

## THE EFFECT OF CIVILIAN UNEMPLOYMENT ON REENLISTMENT DECISION IN TURKISH ARMED FORCES

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The existing studies on the issue of reenlistment decision regard joining the army as a choice that an individual makes among alternative courses of action. Previous empirical research suggests that socio-economic background, higher educational benefits, civilian employment status and experience are among the determinants of reenlistment decision. This study investigates if unemployment has an effect on reenlistment decision of recruits for Turkish Armed Forces in a seemingly unrelated bivariate probit framework. Empirical analysis indicates that former civilian unemployment significantly increases the likelihood of reenlistment. Moreover, previous single equation models might be misspecified since the residuals of reenlistment and unemployment equations are correlated.

**Keywords:** Reenlistment, unemployment, Turkish Armed Forces, Seemingly unrelated probit.

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## 1. INTRODUCTION

The existing studies on the issue of reenlistment regard joining the army as a choice that an individual makes among alternative courses of action such as against further education, civilian employment, marriage and family or a combination of these (Hosek and Peterson, 1990). Reenlistment literature shows the importance of other variables in guiding individuals' decision to reenlist such as education, employment, some factors of family, age and so on (Yildirim et al, 2010). Warner and Ash (1995), Ash *et al.* (1983), Asch et al (1999), Goldberg (1982, 1985), Dale and Gilroy (1985) and Brown (1985) regard the relative military pay and civilian unemployment rate as the main determinants of the enlistment decision. The enlistment probabilities of men and women are reported to be strongly related to wage rates and employment status and experience, ability to finance further education, parental influence, expectations for further education, social support for enlisting and perceived advantages (job security) of military service (Hosek and Peterson, 1986, 1990; Orvis and Gahart, 1985; Orvis *et al.*, 1992). Yildirim and Erdinc (2007) also examined the possible economic and socio-economic determinants of the re-enlistment decision of recruits for Turkey's Armed Forces. They found that geographical background as well as economic welfare is influential in the re-enlistment decision.

This paper tries to find out the effect of unemployment on enlistment decision in Turkish Armed Forces. As Brown (1985) found a quite strong effects of unemployment rates on recruitment decision in contrast to several previous studies. Unemployment duration is affected by education level such that most studies estimate a positive relationship between education and unemployment duration (Evans and Koch, 2006). Actually we can not say a positive or negative relation as Kettunen (1997) explained in his paper that people with less than nine years of education and people with master's, licentiate or doctor's degrees have the lowest probabilities of re-employment.

The unemployment duration in Turkey is first studied by Tansel and Tasci (2004). They found there is gender difference that women faced with higher unemployment durations than man. Age has a negative, education has a positive effect on hazard rate, also see the studies about unemployment duration in Australia, Kupets (2006) in Ukraine, Kartseva (2002) in Russia, Kettunen (1997) in Finland and Knight and Li (2006) in China. Dujardin et al

(2006) analyzed some factors of unemployment in France by probit model. Carroll (2006) also analyzes the effects of unemployment duration by using variables, educational background, employment, experience, country of birth, long-term disability, parental employment status, marital status, children, location and disability.

Education decision is also related with enlistment decision as Yildirim et al (2010) explained in their paper that further education decision is affected from family, sibship characteristics, education level and age. Re-enlistment decision is also affected by further education, family and sibling characteristics, unemployment duration and living region. In most of the studies, the overall trend of enlistments is decreasing due to the fact downward youth population and declining unemployment rates (Dale and Gilroy ,1985). Furthermore the social factors; enlistment decision is affected by the economic factors such as economic situation (recession, crises, expansion...) the country in as Brown (1985) contains recession period.

In previous analysis of unemployment effect on enlistment (Ash et al, 1983), Cooper (1977) found a significant but quite low unemployment effect in his enlistment equation. Fisher's (1969) estimated coefficient is statistically insignificant while Fechter's (1979) model gives highly unstable coefficient estimates (with wrong signs and all t-values lower than 2.0). Grissmer's analysis yield significant results with extremely low elasticities. While Wither's (1979) unemployment coefficients for the U.S. are statistically significant, the signs are wrong. As Ash et al (1983) found no significant effect of unemployment on recruitment also in their seven of the twenty cases; the estimated coefficient has wrong (negative) sign.

