SOME ASPECTS OF EMIGRATION FROM JORDAN

Use and Application of a Log - Linear Model in the Analysis of Migration Data

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INTRODUCTION.

In spite of the importance of migration as a process which affects the population growth and structure and generally influences the socio-economic life of the society, the statistics pertaining to the magnitude, trends and characteristics of the phenomenon of migration in Jordan are still below the required standard.

With regard to external migration "transit statistics", that is, arrivals and departures are collected continuously at the Jordanian borders. Basic data on the " Jordanians living abroad" (to be discussed later) were collected from a six percent sample of the households living in Jordan (East Bank) in 1975. The two sets

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ABSTRACT

Volume, destinations, and reasons of emigration from Jordan, in addition to the characteristics of emigrants, were of concern to this paper. Besides, its main interest was the relationship between the socio-economic status and the origin of the emigrants on the one hand and their destinations on the other hand .

The data utilized were those of "The Multi-purpose Household Survey; Jordanians Abroad 1975". And a log-linear model was used to analize these data.

The findings indicate that the Jordanian emigrants are mainly young males (i.e., 15-34 years) from Amman District. Most of the emigrants had obtained the secondary school certificate (Taqjihi).

Only 41 percent of the emigrants left Jordan to work abroad. And only one person out of each 5.6 households left Jordan to live abroad.

The association between the origin and the educational attainment of the emigrants and their destinations is evident. Generally, the low educated emigrants go mainly to the Gulf countries and to Western Europe; While the school leavers go to West European countries, Iraq-Lebanon and Syria, and East European. But the highly educated

of data remain unrepresentative of the real state of affairs.

Nevertheless, this sample survey of 1975 is considered the best and to some extent the only acceptable-source for information about emigration from Jordan. Thus the analysis in this paper will be based upon its data, and consequently the perspective of the research will be limited to the variables covered by its questionnaire as presented in cross-classifications in its published report (The Hashemite Kingdom of Jordan, Department of Statistics, 1976).

The Multi-Purpose Household Survey 1975 is a six percent multi-stage stratified random sample of households living in Jordan (East Bank). Its data were collected by asking the head of each household covered by the survey if any member of his household is living abroad(i,e,.) residing abroad for not less than three months), and if so, what are the reasons for his move (i.e., education, work, or medical care), and where he is living(i,e.,what country he is residing). The outcome of these two questions and other questions about the personal characteristics (i.e., age,sex and occupation) of the emigrants yielded several tables published in specific cross-classifications in the report mentioned above.

" No matter how short or how long, how easy or whow difficult. every act of migration involves as origin, a destination and an intervening set of obstacles"(E.S.les, 1966,P. 49). The Following set of factors enter the decision to migrate:

1- Personal factors.

2- Factors associated with the places of origin and destination.

3- the intervening obstacles.(1)

The personal factors can be divided into: firstly demographic characteristics of the migrant (age, sex, etc.) and secondly his socio-economic characteristics (education,occupation, etc.).

In this research we will focus on the educational attainment, considering it as a proxy for the socio-economic status of the individual. Thus the educational

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(1) In spite of the importance of the concept of the intervening obstacles (i.e., distance, cost,regulations, etc.)in the explanation of the properties of the volume and the characteristics of the migrants to a particular destination, it was assumed that the intervening obstacles do not affect the relationship between the variables involved in this analysis. That is, every potential Jordanian migrant could choose any destination regardless any intervening obstacle if his level of education gives him the chance to work or study (depending on the reason for his move) in that destination.

level of the migrant will be the only variable to be included in the model (to be discussed later) and relates to the personal characteristics of the migrant. As far as the other individual traits are concerned, they will be excluded from the model, but the reasoning for excluding them will be discussed together with using the data of these characteristics-when necessary-as sources for additional pieces of information and for obtaining better explanations.

Anyhow, the variable "sex" is excluded because women constitute only ten percent of the Jordanians abroad (i.e., 345 females out of 3,436 migrants). Also the variable "age" is left out of the analysis because it was not cross-classified with education and the other variables included in the model, in the published table; besides, this research is not interested in the characteristics of the migrants per se. However, it is worthwhile to indicate that 87.1 percent of the Jordanian males who were living abroad in 1975 were young, that is ,15-34 years of age, and 68.8 percent were 20-29 years of age.

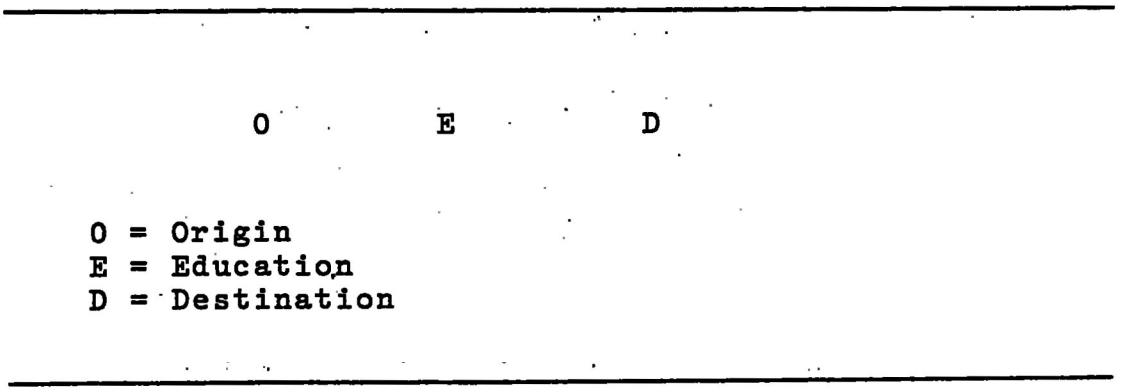
Only one table in the whole published report(The Hashemite Kingdom of Jordan, Department of Statistics, 1976, table 3,pp.22-37) brought the variable education together with the place of origin (i.e., the district

where the migrant's household is living) and the place of destination (i.e., the country where the migrant is residing). This paper will use the data provided by the table indicated above to analyze the association between the socio-economic status of the Jordanian migrants and the destinations of these migrants.

