Determining the Factors that Affect the Net Migration Rate in Turkey with Ordered Panel Logit Regression Analysis

Türkiye'nin Net Göç Hızını Etkileyen Faktörlerin Sıralı Panel Logit Regresyon Analizi ile Belirlenmesi

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ABSTRACT: Internal migration, which has been continuing without slowing down since 1950s in Turkey, has started to reduce the quality of life in especially the metropolis that let in excessive numbers of immigrants for the last 15-20 years. From the perspective of the regions of outgoing migrations, production decreases here due to the population and labor force transfers. The net migration rate, which is a measure of incoming and outgoing migrations balance, needs to be examined closely. In this study, the determinants of net migration 12 regions of Turkey in NUTS1 level, which are rate divided into 4 categories, were analyzed for 2008-2014 period using ordered panel logit regression.

Keywords: Net Migration Rate, Ordered Panel Logit, NUTS1

JEL Classifications: C23; C25; O15

Öz: Türkiye'de 1950'li yıllardan günümüze kadar hız kesmeden devam eden iç göç, yaklaşık son 15-20 yıldır özellikle fazla miktarda göç alan büyük şehirlerde yaşam kalitesini düşürmeye başlamıştır. Göç veren açısından bakıldığında ise, nüfus ve işgücü transferinden dolayı buralarda üretimin düşmesine neden olmaktadır. Alınan ve verilen göçlerin dengesinin bir ölçüsü olan net göç hızının yakından incelenmesi gerekmektedir. Bu çalışmada, 4 kategoriye ayrılmış net göç hızının belirleyicileri Türkiye'nin NUTS1 düzeyinde yer alan 12 bölgesi 2008-2014 dönemi için sıralı panel logit regresyon kullanılarak incelenmiştir.

Anahtar Kelimeler: Net Göç Hızı, Sıralı Panel Logit, NUTS1

1. Introduction
In general terms, migration can be described as the geographical relocation that human communities experience by moving from a location and settling in another in order to spend a part or the rest of their lives, due to the religious, economic, political, social and other reasons.

Migration can be discussed under two titles in terms of the migrated settlements: internal migration and external migration. Internal migration represents the migrations within the boundaries of a country, and external migration represents the migrations from a country to other countries. In internal migration, while there is not any change on the country population, the population of cities, towns and villages increases and decreases. External migration, which is described as moving to another country in order to change the living environment, is out of the scope of this study.

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Internal migration occurs from rural areas to cities, from rural areas to rural areas, from cities to rural areas and from cities to cities. Internal migration mostly occurs from rural areas to cities and from underdeveloped cities to metropolis, hence, while the population metropolis increases due to the internal migration, the population of rural areas and underdeveloped cities decreases. Considering the migration statistics of Turkey, it is observed that emigrational mobility started with the economic recovery after 1950s and that it mostly occurs from rural areas to metropolis. Various factors such as inadequacy of education and health condition and unemployment due to the reducing number of agricultural areas and mechanization in village life underlie the migration from rural areas to metropolis. While the cities that grow up with high quantity of migrations encounter various problems such as inadequate education, lack of health services, need for lands and houses, poor municipality services for water, energy, infrastructure, etc., traffic density, crowd, environmental pollution and noise, the migration mobility from underdeveloped regions to developed regions causes the young labor force and capital to flow outside the region, therefore, underdeveloped regions regress more and more.

In this study, the ranges for the net migration rate, which can be described as the difference between the incoming and outgoing migrations of the region, for NUTS1 (12 sub-regions of Turkey) were identified based on the regional classification of TUIK, and the factors that affect the possibility of net migration rate of the regions to be within these ranges between 2008 and 2014 were examined using ordered panel logit regression analysis. The first part of the study consists of the literature summary and is followed by methodology, data analysis and application respectively.