As the situation of unemployment of recruitments (enlistment men) unemployment rate in the country has also an important effect on enlistment. Grissmer (1979) argued that armed forces increased their selectivity during periods of high unemployment and tried to have enlistments from the more selected, educated group.

This paper aims to analyze reenlistment decision and unemployment and to compare the single equation and multiple equation estimations between separate probit models of re-enlistment decision and unemployment and the seemingly unrelated probit model that estimates both decisions jointly. The bivariate probit estimation results do not confirm the

literature that insignificant (positive) effect of unemployment Fisher (1969) because the literature show if the effect is positive it is insignificant or if it is significant, it is negative (incorrect) (Fechter, 1979). However the joint model estimates a positive and significant effect. Empirical evidence suggests that the unemployment, further education, education level, region, sibling characteristics and marriage are influential in the re-enlistment decision.

The rest of the paper is as follows. The following section offers a brief overview of the analytical framework. The definition of re-enlistment and the data are described in section 3. The empirical results are presented in section 4. Finally, section 5 concludes.

## **2. ANALYTICAL FRAMEWORK**

This paper aims to model the effect of civilian unemployment on re-enlistment decision in Turkish Armed Forces. The reenlistment decision is affected by various factors such as educational and family factors, age, geographical region, income (Yildirim et al, 2010) also economic situations (recession, crises) are important for re-enlistment decision (Brown, 1985). As employment is a problematic issue, a conscript who is unemployed can join the army and make a decision of re-enlistment. Since the employment history can affect re-enlistment decision, there may be a correlation between the unobservable factors affecting the re-enlistment decision and the unobservable factors affecting the unemployment. In order to address this issue, the seemingly unrelated probit model has been estimated where both the re-enlistment decision and the unemployment depend on the same set of independent variables and the correlation between the two error terms is estimated as an auxiliary parameter. The significance and direction of the correlation between the two decisions can be investigated by modeling the correlation between two cases. The advantage of the seemingly unrelated probit over the bivariate lies in the fact that we can investigate whether or not the correlation is significantly different from zero, without making a priori identifying restrictions, as would be preferable when using the standard bivariate probit (Powell *et al.*, 2002). Moreover, the seemingly unrelated probit model does not require exclusion restrictions to provide meaningful estimates, particularly of the correlation coefficient  $\rho$ .

Our model consists of two simultaneous equations, one for the binary decision to re-enlist or not ( $y_{1i}$ ) and the other for the binary outcome if he has ever been unemployed before

the army or not ( $y_{2i}$ ). Let the superscript \* denote the unobserved variable and suppose that

$y_{1i}^*$  and  $y_{2i}^*$  follow

$$y_{1i}^* = \alpha_1 x_{1i} + \beta y_{2i} + \varepsilon_{1i} \quad (1)$$

$$y_{2i}^* = \alpha_2 x_{2i} + \varepsilon_{2i} \quad \text{for } i=1,2,\dots,n. \quad (2)$$

Where  $x_{ij}$ ,  $j=1,2$  are  $1 \times k_j$  vectors of explanatory variables,  $\alpha$ s are  $k_j \times 1$  vectors of unknown parameters and the error terms are assumed to be zero-mean bivariate normally distributed with unit variance and correlation coefficient  $\rho$ . The correlation between the errors in the two equations,  $\rho$ , can be interpreted as the interdependence of the unobserved components in the further education and the reenlistment equations. The subscript  $i$  denotes an individual. The explanatory variables in  $x_{ij}$  include various socio-economic and demographic characteristics of the conscripts such as age, marital status, education, monthly family income, number of siblings, geographical place of residence, employment status and duration of unemployment prior to the military service. If the error terms of both equations are affected by similar components, then, although they are likely to be normally distributed, they will not be independent. If the error terms are not independent due to the endogeneity of the further education variable, the parameter estimates will not be consistent if estimated by a univariate probit. The Wald test, and/or a Lagrange multiplier test, provide evidence on the correlation between the unobserved explanatory variables of both equations so that if  $\rho = 0$  then  $y_{2i}$  is exogenous for the second equation (Fabbri *et al.*, 2004).