Destination is taken as the dependent variable, while origin and education are the independent ones. (Figure 1)

Origin is dichotomized into " Amman District" (i.e., the capital district) and " Other Districts" (i.e., Irbid, Balqa, Karak and Ma'an Districts) Education is grouped into three categories:low, dedium and high. Low is defined as less than completed secondary education. Medium is completed secondary education (i.e., Tawjihi) and Diploma after secondary school. High education equals attended or completed

Figure 1 - Influence of Origin and Education on Destination.



University education. Finally, destination is classified rather detailed, as follows:

1- Iraq, Lebanon, Syria.

2- Saudi Arabia, Yemen Arab Republic, P.D.R. of Yemen.

3- The Gulf states (Kuwait, Qatar, Bahrain, Abu Dhabi, Dubai, other Emirates).

4- Egypt and Sudan.

5- Other North African Arab countries (Libya,Algeria and Morocco).

6- USA and Canada.

7- Western Europe.

8- East Europe.

9- Other Countries.

The "Other category is rather heterogeneous. In general, this category includes the LDCs.The category isdominated by migrants to Asian countries.

The data are processed using the "BMDP3F) program for log-linear models (Biomedical Computer Programs P-Series, BMDP-77, 1977,pp. 297-325).

One of the important goals of using log-linear models in social science research is the explanation of variation in dependent variables. Explaining variables leads to the investigation of causal relationships, the mechanisms that may relate one variable to another.

In addition, the log-linear models help the social scientist to predict some aspects of behavior on the basis of limited knowledge. In sum, applying this technique has three main benefits: Explaining variation, exploring causal relationships, and making predications.

COMPUTATION.

Table 1 presents the observed values, and table 2 provides us with information about which level(s) of interactions reduce(s) the chi-square value of the mean more than the other level (s) do. The more we can reduce the chi-square the closer we approach the data and the further we go from tables of ones. The zero (mean)factor gave a Likelihood Ratio chi-square of 3752.34 with a probability of 0.0. The one-factor interactions have a LR-chi-square of only 907.48, that is , there is a reduction of 2844.86(11 d.f.) from the mean, by far the highest reduction. These interactions thus contribute most to the explanation of the data. The two-factor interactions reduce the LR-chi-square further with 815.39 (26 d.f.) to a level of 92.09. In all cases the probabilities are zero, meaning that all levels of interaction as a whole are worthwhile to be taken into account when specifying a model.

Table 1 - Jordanians Abroad by Educational Level, Country of Residence and Origin According to the Sample Survey 1975.

Origin	Educational level	Destination: Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others	Total
Total (Jordan)	Less than secondary (Low)	79 (2.6)	116 (3.8)	303 (9.8)	8 (0.3)	96 (3.1)	66 (2.1)	260 (8.4)	4 (0.1)	17 (0.5)	949 (30.7)
	Secondary & Diploma (Medium)	313 (10.1)	110 (3.6)	126 (4.1)	148 (4.8)	74 (2.4)	143 (4.6)	585 (18.9)	201 (6.5)	129 (4.2)	1829 (59.2)
	University (High)	15 (0.5)	45 (1.5)	60 (1.9)	18 (0.6)	40 (1.3)	56 (1.8)	54 (1.7)	12 (0.4)	13 (0.4)	313 (10.1)
	All educational levels	407 (13.2)	271 (8.8)	489 (15.8)	174 (5.6)	210 (6.8)	265 (8.6)	899 (29.1)	217 (7.0)	159 (5.1)	3091 (100.0)
Amman District	Less than secondary (Low)	60 (2.7)	87 (3.9)	234 (10.6)	5 (0.2)	68 (3.1)	51 (2.3)	107 (4.9)	2 (0.1)	11 (0.5)	625 (28.3)
	Secondary & Diploma (Medium)	208 (9.4)	81 (3.7)	94 (4.3)	126 (5.7)	41 (1.9)	121 (5.5)	416 (18.8)	137 (6.2)	100 (4.5)	1324 (60.0)
	University (High)	13 (0.6)	37 (1.7)	49 (2.2)	11 (0.5)	25 (1.1)	51 (2.3)	51 (2.3)	11 (0.5)	11 (0.5)	259 (11.7)
	All educational levels	281 (12.7)	205 (9.3)	377 (17.1)	142 (6.4)	134 (6.1)	223 (10.1)	574 (26.0)	150 (6.8)	122 (5.5)	2208 (100.0)
Other Districts	Less than secondary (Low)	19 (2.2)	29 (3.3)	69 (7.8)	3 (0.3)	28 (3.2)	15 (1.7)	153 (17.3)	2 (0.2)	6 (0.7)	324 (36.7)
	Secondary & Diploma (Medium)	105 (11.9)	29 (3.3)	32 (3.6)	22 (2.5)	33 (3.7)	22 (2.5)	169 (19.1)	64 (7.3)	29 (3.3)	505 (57.2)
	University (High)	2 (0.2)	8 (0.9)	11 (1.3)	7 (0.8)	15 (1.7)	5 (0.6)	3 (0.3)	1 (0.1)	2 (0.2)	54 (6.1)
	All educational levels	126 (14.3)	66 (7.5)	112 (12.7)	32 (3.6)	76 (8.6)	42 (4.8)	325 (36.8)	67 (7.6)	37 (4.2)	883 (100.0)

Percentages are shown between brackets.

Source: The Hashemite Kingdom of Jordan, Department of Statistics, The Multi-Purpose Household Survey, "Jordanians Abroad" January-April 1975 (Amman: Department of Statistics Pr ber 197).

Table 2

The results of fitting all k-factor marginals.
This is a simultaneous test that all k+1 and higher factor interactions are zero.

k - factor	Degrees of freedom	Likelihood Ratio chisquare	Probability	Pearson chisquare	Probability	Iterations
0 (mean)	53	3752.34	0.0	5066.41	0.0	
1	42	907.48	0.0	866.02	0.0	2
2	16	92.09	0.0000	91.49	0.0000	6

A simultaneous test that all k-factor interactions are zero.
The entries are differences in the above sub-table.

k - factor	Degrees of freedom	Likelihood Ratio chisquare	Probability	Pearson chisquare	Probability
1	11	2844.86	0.0	4200.39	0.0
2	26	815.39	0.0	774.52	0.0
3	16	92.09	0.0000	91.49	0.0000

In table 3 the difference between the full k-th order model and the model which excludes only one- the specified -effect, is calculated; then the difference between these two calculations is computed and printed out as the contribution of the one deleted factor (through d.f. chi-square and probability). The deleted factor is considered to be important (and hence will probably be included in the model-specification) if the LR-chi-square value is high and the probability is low. In our case E and D (education and destination respectively) gave especially high chi-squares; and for all possible interactions the effects had zero probabilities.

