	.122	.120	.134	.121	-.005	.073	.009	.215
	Age	.292	.599	.234	1.000	-.130	.001	-.041	-.094	-.193	-.096	.054	.019	.113	-.108	.308	.241	.062	.225	.074	-.133	.067	.130
	Certification	.135	-.193	.252	-.130	1.000	.166	.218	.022	.010	.038	-.117	.149	.023	-.075	.010	.007	-.055	.084	.202	-.015	-.070	.046
	Wife income	.018	-.057	-.018	.001	.166	1.000	.005	-.103	-.286	-.089	.067	-.030	.091	.123	-.026	.165	.236	.000	.150	.089	.034	.130
	House rent	.105	.189	-.034	-.041	.218	.005	1.000	.142	.218	.240	-.190	.207	-.006	-.133	.046	-.189	-.153	-.006	.023	-.090	-.025	.136
	Delaying salary	.002	-.069	.061	-.094	.022	-.103	.142	1.000	.137	.004	-.167	.055	-.037	-.074	-.005	-.106	-.064	-.003	.011	.096	-.095	.028



Debts	- .232	- .114	- .128	- .193	.010	- .286	.218	.137	1.000	.383	- .291	- .087	-.178	.100	-.151	- .170	-.159	-.141	- .096	.064	- .316	- .005
Installment	- .086	- .084	- .068	- .096	.038	- .089	- .240	.004	.383	1.000	- .129	- .046	-.165	.125	-.027	- .123	-.098	-.075	- .018	.011	- .281	-.040
Extra job income	- .076	- .016	- .037	- .054	-.117	.067	- .190	-.167	-.291	-.129	1.000	- .037	.324	-.086	.215	.342	.300	.002	.030	.059	.232	.137
Health care type	- .014	- .136	- .038	.019	.149	- .030	.207	.055	-.087	-.046	- .037	1.000	.027	-.158	.019	- .210	-.130	-.113	.040	-.234	.056	-.325
Car Expenses	.125	.087	.148	.113	.023	.091	-.006	-.037	-.178	-.165	.324	.027	1.000	-.412	.196	.202	.252	-.022	.050	.281	.082	.072
Transportation exp.	- .002	.049	- .005	-.108	-.075	.123	-.133	-.074	.100	.125	- .086	- .158	-.412	1.000	-.124	.014	.034	-.007	- .023	- .017	.087	
Children education exp.	.114	.205	.122	.308	.010	- .026	.046	-.005	-.151	-.027	.215	.019	.196	-.124	1.000	.073	-.101	.132	.030	.015	.053	.103
Cloths exp.	.301	.255	.120	.241	.007	.165	- .189	-.106	-.170	-.123	.342	- .210	.202	.014	.073	1.000	.445	.264	.160	-.009	.159	.253
House Equipment exp.	.229	.105	.134	.062	-.055	.236	- .153	-.064	-.159	-.098	.300	- .130	.252	.034	-.101	.445	1.000	.035	.136	.065	.108	.268
Electricity exp.	.617	.234	.121	.225	.084	.000	-.006	-.003	-.141	-.075	.002	- .113	-.022	-.007	.132	.264	.035	1.000	.233	.031	.055	.064
Water supply exp.	.163	- .066	- .005	.074	.202	.150	.023	.011	-.096	-.018	.030	.040	.050	-.023	.030	.160	.136	.233	1.000	-.074	- .006	.112
Personal exp.	.020	.026	.073	- .133	-.015	.089	- .090	.096	.064	.011	.059	- .234	.281	.132	.015	- .009	.065	.031	- .074	1.000	- .081	.198
War effect	.019	.172	.009	.067	-.070	.034	- .259	-.095	-.316	-.281	.232	.056	.082	-.017	.058	.159	.108	.055	- .006	- .081	1.000	-.196
Total of food exp.	.091	.233	.215	.130	.046	.130	- .136	.028	-.040	.137	- .325	.072	.087	.103	.253	.268	.064	.112	.198	- .196	1.000	.006

a.