2. Literature Review

Migration phenomenon was theoretically approached by the English geographer Ravenstein for the first time. The study of Ravenstein (1885) is a theoretical study which is limited to only the internal migration; practical studies on migration started in 1960s. Rogers (1967) analyzed the emigrational mobility in California; Greenwood (1971) in India; Pack (1973), Kau and Sirmians (1977), Anjomani (2002), Cebula (2005) and Rebhun and Goldstein (2009) in USA; Fields (1982) in Colombia; Ramin (1988) in Iran; Foot and Milne (1990) in Canada; Henry et al. (2003) in Burkina Faso of Western Africa; Kalashnikov et al. (2008) in Mexico; Hierro and Maza (2010) in Spain; and Bunea (2012) in Romania. Although the studies conducted for different countries, the literature of which are given here, are based on different country groups, different time frames and different migration theories, most of them were designed to present the determinants of migration.

Various verbal and statistical studies addressing the migration problem in Turkey have been encountered since the beginning of 1970s, and the increasing emigrational mobility in Turkey attracted the attention of both local and foreign researchers. In Munro (1974), the factors that affected the internal migration in Turkey between 1960 and 1965 were reviewed; in Doh (1984), an analysis of the socio-economic factors that affected the interprovincial migration in Turkey was presented and a significant relationship was discovered between the employment opportunities and migration rates based on the results. In Mutlu (1990), it was concluded that the developments in internal terms of trade played a "primary role"

on rural area-city migration between 1975 and 1985 in Turkey. Tunalı (1996) studied the determinants in the migration and reverse migration decision of individuals between 1963 and 1973 in Turkey. In Gedik (1997), the internal emigrational mobility in Turkey was examined and it was concluded that social and psychological factors as well as physical distance had a significant effect on migration decision.

Yamak and Yamak (1999) empirically examined the relationship between the per capita income and the net migrations among cities between 1980 and 1990. It was suggested that appealing factors rather than driving factors were more important in migration decision; in other words, the cause of migrations is the high income level of net immigrant-receiving cities rather than the low income level of net emigrant cities. In Pazarlıoğlu (2001), the econometric model of internal migration in Turkey was built using panel data; the need for eliminating the income inequality and for removing the interprovincial economic differences in order to prevent internal migration was emphasized, and it was determined that one of the most important consequences of internal migration was unplanned urbanization. Gür and Ural (2004), using cross sectional data, similar outcomes were obtained, and it was asserted that the economic opportunities and the wage gap between the immigrant-receiving regions and the emigrant regions raised the migration rate. Ceritli, Sunar and Demirci (2005) confirmed that the actual reason of migration was employment, and that the causes such as appointment/assignment, education and Marmara & Duzce earthquakes led to high emigrational mobility both within the city and between the cities.

Çelik (2006) found out that also non-economic appealing social factors were effective on the emigrational mobility in Turkey. In 2006, a comprehensive migration research was conducted throughout Turkey by the Institute of Population Studies of Hacettepe University. Within the scope of this research, 5009 households and 7316 people were interviewed. The majority said that they did not voluntarily decide to migrate and that they had to leave their village due to the pressure and demand around under the circumstances. In 4 cities where the research was conducted, it was confirmed that 87% of the migrations occurred for security reasons and against the will of people and families; in other words, under coercion. In selection of the migration area, the elements such as the proximity to the settlement which was left and the existence of relatives or friends who can give support stand out. Filiztekin and Gökhan (2008) determined that the wage gap, unemployment rate, age, educational background, distance and social network were the most important factors that affected the migration in Turkey between 1990 and 2000. In their study, Bahar and Korkmaz Bingöl (2010) found out by using the TUIK migration statistics of 2000 that the most important reason of internal migration mobility in Turkey was job hunting and employment.