Thus the saturated model DEO was chosen to be fit. It gave the minimum chi-square 0.0 and the maximum probability 1.0 (d.f. are 0.0).

Further,

the models which differ from the fitted model by only one effect are tested. By adding and delting one effect difference from the fitted model, every possibility of including each effect is checked (throught d.f., chi-square and probability). The decision of including versus excluding an effect is naturally based on the criterion that deletion increases chi-square while

Table 3

A test of partial association of the factors. It is calculated as the difference between the full k-th order model and that which excludes only the specified effect. K is the number of factors in the effect.					A test of marginal association of the factors. The table is summed over the unspecified indices and then the effect is tested to be zero.		
Effect	Degrees of freedom	Likelihood Ratio chisquare	Proba-bility	Itera-tions	Likelihood Ratio chisquare	Probability	Iterations
E	2	1197.37	0.0				
D	8	1060.68	0.0				
O	1	586.79	0.0				
DE	16	701.37	0.0	2	702.44	0.0	2
EO	2	35.41	0.0000	2	36.47	0.0000	2
DO	8	76.48	0.0000	2	77.55	0.0000	2
DEO	16	92.09	0.0000	6			

addition would decrease it.

If the chi-square due to the deled effect is high and the probability is low, we would generally prefer to reject the hypothesis that the deleted effect equals zero in favor of the alternative hypothesis that it does not. Thus, in such a case we would want to keep this specific effect in the model. (when performing the addition proce= dure, the same applies).

In our case deletion of the effect DEO leaves a model DE,EO,DO, but the deletion gives a high chi-square (92,90) with a zero probability, as shown in table 4. Thus it is decided that the staturated model fits the databest.

However, these overall interactions do not tell us anything about the specific locations of the interactions, that is, about which cells in particular are important. This can be traced by examining the lambda-parameters. Table 5 lists all estimated log-linear parameters and the same parameters divided by their standard error(as provided through fitting the saturated model).

Large lambdas suggest substantial association between the factors involved in that lambda. Thelabdas can be arranged according to their sizes, so that the factors

related to these lambdas can be arranged according to their importance in or influence on the cell frequencies. If the values are close to zero, the factors related to them are or only slight importance. To help judge what is far enough from zero to be important the standardized lambdas are computed: A lambda is zero when the observation has risen from the unit normal distribution. In such a case 95 percent of the standardized values will fall within a range of -2.0, +2.0. If a value is outside this range, one probable explanation is that the corresponding lambda does not equal zero.

Thus, from table 5 it can be seen that in all interactions between variables values out-of-range occur (i.e., above +2.0 or below -2.0), which indicates that the model specified is good in terms of overall interactions. In the dichotomized case, indicating that $S\lambda^x_1$ is not important (i.e., has a value between +2.0) would imply that also $S\lambda^x_2$ is not important, because $S\lambda^x_1 = -S\lambda^x_2$. Thus in such a case the whole variable should be omitted. In the polytomous case on the other hand, it is possible that one or more of the levels are within the range while one ore more or the others are outside the range (as is for instance the case in our variable education), due to the fact that there is more than one $S\lambda$ as interaction measure.

Table 5 - Parameter Estimates and Their Standardized Values Under the Saturated Model "DEO"

(1) MAIN EFFECTS		
Parameter	Estimate	Standardized Value
Education "E"		
Less than secondary: Low	-0.094	-1.463
Tawjihi & Diploma: Medium	1.031	21.238
University: High	-0.937	-12.588
Origin "O"		
Amman District	0.571	12.736
Other Districts	-0.571	-12.736
Destination "D"		
Iraq, Lebanon & Syria	0.135	1.058
Saudi Arabia & Yemens	0.301	3.525
Gulf countries	0.752	9.935
Egypt & Sudan	-0.750	-5.338
North Africa (Libya, Algeria, Morocco)	0.202	2.486
U.S.A. & Canada	0.098	0.993
Western Europe	1.069	10.611
Eastern Europe	-1.103	-5.050
Other countries	-0.704	-4.825

Table 5 - Continued

(2) TWO-FACTOR INTERACTIONS

Destination and Origin "DO"

Destination "D"	Origin "O"	Estimate	Standardized value
Iraq, Lebanon & Syria	Amman	0.047	0.368
Saudi Arabia & Yemens	"	0.039	0.456
Gulf countries	"	0.061	0.813
Egypt & Sudan	"	-0.119	-0.839
North Africa	"	-0.301	-3.715
U.S.A. & Canada	"	0.305	3.080
Western Europe	"	-0.008	-0.078
Eastern Europe	"	-0.044	-0.202
Other countries	"	0.021	0.143
Iraq, Lebanon & Syria	Other	-0.047	-0.368
Saudi Arabia & Yemens	"	-0.039	-0.456
Gulf countries	"	-0.061	-0.813
Egypt & Sudan	"	0.119	0.839
North Africa	"	0.301	3.715
U.S.A. & Canada	"	-0.305	-3.080
Western Europe	"	0.008	0.078
Eastern Europe	"	0.044	0.202
Other countries	"	-0.021	-0.143

Education and Origin "EO"

Education "E"	Origin "O"	Estimate	Standardized value
Less than secondary	Amman	-0.218	-3.392
Tawjihi & Diploma	"	-0.051	-1.048
University	"	0.269	3.617
Less than secondary	Other	0.218	3.392
Tawjihi & Diploma	"	0.051	1.048
University	"	-0.269	-3.617

Table 5 - Continued

Education and Destination "DE"