$Y_{1i}$  is a binary variable that takes value of 1, if the conscripts want to re-enlist.  $Y_{1i}$  takes value of zero, otherwise.

$$y_{1i} = \begin{cases} 1 & \text{if } y_{1i}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

Similarly,  $Y_{2i}$  is a binary variable that takes value of 1, if the conscripts have ever been unemployed before the army.  $Y_{2i}$  takes value of zero, otherwise.

$$y_{2i} = \begin{cases} 1 & \text{if } y_{2i}^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

This set of equations constituting the model of reenlistment and further education is capable of explaining the set of four possible qualitative outcomes regarding the conscripts' decisions provided that the error terms are assumed to be zero-mean bivariate normally distributed with unit variance and correlation coefficient  $\rho$ . The two equations can be estimated consistently by individual single equation probit methods. However, this is inefficient in that it ignores the correlation between the disturbances  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  of the underlying stochastic utilities function associated with reenlistment and further education decisions, respectively (Green, 2003).

In this paper, the bivariate probit model is employed to circumvent inadequacies of the single probit model. The joint probability for each of these four outcomes is modeled with three systematic components: the marginal  $\Pr(y_{1i} = 1)$  and  $\Pr(y_{2i} = 1)$ , and the correlation coefficient  $\rho$  for the two marginal distributions. Each of these systematic components may be modeled as functions of (possibly different) sets of explanatory variables. The two equation system, then, can be estimated using a bivariate probit maximum likelihood model, where the likelihood function is given by:

$$L = \sum_{i=1}^n \ln \Phi_2(q_{1i}\xi_{1i}, q_{2i}\xi_{2i}, \rho_i^*)$$

Where  $\Phi_2$  denotes the cumulative density function of the bivariate normal density and

$$q_{1i} = 2y_{1i} - 1$$

Implying that for a reenlister  $q_{1i} = 1$  and for a separator  $q_{1i} = -1$ ,

$$q_{2i} = 2y_{2i} - 1$$

and similarly for an individual who continues to have further education  $q_{2i} = 1$  and for an individual who does not continue to have further education  $q_{2i} = -1$ ,

$$\xi_{1i} = \alpha_1 x_{1i} + \beta y_{2i}$$

from the reenlistment equation

$$\xi_{2i} = \alpha_2 x_{2i}$$

from the further education equation, and

$$\rho_i^* = q_{1i} q_{2i} \rho.$$

Maximization of this bivariate probit maximum likelihood function yields consistent, asymptotically efficient estimates of the model coefficients and the covariance matrix. However, the coefficients cannot be interpreted as straightforward as with linear models, because of the nonlinear nature of the bivariate probit maximum likelihood model. The bivariate probit approach is more efficient than the commonly employed two-step procedure because the latter does not take into account the correlation between the disturbances of the reenlistment and further education equations (Green, 2003). Equations (1) and (2) are estimated by full-information maximum likelihood. The likelihood-ratio test of whether the correlation coefficient of the residuals  $\rho$  is equal to zero can be used as a Hausman endogeneity test (Knapp and Seaks, 1998).

### 3. THE DEFINITION OF REENLISTMENT AND THE DATA

Traditionally, the Turkish Military Service system has always large core of professionals and a main body of conscripts so the system has always been a mixed system.<sup>1</sup> Every male citizen is required to complete his compulsory military service. But the type and time is depending on the education level. University graduates may fulfill their military obligation as reserve officers with a 12 month period (also they have a chance of short term of 6 months) Recruits who are high school graduates or less have to serve as privates for 15 months. After their initial training of three months, they are posted to their bases.

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<sup>1</sup> For a brief history of Turkish Military service and structure, please see Varoğlu and Bıçaksız (2003).

The Turkish Armed Forces are formed from four services: Army, Navy, Air Force and Gendarmerie. The categories that the services have are followings:

- Professionals
  - Commissioned officers
  - Non-commissioned officers (NCOs)
  - Specialists
  - Civilians (officials and workers)
- Conscripts
  - Reserve officers
  - Short-term conscripts
  - Long-term conscripts

Due to the recruitment system of the Turkish Armed Forces, only serving conscripts can enlist. Otherwise it is not possible to join the army unless they are graduated from Turkish Military Academy. Conscripts who would like to join the army should apply at the end of their duty. Their first contact shall be 3 years. They can serve until 20 years in the Army.