Bülbül and Köse (2010) concluded that Istanbul and Northeastern Anatolia Region differed from other regions by using the multidimensional scaling method for NUTS1 in 2008 and constituted a group by themselves; Istanbul and other Marmara Regions as well as Aegean, Western Anatolia and Mediterranean which are generally located in the western side of the country and which can be defined as relatively developed regions are the immigrant-receiving areas, and the Eastern Regions as well as Black Sea Region which are quite below the average of Turkey

in terms of income, employment and general welfare are the emigrant areas. In a study by Karakuş (2010) for Aegean, Marmara, Eastern Anatolia and Southeastern Anatolia regions, while it was confirmed that the population migrated due to the interregional wage gap, it was understood that the emigrational mobility did not affect the interregional income convergence.

In their study, Ercilasun, Hiç Gencer and Ersin (2011) suggested that the most significant factors which affected the internal migration decision of individuals in Turkey were education and the appealing force of people who migrated before. Uysal and Aktaş (2011) examined the relationship between the net migration rate of 81 cities in 2009 and the socio-economic variables within the scope of ordered logit models, and categorized the variables contributing to the model as annual population growth, number of tractors per 10.000 people and literate population. Yakar (2013) examined the relationship between the socio-economic development index of Turkey and the net migrations via geographically weighted regression analysis by using the data of 2009, and concluded that the eastern and southeastern regions of Turkey would keep letting out immigrants, on the other hand, Marmara region as well as Aegean and Western Mediterranean coasts and metropolis would keep letting in immigrants. Karpat Çatalbaş and Yarar (2015) analyzed the factors that determine the interregional migration in Turkey by using the panel data set of 26 sub-regions between 2008 and 2012. They found that the most important factors of migration were mainly the socio-economic reasons and security problems.

The above mentioned studies aiming to discover the determinants of migration in Turkey revealed that the appealing socio-economic factors such as employment, education and relatives that settled in the migration area before as well as the driving factors such as security problems, unemployment and underdevelopment had an effect on internal migration. Furthermore, it was proved that Marmara, Aegean, Western Anatolia and Mediterranean regions were the immigrant-receiving areas, and the remaining regions were the emigrant areas.

Unlike other studies, the usage of panel data on regional basis, net migration being focused on instead of incoming or outgoing migrations, and the net migration being estimated via ordered panel logit model with definite threshold values demonstrate both theoretical and technical authenticity of the study.

3. Methodology

In this study, ordered panel logit regression analysis is used as the econometric method. Ordered logit model is used to estimate the relationship between the ordered multiple categorical dependent variables and the quantitative or qualitative independent variables. The estimation methods of ordered panel logit models including both the individual and time dimension were derived from the estimation methods of classical logit model. Ordered panel logit model can be generally approached as follows:

$$Y_{it}^* = x_{it}\beta + \mu_i + u_{it} \qquad i=1,....,N \qquad t=1,......,T \qquad (1)$$

Here, while Y_{it}^* is categorical variable, x_{it} is independent variable and μ_i is individual effect. When x_{it} is statistically dependent on unobservable individual effect (μ_i), μ_i is taken as a constant and the fixed effect model is used; in the contrary case when x_{it} and μ_i are distributed as independent from each other, the random effect model is used.

$$\text{If } \kappa_k < Y_{it}^* \le \kappa_{k+1}, \text{ then } \quad Y_{it}=k \qquad k=1,......., K \qquad (2)$$

κ is the threshold parameter. With individual-specific thresholds, the model can be written in general as follows:

$$\text{If } \kappa_{ik} < Y_{it}^* \le \kappa_{ik+1} \text{ , then } \quad Y_{it}=k \qquad k=1,......., K \qquad (3)$$

In fixed effect ordered logit model, x_{it}, μ_i and u_{it} IID have the standard logistic distribution. For example, the distribution of u_{it} is as follows:

$$F\left(u_{it} \mid x_{it}, \mu_i\right) = F\left(u_{it}\right) = \frac{1}{1+\exp\left(-u_{it}\right)} \equiv \Lambda\left(t_{it}\right) \qquad (4)$$