Destination "D"	Education "E"					
	Less than secondary		Tawjihi & Diploma		University	
	Esti-mate	Stand-ardized value	Esti-mate	Stand-ardized value	Esti-mate	Stand-ardized value
Iraq, Lebanon & Syria	0.232	1.534	0.583	4.401	-0.815	-3.409
Saudi Arabia & Yemens	0.462	4.158	-0.698	-6.753	0.235	1.632
Gulf countries	0.941	9.876	-1.025	-10.931	0.084	0.653
Egypt & Sudan	-1.048	-4.413	0.436	2.841	0.612	3.124
North Africa	0.422	3.854	-0.874	-8.541	0.452	3.466
U.S.A. & Canada	0.069	0.525	-0.432	-3.707	0.363	2.187
Western Europe	0.630	5.459	0.233	2.220	-0.863	-4.516
Eastern Europe	-1.356	-4.007	1.364	6.131	-0.008	-0.023
Other countries	-0.353	-1.763	0.413	2.635	-0.060	-0.237

Table 5 - Continued

(3) THREE-FACTOR INTERACTION

Destination, Education and Origin "DEO"

Origin "O"	Destination "D"	Education "E"					
		Less than secondary		Tawjihi & Diploma		University	
		Esti-mate	Stand-ardized value	Esti-mate	Stand-ardized value	Esti-mate	Stand-ardized value
Amman	Iraq, Lebanon & Syria	0.176	1.162	-0.225	-1.697	0.049	0.205
"	Saudi Arabia & Yemens	0.158	1.419	-0.045	-0.436	-0.113	-0.786
"	Gulf countries	0.197	2.067	-0.042	-0.453	-0.154	-1.203
"	Egypt & Sudan	0.022	0.095	0.472	3.077	-0.495	-2.524
"	North Africa	0.393	3.588	-0.110	-1.072	-0.283	-2.169
"	U.S.A. & Canada	-0.045	-0.339	0.028	0.241	0.017	0.101
"	Western Europe	-0.523	-4.532	-0.061	-0.585	0.585	3.057
"	Eastern Europe	-0.308	-0.910	-0.095	-0.427	0.403	1.155
"	Other countries	-0.070	-0.349	0.078	0.500	0.008	-0.033
Other	Iraq, Lebanon & Syria	-0.176	-1.162	0.225	1.697	-0.049	-0.205
"	Saudi Arabia & Yemens	-0.158	-1.419	0.045	0.436	0.113	0.786
"	Gulf countries	-0.197	-2.067	0.042	0.453	0.154	1.203
"	Egypt & Sudan	-0.022	-0.095	-0.472	-3.077	0.495	2.524
"	North Africa	-0.393	-3.588	0.110	1.072	0.283	2.169
"	U.S.A. & Canada	0.045	0.339	-0.028	-0.241	-0.017	-0.101
"	Western Europe	0.523	4.532	0.061	0.585	-0.585	-3.057
"	Eastern Europe	0.308	0.910	0.095	0.427	-0.403	-1.155
"	Other countries	0.070	0.349	-0.078	-0.500	-0.008	0.033

We can use the estimated lambda-parameters(table 5) to imterpret our data. Preliminary, it is necessary to keep the following theoretical considerations in mind:

The logarithm of the theoretical probability ($V_{i\ jk}$) for the cell (i,j,k) where there is no interaction between the variables, is:

$$V_{ijk} = \mu + \lambda_i^D + \lambda_j^E + \lambda_k^O$$

and in order to remove redundancies in the model the lambdas are constrained by :

$$\Sigma\lambda^D_i = \Sigma\lambda^E_j = \Sigma\lambda^O_k = 0.0$$

The same rule applies to the interactions, thus:

$$\Sigma_i \lambda^{DE}_{ij} = \Sigma_j \lambda^{DE}_{ij} = 0.0$$

Hence there are (I - 1)(J - 1) independent lambdas relating to the DE interactions, which means(I - 1)(J - 1) degrees of freedom associated with it. In contrast to that, if I = J = 2 (dichotomy), there will be only one single interaction lambda.

Applied to our case we will have for instance:

$$\lambda^O_1 = -\lambda^O_2$$

$$\lambda^{DO}_{11} = -\lambda^{DO}_{12} \quad \text{that is :} \quad \lambda^{DO}_{11} + \lambda^{DO}_{12} = 0.0$$

$$L^{DEO}_{111} = \theta(\text{theta}) + \lambda^{D}_{1} + \lambda^{E}_{1} + \lambda^{O}_{1} + \lambda^{DE}_{11} + \lambda^{DO}_{111} + \lambda^{EO}_{11} + \lambda^{DEO}_{111}$$

$$L^{DEO}_{112} = \theta + \lambda^{D}_{1} + \lambda^{E}_{1} + \lambda^{O}_{2} + \lambda^{DE}_{11} + \lambda^{DO}_{12} + \lambda^{EO}_{12} + \lambda^{DEO}_{112}$$

$$L^{DEO}_{121} = \theta + \lambda^{D}_{1} + \lambda^{E}_{2} + \lambda^{O}_{1} + \lambda^{DE}_{12} + \lambda^{DO}_{11} + \lambda^{EO}_{21} + \lambda^{DEO}_{121}$$

$$L^{DEO}_{122} = \theta + \lambda^{D}_{1} + \lambda^{E}_{2} + \lambda^{O}_{2} + \lambda^{DE}_{12} + \lambda^{DO}_{12} + \lambda^{EO}_{22} + \lambda\lambda^{DEO}_{122}$$

$$L^{DEO}_{131} = \theta + \lambda^{D}_{1} + \lambda^{E}_{3} + \lambda^{O}_{1} + \lambda^{DE}_{13} + \lambda^{DO}_{11} + \lambda^{EO}_{31} + \lambda^{DEO}_{131}$$

$$L^{DEO}_{132} = \text{etcetera.}$$

etcetera.

L^{DE}_{11} , L^{DE}_{12} , L^{DE}_{13} , etcetera, are computed according to the same principle.

Table 6 presents the L-values which represent all possible interactions between the different levels of the factors (variables) under the fitted model.

INTERPRETATION AND CONCLUSIONS.