In order to analyze the determinants of re-enlistment, two separate surveys have been carried out among recruits who were in their first three month before posting their bases. The first survey was carried out on 9 November 2006 with 293 participants and the second one was carried out on 16 December 2006 with 502 participants at the naval bases in Kocaeli and Istanbul respectively<sup>2</sup>. The total number of conscripts from the two surveys were 940 and 855 of them were eligible for re-enlistment. But only 795 of them participated at the survey. Main question in the survey was if the recruits would like to join the army at least for 36 months the other question was if they have ever been unemployed before the army. According to these two questions, the sample divided into two parts in table 1. Unemployment and re-enlistment variables form two dependent variables of our analysis. The conscripts are analyzed for their answers. The factors such as living, family, education characteristics, income and age are summarized in order to their situation of re-enlist or not and unemployed or not in Table 1. The questions are prepared in order to capture economic, socio-economic and educational background of the recruits.

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<sup>2</sup> In order to ensure that this sampling is a valid representative of the population, the data from the surveys have been compared to the 2002 population data where male population between 20-29 years of age is grouped according the region and education level. The comparison indicates that our sampling is a valid representative of the male population in Turkey.

**Table 1: Descriptive Statistics**

Variable	Panel A				Panel B			
	Re-enlistment				Unemployment			
	Yes		No		Yes		No	
	N	%	N	%	N	%	N	%
	360	45.3	435	54.7	514	64.7	281	35.3
Age								
Less than 20	109	30.3	131	30.1	162	31.5	78	27.8
Between 20-25	245	68.1	286	65.7	337	65.6	194	69
Between 25-30	5	1.4	15	3.4	12	2.3	8	2.8
More than 30	1	0.3	3	0.7	3	0.6	1	0.4
$\chi^2(3)$	4.144 (0.246)				1.556(0.669)			
Region								
Blacksea	46	12.8	64	14.7	66	12.8	44	15.7
Aegean	37	10.3	49	11.3	47	9.1	39	13.9
Marmara	62	17.2	102	23.4	84	16.3	80	28.5
East Anatolia	30	8.3	34	7.8	50	9.7	14	5
Southeast Anatolia	73	20.3	82	18.9	120	23.3	35	12.5
Central Anatolia	22	6.1	18	4.1	23	4.5	17	6
Mediterranian	90	25	86	19.8	124	24.1	152	18.5
$\chi^2(6)$	0.861(0.195)				37.382(0.000)*			
Education								
Illiterate	1	0.3	1	0.2	2	0.4	0	0
Elementary School Degree	64	17.8	121	27.8	133	25.9	52	18.5
Secondary School Degree	162	45	187	43	223	43.4	126	44.8
High School Degree	126	35	112	25.7	143	27.8	95	33.8
University Degree	7	1.9	14	3.2	13	2.5	8	2.8
$\chi^2(4)$	15.573(0.04)**				7.666(0.105)			
Mother's education level								
Illiterate	113	31.4	137	31.5	182	35.4	168	24.2
Elementary School Degree	170	47.2	216	49.7	242	47.1	144	51.2
Secondary School Degree	51	14.2	48	11	56	10.9	43	15.3
High School Degree	23	6.4	26	6	28	5.4	21	7.5
University	3	0.8	8	1.8	6	1.2	5	1.8