Therefore, the probability of the observation of k for i individual and t time is as follows:

$$\Pr(Y_{it}=k|x_{it}, \mu_i)=\Lambda(\kappa_{ik+1}-x_{it}\beta-\mu_i)-\Lambda(\kappa_{ik}-x_{it}\beta-\mu_i) \qquad (5)$$

As it is seen, this probability is dependent not only on β and x_{it}, but also on μ_i and κ_{ik} and κ_{ik+1}; therefore, dependent variable is a function of individual effect and threshold values as well as independent variables. There are two problems in estimating this equation via the maximum likelihood method based on the fixed effects. First one is the identification problem: κ_{ik} cannot be separated from μ_i, only $\kappa_{ik}-\mu_i \equiv \mu_{ik}$ can be identified and only T can be estimated consistently in infinite. Second problem is that κ_{ik} cannot be estimated consistently due to the incidental parameter problem when T is finite and small which is often encountered in applications. The deviation in κ_{ik} reflects on the estimator of β and $\hat{\beta}$ becomes biased in short panels. In recent years, although there are various studies in the literature for obtaining consistent estimators with fixed effects, there is not sufficient information for the application yet. In this case, when working with panel data to estimate the ordered logit model, the maximum likelihood estimation method can be commonly used based on the random effect model or classical regression model on the assumption that there is not any individual effect. When μ_i and x_{it} are distributed independently, the random effect ordered panel logit model can be effectively estimated with the maximum likelihood method.

4. Data Analysis

In this study, the relationship between the socio-economic variables and the net migration rate of 12 regions of Turkey within NUTS1 category of TUIK between 2008 and 2014 was analyzed by using ordered panel logit model. Before proceeding with the application, the region, the variables and the data used in the model will be identified. NUTS1 regions, which are identified as level 1 by TUIK, as well as the cities in these regions can be seen in the following table.

Table 1. NUTS1 Regions

Region Code	Region	Region Code	Region
TR1	Istanbul	TR7	Middle Anotolia
TR2	Western Marmara	TR8	Western Blacksea
TR3	Aegean	TR9	Eastern Blacksea
TR4	Eastern Marmara	TRA	Northeast Anotolia
TR5	Western Anotolia	TRB	Middle East Anatolia
TR6	Mediterranean	TRC	Southeast Anatolia

In a study by Kocaman (2008), it was suggested that 11% of the population between 1990 and 2000 migrated from the relatively underdeveloped regions of the country in terms of social and economic aspects to the developed western regions and metropolis. This situation has not changed in recent years, yet; looking at the proportion of the immigrants to the total migration, which NUTS1 regions let in between 2008 and 2014, in Table 2, it is seen that Istanbul is well ahead and lets in 20% of the total migration. Istanbul is followed by Eastern Marmara, Western Anatolia, Aegean and Mediterranean regions respectively. The eastern regions of the country are the regions with the lowest number of incoming migrations.

Table 2. The Proportion of the Received Migration to Total Migration in NUTS1 Regions

Region/Year	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2008	19.7	5.59	10.4	11.2	10.3	10.8	5.05	7.51	4.70	2.99	4.75	6.95
2009	20.7	5.08	9.67	10.3	11.0	10.3	5.53	7.95	5.24	3.33	4.57	6.32
2010	22.1	5.25	9.34	10.1	11.2	10.3	5.24	6.66	4.55	3.46	4.57	7.19
2011	22.0	5.18	9.39	10.1	11.5	10.1	4.93	6.59	4.17	3.54	5.02	7.41
2012	19.8	5.63	10.1	10.3	10.5	10.1	5.21	7.38	5.41	3.26	5.78	6.57
2013	20.6	5.59	9.65	10.4	10.7	10.0	5.37	7.63	4.96	3.25	5.05	6.70
2014	19.5	6.55	10.4	10.5	11.0	10.0	5.19	7.13	5.05	3.55	4.49	6.57

From the perspective of the emigrant regions, production decreases due to the population and labor force transfers, and the investments made on infrastructure, education, health and security in these regions go for nothing due to the high migration rate. Moreover, the skill levels, capital opportunities, knowledge and experiences of the migrating population are utilized in the migration area. Looking at the proportion of the immigrants, which NUTS1 regions let out between 2008 and 2014, to the total migration in the Table 3, it can be said that Istanbul as well as Black Sea and the eastern regions in addition to the western and southern regions have a high outgoing migration rate.