A. General Characteristics of Jordanian Emigration.

Before interpreting the interactions between the three variables (i.e., education, origin, destination) in the context of external migration from Jordan, it is worthwhile to make an attempt to clarify the background

Table 6 - L-Values

(1) MAIN EFFECTS	
Education "E"	L-value
Less than secondary: Low	3.152
Tawjihi & Diploma: Medium	4.277
University: High	2.309
Origin "O"	
Amman District	3.817
Other Districts	2.675
Destination "D"	
Iraq, Lebanon & Syria	3.381
Saudi Arabia & Yemens	3.547
Gulf countries	3.998
Egypt & Sudan	2.496
North Africa (Libya, Algeria, Morocco)	3.448
U.S.A. & Canada	3.344
Western Europe	4.315
Eastern Europe	2.143
Other countries	2.542

Table 6 - Continued

(2) TWO-FACTOR INTERACTIONS

Education and Origin "EO"

Education "E"	Origin "O"	
	Amman District	Other Districts
Less than secondary (Low)	3.505	2.799
Tawjihi & Diploma (Medium)	4.797	3.757
University (High)	3.149	1.469

Destination and Origin "DO"

Origin "O"	Destination "D"								
	Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others
Amman District	3.999	4.157	4.630	2.948	3.718	4.220	4.878	2.670	3.134
Other Districts	2.763	2.937	3.366	2.044	3.178	2.468	3.752	1.616	1.950

Destination and Education "DE"

Education "E"	Destination "D"								
	Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others
Less than secondary (Low)	3.519	3.916	4.845	1.354	3.776	3.319	4.851	0.693	2.095
Tawjihi & Diploma (Medium)	4.995	3.880	4.004	3.963	3.605	3.943	5.579	4.538	3.986
University (High)	1.629	2.845	3.145	2.171	2.965	2.770	2.515	1.198	1.545

(3) THREE-FACTOR INTERACTION

Destination, Education and Origin "DEO"

Origin "O"	Education "E"	Destination "D"								
		Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others
Amman District	Less than secondary (Low)	4.095	4.466	5.456	1.610	4.221	3.932	4.673	0.694	2.399
	Tawjihi & Diploma (Medium)	5.337	4.394	4.543	4.836	3.714	4.796	6.030	4.919	4.605
	University (High)	2.565	3.611	3.892	2.397	3.219	3.932	3.932	2.397	2.398
Other Districts	Less than secondary (Low)	2.943	3.366	4.254	1.098	3.331	2.706	5.029	0.692	1.791
	Tawjihi & Diploma (Medium)	4.653	3.366	3.465	3.090	3.496	2.988	5.128	4.157	3.367
	University (High)	0.693	2.079	2.398	1.945	2.707	1.608	1.098	-0.001	0.692

of the picture by introducing some important indicators about the Jordanian emigration which are relevant to the interpretation.

The Multi-Purpose Household Survey 1975 gave a number of 3,091 Jordanian males living abroad for the 17,373 households covered by the survey. When the same households were interviewed in 1976 to collect different data, the Total number of males in the sample population was 58,183 persons (The Hashemite Kingdom of Jordan, Department of Statistics, 1977,p. 2,p. 29). Ratios of 5.3 male migrants per hundred males in the population and one migrant per each 5.6 households were computed.

Of all Jordanian males who were found living abroad in 1975, 53.6 percent left Jordan to obrain better education, and only 41.2 percent moved to work abroad . The reason for the remaining 5.2 percent was to receive medical care (The Hashemite Kingdom of Jordan, Department of Statistics, 1976,p.7) This implies that access to higher education (generally for the graduate level in most of the specializations, and in some undergraduate fields which are not available at the University of Jordan) is an important reason for emigration from Jordan, and its significance to emigration exceeded the economical reasons (i.e., employment).

The distribution of members abroad of households in Jordan by educational level and country of residence is provided by the Multi-Purpose Household Survey (table 3, p.23). It is expected that almost all low educated (less than Tawjihi) Jordanian emigrants to any particular destination are workers, because it is likely that nobody will go abroad to obtain secondary schooling while it is available for everbody in Jordan. The medium and highly educated emigrants leave Jordan either to work and/or to obtain higher education. Thus all destinations which receive mainly low educated are work-oriented countries, while other destinations which receive mainly medium and highly educated emigrants are work-and/or study-oriented countries. A general criterion was used to distinguish between the last three types of destination (i.e., work-oriented, education-oriented,education-oriented, and work-study-oriented countries), namely, the general knowledge about any particular country with regard to employment opportunities and possession of higher educational institutions and universities. According to these critieria an aggregation of the similar destinations, in addition to summarizing the datapresented in the above mentioned table is possible and worthwhile.

A rough classification of the destinations yields the following percentages for the geographic distribution of the Jordanians living abroad:

1- Countries providing work only (Saudi Arabia, Kuwait, Gulf states and Emirates, Libya, Other Arab Countries Except Egypt, Syria and Lebanon; Latin American Countries and some West European Countries). Of the Jordanians abroad 31.3 percent live in these countries.

2- Countries providing higher education only (Egypt, England, U.S.A.R. and the East European countries and most of the West European countries). In these countries resided 46.8 percent of the emigrants.

3- Countries that offer both work and study (United States,Canada, Federal Republic of Germany, Italy, Australia). Approximately 22 percent of the Jordanian emigrants are residing in these countries.

In general, the above mentioned percentages indicate that the countries which offer higher education received the higher proportion of the Jordanian emigrants. s. Again, gaining higher education seems to be the main motivation for migration from Jordan. Approximately two thirds of the emigrants left Jordan mainly to get better education(The motivation for most of the migrants allocated ed

in the third category is obtaining higher education, and they move to the mentioned countries because they expect to reduce the cost of their higher education by working part of their time while studying).

The positive correlation between educational attainment and migration is a typical finding in the migration literature. Bringing together the percentage distribution of emigrants and the percentage distribution of the population by educational level in 1975, and calculating the ratio of the two as demonstrated in table 7, the educational structure of the Jordanians living abroad and generally the selectivity of migration with regard to educational attainment can be discussed.