Determinant =

.004

Appendix 5

The Correlation Matrix of the Second Set Variables

	Bread exp.	Edible oil exp.	Rice exp.	Burghul exp.	Wheat exp.	Wheat grots exp.	Chicken meat exp.	Red meat exp.	Fish meat exp.	Sugar exp.	Flour exp.	Vegetables exp.	Fruits exp.	Beans exp.	Prepared meals exp.	prepared sweets exp.	Tea exp.	Nut exp.	All expenses except food	Salary	Wife income	Extra job income
Bread exp.	1.000	.053	.083	.057	.155	.151	.143	.169	.133	.010	-.077	-.146	.106	-.019	.016	-.083	.076	.017	-.255	.233	.034	.092
Edible oil exp.	.053	1.000	.239	.254	.083	.200	.168	.261	.234	.179	.145	.119	.188	.373	.298	.190	.232	.258	.088	- .004	.102	.022
Rice exp.	.083	.239	1.000	.118	- .035	.014	.233	.305	.031	-.046	- .001	.180	.217	.188	.061	.036	.283	.153	.007	.037	.026	.031
Burghul exp.	.057	.254	.118	1.000	.239	.383	.084	-.007	.047	.260	.318	.134	-.022	.240	.088	.002	.071	.057	.190	.208	.037	-.086
Wheat exp.	.155	.083	- .035	.239	1.000	.212	.081	.014	.222	.079	.091	.231	-.008	.025	.130	.066	.076	.099	.179	.174	.055	.070
Wheat grots exp.	.151	.200	.014	.383	.212	1.000	-.010	-.067	.109	.231	.295	.109	-.033	.153	-.002	-.036	.009	.015	.196	.182	.094	-.124
Chicken meat exp.	.143	.168	.233	.084	.081	-.010	1.000	.254	.136	.065	.053	.196	.235	.287	.161	.105	.200	.172	.102	.060	.179	
Red meat exp.	.169	.261	.305	-.007	.014	- .067	.254	1.000	.226	- .141	-.018	.221	.296	.125	.307	.181	.174	.219	- .006	.015	.109	
Fish meat exp.	.133	.234	.031	.047	.222	.109	.136	.226	1.000	.053	.133	.134	.107	.271	.418	.297	- .006	.413	.079	.036	.038	.007
Sugar exp.	.010	.179	- .046	.260	.079	.231	.065	- .141	.053	1.000	.398	-.128	- .161	.114	-.100	-.079	- .032	- .064	.265	.162	.095	-.101
Flour exp.	-.077	.145	- .001	.318	.091	.295	.053	- .018	.133	.398	1.000	-.032	.091	.166	.065	-.004	.014	.041	.114	.114	.048	-.066
Vegetables exp.	.106	.119	.180	.134	.231	.109	.196	.221	.134	-.032	-.032	1.000	.416	.203	.145	.069	.141	.146	.094	.022	.032	.034
Fruits exp.	.106	.188	.217	-.022	- .008	-.033	.235	.296	.107	- .161	- .091	.416	1.000	.129	.192	.208	.188	.198	- .048	.034	.055	
Beans exp.	- .019	.373	.188	.240	.025	.153	.287	.125	.271	.114	.166	.203	.129	1.000	.206	.172	.060	.247	-.032	- .014	.003	-.060
Prepared meals exp.	.016	.298	.061	.088	.130	- .002	.161	.307	.418	.105	.065	.145	.192	.206	1.000	.581	.094	.401	- .011	- .040	.122	.135
prepared sweets exp.	- .083	.190	.036	.002	.066	- .036	.105	.181	.297	.105	-.004	.069	.208	.172	.581	1.000	.037	.369	-.015	- .034	.152	.119

Tea exp.	.076	.232	.283	.071	.076	.009	.200	.174	-.006	-.032	.014	.141	.188	.060	.094	.037	1.000	.144	-.004	.064	.023	.134
Nuts exp.	.017	.258	.153	.057	.099	.015	.172	.219	.413	-.064	.041	.146	.198	.247	.401	.369	.144	1.000	-.059	.000	.043	.070
All expenses except food	.255	.088	.007	.190	.179	.196	.149	.082	.079	.265	.114	.094	.041	-.032	-.011	-.015	-.004	-.059	1.000	.423	.180	.161
Salary	.233	-.004	.037	.208	.174	.182	.102	-.006	.036	.162	.114	.022	-.048	.014	-.040	-.034	.064	.000	.423	1.000	.018	-.076
Wife income	.034	.102	.026	.037	.055	.094	.060	.015	.038	.095	.048	.032	.034	.003	.122	.152	.023	.043	.180	.018	1.000	.067
Extra job income	.092	.022	.031	-.086	.070	-.124	.179	.109	.007	-.101	-.066	.034	.055	-.060	.135	.119	.134	.070	.161	-.076	.067	1.000

a.
Determinant =
.014

به کارهیتانی هۆکاره شیکاری بۆ خهرجی بابتهکانی خیزانهکانی پيشمه رگه له پاريزگای ههولير ، به چرپوونهوه له سه ر بابته خوراکيه کان