Table 3. The Proportion of the Migrations to Total Migration in NUTS1 Regions

Region/Year	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2008	18.29	4.01	8.60	6.87	9.25	9.80	6.85	8.53	4.99	6.05	6.83	9.88
2009	18.59	4.41	8.78	8.04	9.32	10.04	6.54	8.52	5.15	5.06	6.34	9.16
2010	16.96	4.51	9.29	8.19	9.19	10.07	6.98	9.21	5.69	4.97	6.24	8.65
2011	16.06	4.40	9.33	8.04	9.00	10.72	6.58	8.52	5.38	4.90	8.03	8.98

2012	18.22	4.33	8.77	8.37	9.15	10.65	6.02	8.12	4.45	5.03	7.17	9.68
2013	17.50	4.69	8.90	8.17	9.42	10.34	6.24	8.84	5.39	5.26	6.32	8.88
2014	18.83	4.48	8.40	8.02	9.26	9.87	6.33	8.67	5.25	5.46	6.56	8.81

It is obvious in both tables that all of the regions have both incoming and outgoing migrations; while the percentage difference between both types of migration is lower in some regions such as Istanbul (TR1). This difference is higher in eastern regions (TRA, TRB and TRC). In other words, the level of the cities to regain the number of immigrants that they let out is different from each other. In order to conduct a better analysis, it is useful to divide the internal migration into two as permanent and temporary. While permanent migration occurs with the thought of settling in the migration area due to unemployment and in order to increase income, seasonal migration due to the economic reasons, as well as the migration that occurs at a certain period of time for the purpose of education or health can be addressed within the scope of temporary migration. Looking at the Table 2 and 3, it is seen that some regions have temporary migrations and some have permanent migrations. In order to clarify this distinction, we need to review the net migration number, which can be described as the difference between the incoming and outgoing migrations of the region. If the migration that a specific region lets in is higher than the migration that it lets out, then the net migration is positive, and if the migration that it lets out is higher than the migration that it lets in, then the net migration is negative.

Table 4. Net Migration in NUTS1 Regions

Region /Year	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2008	26.67	30.07	34.69	82.16	20.06	19.44	-34.29	-19.52	-5.62	-58.26	-39.61	-55.78
2009	39.48	12.57	16.56	42.57	31.54	4.79	-19.17	-10.84	1.58	-32.58	-33.20	-53.29
2010	102.58	14.59	9.55	37.57	39.12	5.47	-34.62	-50.72	-22.70	-30.10	-33.25	-28.91
2011	121.78	15.86	12.25	42.82	50.30	-11.79	-33.87	-39.55	-24.94	-27.97	-61.67	-32.16
2012	30.46	25.05	25.35	37.09	26.19	-10.52	-15.86	-14.39	18.49	-34.43	-27.09	-60.34
2013	66.32	19.26	15.74	47.04	28.22	-7.01	-18.62	-25.67	-9.22	-42.76	-26.97	-46.31
2014	14.33	46.44	46.11	56.18	39.23	3.44	-25.86	-34.81	-4.55	-43.08	-46.79	-50.64