More than half of the emigrants attained the "Tawjihi" and presumably most of them left Jordan to pursue their studies abroad either because they are interested in the specialization not available at the University of Jordan and/or because they did not obtain the high grades which enable them to get enrolled in the University. The validity of this explanation can be seen through the percentage of the Tawjihi-group in the population and in its ratio as compared with the other ratios (see table 7). In other words, it is not expected that those with secondary school education are motivated

Table 7 - Percentage Distribution of Male and Female Jordanian Emigrants (Residing Abroad) and the Population of Jordan 1975

Category	Educational level	Percent of total emigrants (1)	Percent of total population (2)	Ratio (1)/(2) = (3)
A	Less than primary	8.3	70.2	0.118
B	Less than secondary	22.4	24.0	0.933
A+B	Low	30.7	94.2	0.326
C	Secondary (Tawjihi)	55.9	4.0	13.975
D	Post secondary (Diploma)	3.7	0.7	5.286
C+D	Medium	59.6	4.7	12.681
E	University (B.A. or B.Sc.)	7.8	1.0	7.800
F	Post graduate (M.A. & Ph.D.)	1.9	0.1	19.000
E+F	High	9.7	1.1	8.818

A : Did not finish primary school (six years of schooling).
B : Finihed the primary school and obtained some schooling afterwards but did not obtain the"Tawjihi certificate".
C : Obtained the"Tawjihi certificate"(national exam which ends the secondary stage; it is equivalent to matriculation).
D : Finished two years of schooling after"Tawjihi"and got a "Diploma".
E : Finished four years of university study and obtained a B.A. or B.Sc.
F : Obtained a degree after the B.A. or B.Sc. such as M.A. or Ph.D.

Source of raw data: The Multi-Purpose Household Survey 1975, p.9.

more than the university candidates to work abroad, because one expects that the demand for the latter category is much higher as compared with that for the first. Besides, as we will see later in the analysis of the relationship between the variables (level of education and destination), most of the male migrants with secondary education are residing in countries which offer only educational opportunities. However, the educational composition of the Jordanians abroad is included in the model (parameter E); thus it will be reviewed through interpreting the whole set of the parameter estimates (referring to table 6) or the percentage distributions presented in tables 8 and 9.

The Jordanians residing abroad were drawn from the population of Jordan during the years which preceded 1975. In other words, the time of migration is not indicated. Thus it is likely to find that some of these migrants moved during 1975 for instance while others are residing abroad since a long time. Thus the current educational status of the emigrants at the time of the survey is not their status at the time of migration . The same thing applies to the educational structure of the

population. Assuming that the change in the educational practised by the two populations through time was the same, in other words, assuming that the percentage educational attainment distribution presented in table 7 represents the educational composition at the time of migration for the two populations, it can be seen that migration is highly selective of people with secondary s school (Tawjihi) attainment (table 7, third column,fourth line). And with the exception of this case the positive correlation between the level of education and migration is evident. That is, the better the educational attainment the higher the propensity to migrate.

B- The Interpretation of the Model (The Interactions).

As stated before, we are interested in the direct influence of the educational attainment of the male emigrants and their depending on the place of origin of the migrants (the third variable).

The presence of the three-factor interaction in the staturated model which fits our data very well (i.e.,DEO) means that the association between any two variables changes with the changes in the level of the third variable. That is, the nature of the relationship between

any two variables depends on the level of the third (e.g., compare the first row or column in the interaction "DE" Amman and for the other districts, in table 6).

Thus it is expected that the level of education association differe with respect to the place of origin. It is likely that the influence of origin on destination goes mainly through the education variable.

It should be noted that the saturated model contains as many independent parameters as there are cells in the table (H.T. Reynolds, 1977,P.115). Thus ,all possible interactions are included in the model. Hence the computed L-values are actually the logs of the observed values. Thus the interpretation can be based upon discussing the L-vaues as well as the row and column percentages for the particular subtables. But one of the most convenient properties of the first is that it becomes possible to contrast and compare the interactions in a multi-dimensional by using the percentages.

A convening interpretation and alternative to the comp comparisons of the percentages of numerous tables is that of comparing the L-values computed under the specified model. Examples to be given below demonstrate the usefulness of the L-values as compared to the percentages in interpreting multi-dimensional tables.

As indicated earlier in table 1, the majority of the Jordanian males who are living abroad have medium education, that is 59.2 percent, while the university graduates constitute only 917 percent. Besides, as shown in table 7 Jordanian emigration is highly selective of the medium educated persons. A confirmation can be seen explicitly in table 6 if we compare the L-values for the three levels of education (main effect-education"E"). The L-values were 4.277, 3.152 and 2.309 for the medium,low and high educational levels respectively. It should be noted that these L-values demonstrate the same thing which was indicated by the percentage distribution of emigrants by educational level. And they should not be interpreted as differential propensities for the

population according to educational level to emigrate from Jordan. They indicate the probability that an emigrant has a certain level of educational attainment in contrast with the probability of having other levels of educational attainment..

Amman district, which includes approximately 60 percent of the total population of Jordan, was the origin or 71.4 percent of all jordanians who are residing abroad. Again this finding is expressed in table 6 (main effect-origin"0") by the two L_values 3.817 for Amman District and 2.673 for the other districts. This means that the probability of a Jordanian emigrant being from Amman is higher than that of being from other districts. We should be careful in interpreting these values, because they cannot be used as indicators of selectivity of emigrants with regard to origin. The high L-value for Amman District may be due to the fact that the population at risk is larger given that the propensity to emigrate from Amman is equal to that from other districts. However, it is possible that the probability to emigrate from Amman District is greater than

that from other districts. But the available data do not leave us the apportunity to confirm this hypothesis.

The percentage distribution of the Jordanian males residing abroad by country of residence shows that the largest proportion of them is redusing in the West European countries (29.1 percent), the Gulf countries(15.8) percent), while 13.2 percent of them are living in "Iraq,Lebanon and Syria". As for "Saudi Arabia and Yemans", "U.S.A. and Canada", East European countries, and North African countries except for Egypt and Sudan, the percentages are 8.8, 8.6 7.0 and 6.8 respectively (table 8, fourth line). The list of L-values in table 6 for the main effect destination "D" demonstrate that Western Europe, the Gulf countries, Saudi Arabia, North Africa,"Iraq, Lebanon and Syria" and "U.S.A. and Canada" are the important destinations for the jordanian demigrants according to the fitted model which accounts for the interrelationships between the destinations,the levels of education and the origin of the emigrants.

Table 8 - Jordanians Abroad by Educational Level, Country of Residence and Origin According to the Sample Survey 1975; Rowpercentages.