پوخته

پيشمه رگه بریتبه له هیزکی سه ربارزی له هه ریمی کوردستانی عیراق. ئەم توێژینه وه به ورده کاری خه رجه کانێ جۆره کانێ خیزانی سامپلیک که له 385 پيشمه رگه پیکهاتوهه پوون ده کاته وه له پێگای دوو کۆمه له له گۆراوه کان. یه که م کۆمه له پیکهاتوه له 22 جۆر (گۆراو) که کاریگه ری هه به له سه ر خه رجه جۆره کانێ گشتی خیزان له مانگی کدا، وه ک مووچه، سالانی خزمه ت، پله ی سه ربارزی، جۆری چاودێری ته ندورستی" له که رتی گشتی، یان تاییه ت"، خه رجه هاتوچۆ به دیناری عیراقی، خه رجه خویندنی مندال، ... هتد. دووه م کۆمه له له گۆراوه کان پیکهاتون له 22 جۆر خه رجه جۆره کانێ خوراک له مانگی کدا، وه ک خه رجه نان، گوشت، شه کر، ... هتد. بۆ هه ر کۆمه له ئێک توێژه ر هۆکاره شیکاری (تحلیل عاملی) له رێگه ی پیاگه رانی سه ره تایی ته نجامدا وه به جیبه ج کردنی شتواری شیکاری پیکهاته سه ره که به کان به مه به ستی که مکردنه وه ی ژماره ی گۆراوه کان بۆ ژماره یکی که متر له پیکهاته سه ره که به کان. له ده رئه نجامدا 8 پیکهاته ی سه ره کی هه لئینجران له کۆمه له ی یه که م به رێژه ی کۆی جیاوازی (تباین) ی 64.085%. وه سه باره ت به کۆمه له ی دووه م 6 پیکهاته ی سه ره کی هه لئینجران به رێژه ی کۆی جیاوازی 52.856%.

ده سه تهاژه گرنگه کان: جۆره کانێ خه رجه، خه رجه جۆره کانێ گشتی، خه رجه جۆره کانێ خوراک، هۆکاره شیکاری، شیکاری پیکهاته سه ره که به کان.

اسخدام التحليل العاملي لانماط الانفاق الاسري للپيشمه رگه في محافظة اربيل، مع التركيز على البنود الغذائية

ملخص

البیشمرکه هه ی قوه عسکریه فی إقليم کوردستان العراق. توضح هذه الدراسة بنود الإنفاق لعینه من 385 عائلة من البیشمرکه فی مجموعتین رئیستین من المتغیرات. تتكون المجموعة الأولى من 22 نمطاً (متغیراً) عامّاً للإنفاق الشهري مثل: الراتب ، سنوات الخدمه ، الرتب العسکریه ، نوع الرعايه الصحیه ؛ القطاع العام ، أو القطاع الخاص ، نفقات النقل بالدينار العراقي ، ونفقات تعليم الأطفال ، ... الخ. والمجموعة الثانية تتكون من 22 مادة (متغیراً) غذائیه ؛ نفقات الخبز، نفقات اللحوم، ونفقات السكر ... الخ. بالنسبه لكل من المجموعتین ، أجرى الباحث التحليل العاملي تحلیلاً استکشافیاً للعوامل اعتماداً علی طریقه تحليل المكونات الرئیسیه لتقليل عدد المتغیرات إلى عدد أقل من المكونات. نتیجهً لذلك ، تم استخراج 8 مكونات من المجموعة الأولى بنسبه تباین إجمالي تباین 64.085% ، و 6 مكونات من المجموعة الثانية بنسبه تباین إجمالي 52.856%.

الكلمات الدالّه: انماط الإنفاق ، الانفاق الشهري، البنود الغذائية ، التحليل العاملي ، تحليل العناصر الأساسیه.