**Table 1: Descriptive Statistics**

Variable	Panel A				Panel B			
	Re-enlistment				Unemployment			
	Yes		No		Yes		No	
	N	%	N	%	N	%	N	%
Degree								
$\chi^2(4)$	3.287(0.511)				12.444(0.014)**			
Father's education level								
Illiterate	44	12.2	52	12	72	14	24	8.5
Elementary School Degree	211	58.6	267	61.4	317	61.7	161	57.3
Secondary School Degree	64	17.8	71	16.3	72	14	63	22.4
High School Degree	31	8.6	38	8.7	41	8	28	10
University Degree	10	2.8	7	1.6	12	2.3	5	1.8
$\chi^2(4)$	1.170(0.778)				13.736(0.008)*			
Monthly Income								
Less than US \$400	209	66.8	192	54.4	294	67.3	107	46.7
Between US \$400- 800	83	26.5	119	33.7	108	24.7	94	41
Between US \$800- 1200	6	1.9	23	6.5	13	3	16	7
Between US \$1200- 1600	7	2.2	7	2	9	2.1	5	2.2
Between US \$1600-2000	5	1.6	8	2.3	7	1.6	6	2.6
More than US \$ 2000	3	1	4	1.1	6	1.4	1	0.4
$\chi^2(5)$	15.591(0.08)***				31.376(0.000)*			
Married								
Yes	19	5.3	43	9.9	44	8.6	18	6.4
No	341	94.7	392	90.1	47	91.4	263	93.6
$\chi^2(1)$	5.815(0.016)**				1.173(0.279)			
Any Children								
Yes	12	3.3	38	8.7	34	6.6	16	5.7
No	348	96.7	397	91.3	480	93.4	265	94.3
$\chi^2(1)$	9.754(0.02)**				0.261(0.609)			
Duration of Unemployment								
Less than 3 months	64	36.4	81	45.5	145	41		
Between 3-6 months	68	38.6	62	34.8	130	36.7		

**Table 1: Descriptive Statistics**

Variable	Panel A				Panel B			
	Re-enlistment				Unemployment			
	Yes		No		Yes		No	
	N	%	N	%	N	%	N	%
Between 7-12 months	18	10.2	14	7.9	32	9		
Between 13-18 months	5	2.8	5	2.8	10	2.8		
Between 19-24 months	4	2.3	1	0.6	5	1.4		
Between 25-36 months	5	2.8	7	3.9	12	3.4		
More than 36 months	12	6.8	8	4.5	20	5.6		
$\chi^2(7)$	9.859(0.197)							
Living with Family								
Yes	325	90.3	392	90.1	457	88.9	260	92.5
No	35	9.7	43	9.9	57	11.1	21	7.5
$\chi^2(1)$	0.006(0.939)				2.685(0.101)			
Sibling Number								
1	9	2.5	12	2.8	9	1.8	12	4.3
2	49	13.6	63	14.3	68	13.2	44	15.7
3	67	18.6	80	18.4	88	17.1	59	21
4	53	14.7	66	15.2	69	13.4	50	17.8
5	54	15	54	12.4	68	13.2	40	14.2
6	49	13.6	51	11.7	77	15	23	8.2
More than 6	79	21.9	109	25.1	135	26.3	53	18.9
$\chi^2(6)$	2.523(0.866)				19.936(0.003)*			
Number of brothers								
1	57	15.8	67	15.4	64	12.5	60	21.4
2	109	30.3	120	27.6	153	29.8	76	27
3	75	20.8	89	20.5	101	19.6	63	22.4
4	58	16.1	74	17	90	17.5	42	14.9
5	39	10.8	38	8.7	47	9.1	30	10.7
6	11	3.1	23	5.3	31	6	3	1.1
More than 6	11	3.1	24	5.5	28	5.4	7	2.5
$\chi^2(6)$	6.529(0.367)				25.602(0.000)*			
Number of sisters								
0	61	16.9	94	21.6	89	17.3	66	23.5
1	107	29.7	129	29.7	149	29	87	31
2	81	22.5	94	21.6	113	22	62	22.1
3	57	15.8	60	13.8	78	15.2	39	13.9
4	22	6.1	29	6.7	40	7.8	11	3.9
5	20	5.6	18	4.1	27	5.3	11	3.9
6 and more than	32	3.3	29	2.5	18	3.5	5	1.8