Origin	Educational level	Destination									
		Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others	Total
Total (Jordan)	Less than secondary (Low)	8.3	12.2	31.3	0.8	10.1	7.0	27.4	0.4	1.8	100.0
	Secondary & Diploma (Medium)	17.1	6.0	6.9	8.1	4.1	7.8	32.0	11.0	7.1	100.0
	University (High)	4.8	14.4	19.2	5.8	12.8	17.9	17.3	3.8	4.2	100.0
	All educational levels	13.2	8.8	15.8	5.6	6.8	8.6	29.1	7.0	5.1	100.0
Amman District	Less than secondary (Low)	9.6	13.9	37.4	0.8	10.9	8.2	17.1	0.3	1.8	100.0
	Secondary & Diploma (Medium)	15.7	6.1	7.1	9.5	3.1	9.1	31.4	10.4	7.6	100.0
	University (High)	5.0	14.3	18.9	4.3	9.7	19.7	19.7	4.3	4.3	100.0
	All educational levels	12.7	9.3	17.1	6.4	6.1	10.1	26.0	6.8	5.8	100.0
Other Districts	Less than secondary (Low)	5.9	9.0	21.3	0.9	8.6	4.6	47.2	0.6	1.9	100.0
	Secondary & Diploma (Medium)	20.8	5.7	6.3	4.4	6.5	4.4	33.5	12.7	5.7	100.0
	University (High)	3.7	14.8	20.4	13.0	27.8	9.3	5.6	1.9	3.7	100.0
	All educational levels	14.3	7.5	12.7	3.6	8.6	4.8	36.8	7.6	4.2	100.0

However, it can be seen that the sequence of the destination areas with regard to their relative importance or popularity to Jordanian emigrants differs from one set of data to the other (i,e,, the percentages and the L-values), in spite of the fact that Western Europe and Gulf area were the most popular destinations in the two cases. In other word, the percentage distribution of Jordanian male emigrants by destination (table 8, fourth column) shows the amount of departure from equiprobability in the categories of the destination variable, and pertains to the row effect only (i.e., Jordanian male emigrants are likely to migrate to particular desinations, which implies an uneven distribution over the set of destinations). That is, the (row) percentage distribution does not contain ony other effect or interaction except the destination variable "D". On the contrary, the L-values as shown earlier are the product of all interactions involved in each cell of the table under the staturated model. In other words, they possess the row and the column effects in the two-way and three-way tables(i,e., for each category of destination the effects of the categories of education and those of origin are involved).

For example , consider the percentages for North Africa and for "Iraq, Lebanon and Syria" in table 8, for total Jordan and for each origin by educational level. They indicate that the latter destination is more favorate to Jordanian emigrants as compared with first (fourth row). But when we break down the destination by educational level and origin, we find that the low educated and the highly educated emigrants are more likely to go to North Africa than to " Iraq , Lebanon and Syria". (Compare the percentage for each educational level in the first column with its corresponding percentage in the fifth column in table 8).

The relatively high percentage (13.2 percent) for "Iraq, Lebanon and Syria" is mainly due to the large number of school leavers who move to this destination to obtain undergraduate university studies. Table 8 (The row percentages) alone does not help much in reaching this conclusion. In addition to these, the column percentages for both categories of origin as well as for total Jordan are needed.

The percentage distribution of the Jordanian male emigrants to "Iraq, Lebanon and Syria" and that of emigrants to North Africa is presented together with other percentage distributions of emigrants to other destinations in table 9 (Column percentages).

In short, if we would like to consider the role of the characteristics of the emigrants (the educational level and the origin in this case) on their preference or choice for particular destinations, we should include the effects or interactions between the categories of the variables involved in the analysis. Several sets of percentages are necessary. But it should be noted that the number of tables or the sets of percentages gets larger and hence more difficult if not impossible to interpret when the number of variables involved gets larger.

For the above mentioned example of the two destinations North Africa and "Iraq, Lebanon and Syria" a direct "DE" and the "DEO" interactions can be made

across the columns, the rows, or for each L-value with any other L-value.

Thus, to continue our example, from table 6 ("D") it is clear that of those with a Tawjihi, most go to "Iraq, Lebanon and Syria", While most of the lower and higher educated go to North Africa. And while most of the emigrants to "Iraq,Lebanon and Syria" have medium education , most of those residing in North Africa are low educated. However, when controlling for origin this last characteristic does not hold for those coming originally from outside Amman : more of them are medium than low educated.

Comparing the L-values of destination "D" in table 6 with the percentages of destination in table 8, we find some discrepancies in the rank order of the countries. These can be attributed to the influence of the "O"- and "E"-interactions on the table of L-values. Thus, While of all those emigrated 13.2 percent went to "Iraq, Lebanon and Syria", Only 6.8 percent went

Table 9 - Jordanians Abroad by Educational Level, Country of Residence and Origin According to the Sample Survey 1975; Columnpercentages.

Origin	Educational level	Destination									
		Iraq, Lebanon, Syria	Saudi Arabia, Yemens	Gulf states	Egypt, Sudan	North Africa	U.S.A., Canada	Western Europe	Eastern Europe	Others	Total
Total (Jordan)	Less than secondary (Low)	19.4	42.8	62.0	4.6	45.7	24.9	28.9	1.8	10.7	30.7
	Secondary & Diploma (Medium)	76.9	40.6	25.8	85.1	35.2	54.1	65.1	92.6	81.1	59.2
	University (High)	3.7	16.6	12.3	10.3	19.1	21.1	6.0	5.5	8.2	10.1
	All educational levels	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Amman District	Less than secondary (Low)	21.4	42.4	62.1	3.5	50.8	22.9	18.6	1.3	9.0	28.3
	Secondary & Diploma (Medium)	74.0	39.5	24.9	88.7	30.6	54.3	72.5	91.3	82.0	60.0
	University (High)	4.6	18.1	13.0	7.8	18.6	22.8	8.9	7.4	9.0	11.7
	All educational levels	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Other Districts	Less than secondary (Low)	15.1	43.9	61.6	9.4	36.8	35.7	47.1	3.0	16.2	36.7
	Secondary & Diploma (Medium)	83.3	43.9	28.6	68.8	43.4	52.4	52.0	95.5	78.4	57.2
	University (High)	1.6	12.2	9.8	21.8	19.8	11.9	0.9	1.5	5.4	6.1
	All educational levels	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

to North Africa. The L-values however, do not reflect this; they are 3.448 and 3.381 respectively. The L-values reflect indirectly the dominance or the medium educate from "Other Districts", and to a lesser extent from Amman District going to "Iraq, Lebanon and Syria".

Thus, considering the interactions between the variables, the interpretation of the set of data at hand will depend upon the L-values, taking care of referring to the percentages corresponding to the L-values, when needed for purposes of additional illustration.

Most likely the Jordanian male emigrants who did not finish the secondary school go to western Europe (4.851) and the Gulf countries (4.845). with Saudi Arabia as the third destination (3.916). Table 6-"DE" first line) However, from table 8 it can be seen that 31.3 percent of the low educated go to the Gulf area while 27.4 percent go to Western Eurcpe. The discrepancy between L-values and percentages is clearly due to the factor origin: While for low educated emigrants

from Amman District the Gulf area is more important, Western Europe is more attractive rest of the Country.

The attractiveness of the Gulf countries and Western Europe for low educated emigrants can be explained through the employment opportunities available to them in these areas (low statue jobs, especially in Western Europe).

According to table 6-"DE" , also the medium educated (Tawjihi) go mostly to Western Europe (5.579). Compare table 8:32 percent of the medium educated Jordanians abroad in 1975 resided in a west European country. Probably most of them go there to get their university studies. Generally, access to higher education and not work was the reason behind this high value for Western Europe.

This conclusion can be justified by comparing with the Gulf area (4.004) and "Iraq, Lebanon and Syria" (4.995);that is 6.9 and 17.1 percent respectively. One

Would expect that if the secondary school leavers are available for work, their response to the employment opportunities available in the Gulf area would be higher and compete with that for Western Europe as we saw in the case of the low educated category. Also, the relatively high proportion which moved to Iraq, Syria and Lebanon ,an area with less employment opportunities and more educational opportunities to offer, would indicate that access to higher education was the main reason for the emigration of secondary school leavers, and explains why most of them are residing in Western Europe and the Area of "Iraq',Lebanon and Syria".

As far as the university graduates are concerned it can be seen from table 6 ("DE"-interaction, third line) and table 8(third line)that studying at the graduate level and working abroad have approximately the same importance as factors for the emigration of highly educated men. The Gulf countries and Saudi Arabia (two areas offering employment opportunities only)

have L-values of 3.145 and 2.845 (percentages 19.2 and 14.4). On the other hand, the U.S.A. and Canda, and Western Europe have values of 2.770 and 2.515 (17.9 and 17.9 percent) respectively. It is most likely to expect that the last two countries offer mainly higher educational opportunities and to a leser extent work chances to Jordanian university graduates.

Again, the discrepancies found for some destinations between the L-values and the percentages are due to the factor origin, as will be discussed below.

Introducing origin as a third variable, the relationship between each educational level of the emigrants and any particular destination changes. For instance, the most popular destination for the low educated male emigrants from Amman District is the Gulf area (5.456) and the second important destination for them is Western Europe (4.673): That is 37.4 and 17.1 percent respectiviely. In contrast, the low educated male emigrants from the other districts of Jordan go mainly to

Western Europe (5.029) and to a lesser extent to the Gulf countries (4.254), Corresponding to 47.2 and 21.3 percent respectively. Also , Western Europe is the only destination receiving more loweducate migrants from outside Amman than from Amman.

As expected, Western Europe (6.030),"Iran,Lebanon and Syria"(5.337) and Eastern Europe (4.919) are the most probable destinations for the medium educated male emigrants from Amman District; corresponding to 31.4, 15.7 and 10.4 percent respectively. The same sequence ofdestinations but with different values are found for the medium educated Jordanian male emigrants from other districts (5.128, 4.653. 4.157); that is 33.5, 20 12.7 percent respetively.

The pattern of the areal distribution of the highly educated emigrants changes when controlled for the origin of the emigrants. Those from Amman District go mainly to the U.S.A. and Canada (3.932) and to Western Europe (3.932)(Percentages in both cases 19.7), with

the Gulf only as a third destination (3.892,or 18.9 percent). The highly educated from outside Amman District however, go mainly to North Africa (i.e.,Libya, Algeria and Morocco), while also for them the next popular destination is the Gulf area.

North Africa as a destination is related to employment. North America and Western Europe are primarily education related destinations, while to a lesser extent emigrants have the possibility to combine their study with having a job. With respect to education: students from University of Jordan (which is located in Amman, and the majority of its students are from the capital district) have to go abroad to get a Ph.D. degree and often also to get an M.A. degree. Many of them go to West European and / or North American universities. It should be noted that these areas are less open for highly educated work seekers from foreign countries. (However, some students can find work and support themselves while studying, others stay in these countries after graduation).

It is worthwhile to indicate that the highly educated men from Amman generally migrate farther than other Jordanian men (due to the differences in reasons for migration), while in the case of the low educated the reverse is true : those from Amman prefer the Gulf area, those from the rest of the country are oriented towards Western Europe. (But the second choices of the men from Amman are the first choices of the other men and vice versa).

Comparing the educational distribution of the emigrants for each destination (table 6-"DE" and table 9), it can be seen that the university graduates constitute the smallest proportion as compared with other educational levels of the Jordanians residing at any country except Egypt and Sudan and Eastern Europe. This is attributed to the extremely low proportions of emigrants with less than secondary level living in these two areas. In contrast, in all other areas the emigrants with less than secondary education constitute a major proportion of all Jordanian residing in each of them.

The medium educated *(Tawjihi and Diploma) form majority of the emigrants to any destination except the Gulf countries, Saudi Arabia and the Yemens, and North Africa where the low educated prevail.(Table 6 "DE" and table 9) But it should be noted that the Gulf countries receive the largest proportion of highly educated emigrants from Jordan (19.2 percent, table 8).

It seems that a large proportion of the highly educated Jordanian males residing abroad and whose origin is from "Other Districts" (i.e., not from Amman) is work oriented. Sixty-three percent of them were found to be residing in North Africa, the Gulf countries, Saudi Arabia and the Yemens. The corresponding percentage for the highly educated from Amman is 42.9.

When controlling for origin, we find essentially the same pattern, except that, while those from Amman residing in North Africa are predominantly low educated those from the other districts residing in the same

area are mostly medium educated. (Ta le 6-"DEO" and table 9) Also , table 6-"DEO" shows that for all destinations and for all educational levels emigrants from Amman District dominate, except in the case of the low educated residing in Western Europe.

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