**Table 1: Descriptive Statistics**

Variable	Panel A				Panel B			
	Re-enlistment				Unemployment			
	Yes		No		Yes		No	
	N	%	N	%	N	%	N	%
	6							
$\chi^2(6)$	4.191(0.651)				10.776(0.096)***			
Social Security								
Yes	123	34.2	137	31.5	147	28.6	113	40.2
No	237	65.8	298	68.5	367	71.4	168	59.8
$\chi^2(1)$	0.639(0.424)							
Further education								
Yes	112	31.1	84	19.3	125	24.3	71	25.3
No	248	68.9	351	80.7	389	75.7	210	74.7
$\chi^2(1)$	14.767(0.000)*				0.088(0.767)			
Unemployment								
Yes	259	71.9	255	58.6				
No	101	28.1	180	41.4				
$\chi^2(1)$	15.302(0.000)*							
Reenlistment Decision								
Yes					259	50.4	101	35.9
No					255	49.6	180	64.1
$\chi^2(1)$					15.302(0.000)*			
Re-enlistment Reason								
Job Guarantee	153	42.5			117	45.2	36	35.6
Salary	36	10			27	10.4	9	8.9
To see overseas	16	4.4			11	4.2	5	5
Social Benefits	33	9.2			22	8.5	11	10.9
Liking Military	122	33.9			82	31.7	40	39.6
$\chi^2(4)$	9.847(0.043)				3.609(0.462)			

Values in parenthesis are the p-values and \*, \*\*and \*\*\* denote significance at 1, 5 and 10 per cent level of significance.

Table 1 presents some of the characteristics of the conscripts in our data. In panel A the sample is divided into two sections: those who choose to join the armed forces for at least 36 months (stayers) and those who do not (leavers). Panel B, on the other hand, presents the characteristics of conscripts regarding their unemployment. It appears that conscripts are less likely to re-enlist. There seems no significant difference in age groups for re-enlistment decision. For living region, there seems statistically significant difference in unemployment. Conscripts from the Central Anatolia, East and South East Anatolia and Mediterranean regions are more likely to reenlist compared to the conscripts from other regions. The

conscripts from Marmara, Southeast Anatolia and Mediterranean are more likely unemployed. From the Black sea, Central Anatolia and Mediterranean regions are more likely to re-enlist compared with the conscripts from other regions. When the GNP per capita data is examined, the Marmara region is the richest region in Turkey which is followed by Egean and Mediterranean regions<sup>3</sup>. Mother's and father's education level are statistically significant for the unemployment as we expect. For the mother's and father's education below elementary school degree level, the unemployment is really high. Education level is significant for re-enlistment decision, conscripts who have secondary school degree level education are more likely re-enlist. Monthly income is an important effect on re-enlistment and unemployment cases. Conscripts who are married are less likely to re-enlist and who are living with their family are more likely to re-enlist. Sibling characteristics, such as number of brother, sister and total number of siblings are statistically significant for unemployment. Conscripts who want to reenlist are more likely have 2 brothers and 1 sister. Further education is highly statistically significant as Yildirim et al (2010) paper analyzed.

#### **4. EMPIRICAL RESULTS**

Existing studies investigating the determinants of reenlistment decision have generally employed single equation regression models (see for example Thorpe and Cameron, 2000; Fricker, 2002; Hosek and Totten , 2004 and Yildirim and Erdinc, 2007). Re-enlist and unemployment variables are both categorical variables they are jointly determined endogenous variables. The probit equations for reenlistment decision and unemployment can be estimated individually. However, the random disturbances that affect the two decisions may be correlated. In such a case, estimating the probit equations individually would inappropriately constrain the correlation between the random disturbances to be equal to zero, implying that any randomness affecting the reenlistment decision is unrelated to the unemployment. This constraint can be relaxed by jointly estimating the reenlistment and unemployment in the form of a bivariate probit model, which contains an extra parameter to account for the correlation across equations in the same sense as a seemingly unrelated regressions model.

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<sup>3</sup> For a detailed analysis of income distribution in Turkey, please see Yildirim et al (2004). For the effects of regional policies on economic convergence in Turkey please see, Yildirim (2005).

**Table.2. Estimation Results of Re-Enlistment Decision**

Co-variate	Probit Coefficients (p-value)	Bi-variate probit coefficient (p-value)
Unemployment	0.3301* (0.001)	1.0239 (0.511)
Further education	0.2720** (0.011)	0.2329 (0.165)
No. of sisters	0.0423 (0.321)	0.018 (0.811)
Any children	-0.2649 (0.379)	-0.1866 (0.615)
Education level	0.2185* (0.001)	0.2001** (0.038)
Live with family	-0.0974 (0.555)	-0.038 (0.864)
Region	-0.0529*** (0.096)	-0.055*** (0.079)
Rural	0.0819* (0.002)	0.0600 (0.382)
Income	-0.0761 (0.11)	-0.0224 (0.441)
Mother's education	-0.01802 (0.534)	-0.023 (0.441)
Father's education	0.0261 (0.473)	.0189 (0.645)
No. of siblings	-0.0365 (0.480)	-0.0181 (0.795)
Sibling order	0.0882** (0.012)	0.0855** (0.028)
Car	-0.2162*** (0.082)	-0.1166 (0.688)
Age	-0.1122 (0.124)	-0.1114 (0.128)
Working	0.2437** (0.063)	0.1755 (0.455)
Marriage	-0.2885 (0.290)	0.3252 (0.233)
No. of brothers	-0.0740 (0.116)	-0.0957 (0.119)
constant	-0.7087*** (0.052)	-1.0515 (0.175)
Number of observation	790	790
LR/Wald $\chi^2$	80.86	179.62
Log-likelihood	-504.0513	-981.408
Pseudo R2	0.0743	-
LR rho	-	0.0958 (0.7568)

\*, \*\*and \*\*\* denote significance at 1, 5 and 10 per cent level of significance

**Table.3.Estimation Results of Re-Enlistment Decision**

<b>Co-variate</b>	<b>Probit Coefficients (p-value)</b>	<b>Bi-variate probit coefficient (p-value)</b>
Unemployment	0.3399 <sup>*</sup> (0.001)	1.5455 <sup>*</sup> (0.000)
Further education	0.2720 <sup>**</sup> (0.011)	0.2042 <sup>**</sup> (0.019)
Education level		0.1635 <sup>*</sup> (0.001)
Region	-0.0546 <sup>***</sup> (0.083)	-0.0465 <sup>***</sup> (0.055)
Rural	0.0782 <sup>*</sup> (0.003)	
Income	-0.0814 <sup>***</sup> (0.082)	
Sibling order	0.0871 <sup>*</sup> (0.005)	0.05854 <sup>**</sup> (0.026)
Car	-0.2058 <sup>***</sup> (0.096)	
Working	0.2475 <sup>***</sup> (0.055)	
Marriage	-0.4236 <sup>**</sup> (0.020)	-0.3406 <sup>**</sup> (0.019)
No. of brothers	-0.0929 <sup>*</sup> (0.007)	-0.0976 <sup>*</sup> (0.001)
constant	-0.9546 <sup>*</sup> (0.001)	-1.2175 <sup>*</sup> (0.000)
Number of observation	792	792
LR/Wald $\chi^2$	73.93	365.07
Log-likelihood	-508.7306	-990.8792
Pseudo R2	0.0677	-
LR rho	-	19.745 <sup>*</sup> (0.000)

\*, \*\*and \*\*\* denote significance at 1, 5 and 10 per cent level of significance.

Probit and bi-variate probit regression results are presented in Table 2. In these estimations, all the variables are included in the model. Unemployment, further education, education level, living region, sibling order, having car, working variables are statistically significant for re-enlistment decision. In Tables 2 and 3, LR denotes the Likelihood Ratio statistics testing the joint significance of the variables. Empirical results presented in Table 2 indicate that conscripts who have been unemployed before the army are more likely to stay in the army, confirming our expects.

Table 3 presents only the significant variables of re-enlistment model for probit and bivariate probit analysis. Than in probit model, unemployment, further education, living region, income, rural, sibling order, having car, working, marriage, number of brothers are statistically significant for re-enlistment decision. For bivariate probit model, unemployment, further education, education level, living region, sibling order, marriage, number of brothers

are statistically significant while income, having car, working are not (different from probit model).

**Table.4. Estimation Results of Unemployment**

Co-variate	Probit Coefficients (p-value)	Bi-variate probit coefficient (p-value)
Re-enlistment	0.0934 (0.401)	-
Further education	0.0227 (0.551)	0.0915 (0.416)
No. of sisters	0.1006 (0.028)	0.0989 (0.028)
Any children	-0.2832 (0.360)	-0.3080 (0.346)
Education level	0.0261 (0.694)	0.0238 (0.720)
Live with family	-0.2113 (0.217)	-0.1906 (0.280)
Region	0.0224 (0.494)	0.0199 (0.547)
Rural	0.0673 (0.011)	0.0677 (0.011)
Income	-0.1907 (0.000)	-0.1892 (0.000)
Mother's education	0.0237 (0.429)	0.0243 (0.419)
Father's education	0.0227 (0.551)	0.0217 (0.571)
No. of siblings	-0.0793 (0.150)	-0.0770 (0.163)
Sibling order	-0.0071 (0.845)	-0.0068 (0.850)
Car	-0.3302 (0.007)	-0.3353 (0.006)
Age	0.0154 (0.834)	0.0167 (0.820)
Working	0.2167 (0.100)	0.2277 (0.086)
Marriage	0.2441 (0.399)	0.2822 (0.366)
No. of brothers	0.1165 (0.020)	0.1151 (0.021)
constant	0.0641 (0.860)	0.0395 (0.913)
Number of observation	790	790
LR/Wald $\chi^2$	73.61	179.62
Log-likelihood	-477.40509	-981.40844
Pseudo R2	0.0716	-
LR rho	-	0.9588 (0.7568)

\*, \*\*and \*\*\* denote significance at 1, 5 and 10 per cent level of significance.

Same as re-enlistment decision, for unemployment probit and bivariate probit regression analysis are employed. In Table 4, all the variables are included in the model for probit and bivariate probit analysis. Table 5 presents only significant variables in probit and bivariate probit regression estimations. In seemingly unrelated regression the correlation coefficient parameter  $\rho$  is statistically significant in significant model. In all models, unemployment positively affects re-enlistment decision. For unemployment decision, re-enlistment seems statistically insignificant in probit model but bivariate probit model tells there is a significant

relation. Moreover significant variables in unemployment probit models are income, number of sisters living region (rural), having a car, working and number of brothers.

**Table.5. Estimation Results of Unemployment**

Co-variate	Probit Coefficients (p-value)	Bi-variate probit coefficient (p-value)
Re-enlistment		
Further education		
No. of sisters	0.0563 (0.070)	0.0548 (0.043)
Any children		
Education level		
Live with family		
Region		
Rural	0.0628 (0.016)	0.0779 (0.000)
Income	-0.1943 (0.000)	-0.1668 (0.000)
Mother's education		
Father's education		
No. of siblings		
Sibling order		
Car	-0.3169 (0.008)	-0.3195 (0.002)
Age		
Working	0.2360 (0.066)	0.2897 (0.008)
Marriage		
No. of brothers	0.0652 (0.038)	0.0639 (0.037)
constant	0.0395 (0.846)	-0.1051 (0.559)
Number of observation	793	792
LR/Wald $\chi^2$	67.39	365.07
Log-likelihood	-481.83496	-990.87918
Pseudo R2	0.0654	-
LR rho	-	19.745 (0.0000)

\*, \*\*and \*\*\* denote significance at 1, 5 and 10 per cent level of significance.

## **5. CONCLUSION**

This study directly builds on Yildirim et al (2010) where further education and reenlistment decision have been examined for Turkish Armed Forces by using probit and seemingly unrelated probit analysis. Beyond education decision, unemployment status is also effective for enlistment decision. This study is an attempt to investigate the determinants of re-enlistment and unemployment decisions of the conscripts of the Turkish Armed Forces in a bivariate probit framework.

Empirical analysis indicates that in probit and bivariate probit analysis there is positive and significant effect of unemployment on re-enlistment decision. Only for unemployment model, there is insignificant effect of re-enlistment on the contrary of bivariate probit model. This findings suggest that the previous studies, which ignore the interdependencies in re-enlistment and unemployment might not have the correct estimates of the effect of unemployment on re-enlistment decision. Sibling characteristics are important for both unemployment and re-enlistment decision.

This study highlights the importance of family characteristics on unemployment and re-enlistment decision besides education level.

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