As it is seen in Table 4, while the net migration of TR1-TR5 regions (Istanbul, Western Marmara, Aegean, Eastern Marmara and Western Anatolia) is positive (meaning the migration that it lets in is higher than the migration that it lets out), the net migration of TR7-TR9 TRA-TRC regions (Central Anatolia, Western and Eastern Black Sea, Northeastern, Central Eastern and Southeastern Anatolia) is negative. TR6 region (Mediterranean) has positive net migration in some years and negative net migration in other years. This study is based on the net migration rate, which gives the net migration number per 1000 people who can migrate. Net migration rate is calculated based on the following formula:

$$m_{(.i-i.)} = [(M_{.i}-M_{i.})/(P_{i,t+n}-0,5*(M_{.i}-M_{i.}))]*k \qquad (6)$$

Here; $m_{(.i-i.)}$: net migration rate, $M_{.i}$: migration that i region lets in, $M_{i.}$: migration that i region lets out, $M_{.i}-M_{i.}$: net migration of i region, $P_{i,t+n}$: permanent residential population of i region in t+n time, t: start date, n: time (year), i: region and k=1000.

Table 5. Net Migration Rate in NUTS1 Regions

Region/Year	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2008	2.1	9.7	3.7	12.6	3.0	2.2	-9.0	-4.4	-2.2	-26.1	-10.9	-7.6
2009	3.1	4.0	1.7	6.4	4.6	0.5	-5.0	-2.4	0.6	-14.7	-9.1	-7.1
2010	7.8	4.6	0.1	5.5	5.6	0.6	-9.0	-11.2	-9.0	-13.6	-9.1	-3.8
2011	9.0	5.0	0.1	6.2	7.1	-1.2	-8.8	-8.8	-9.9	-12.5	-16.5	-4.1
2012	2.2	7.7	2.6	5.3	3.6	-1.1	-4.1	-3.2	7.3	-15.3	-7.2	-7.6
2013	4.7	5.9	1.6	6.6	3.8	-0.7	-4.8	-5.7	-3.6	-19.2	-7.1	-5.7
2014	1.0	14.0	4.6	7.7	5.2	0.3	-6.6	-7.7	-1.8	-19.3	-12.2	-6.1

As it is seen in Table 5, the region which has the lowest net migration rate is Northeastern Anatolian Region except in 2011, and Central Eastern Anatolia in 2011. The regions which have the highest net migration rate are Eastern Marmara for 2008, 2009 and 2013, Istanbul for 2010 and 2011, and Western Marmara for 2012 and 2014.

5. Application
In this study, which was conducted to discover the determinants of net migration rate, the dependent variable is the categorical variable and was divided into four categories in total as follows:

$$\begin{cases} \text{if } NMR_{it} \leq -13, \text{ then } NMR_{it}^{*}=1, \\ \text{if } -12.9 \leq NMR_{it} \leq -4 \text{, then } NMR_{it}^{*}=2, \\ \text{if } -3.9 \leq NMR_{it} \leq 5 \text{, then } NMR_{it}^{*}=3, \\ \text{if } NGH_{it} \geq 5.1, \text{ then } NMR_{it}^{*}=4. \end{cases}$$

Here, NMR: net migration rate values specified in Table 5, and NMR* is the categorical net migration rate variable. The number of regions and frequencies within these categories are given in Table 6 based on years.

Table 6. The Distributions of Net Migration Rates to Categories

Yıl	Category	1	2	3	4	Toplam
2008	**Number of Region**	1	4	5	2	**12**
	Frequency	8.33	33.33	41.67	16.67	**100**
2009	**Number of Region**	1	3	7	1	**12**
	Frequency	8.33	25	58.33	8.33	**100**
2010	**Number of Region**	1	4	6	1	**12**
	Frequency	8.33	33.33	50	8.33	**100**
2011	**Number of Region**	1	5	3	3	**12**
	Frequency	8.33	41.67	25	25	**100**
2012	**Number of Region**	1	3	6	2	**12**
	Frequency	8.33	25	50	16.67	**100**

2013	**Number of Region**	1	4	6	1	**12**
	Frequency	8.33	33.33	50	8.33	**100**
2014	**Number of Region**	1	4	5	2	**12**
	Frequency	8.33	33.33	41.67	16.67	**100**

All socio-economic determinants as well as health, education and development indicators which were thought to affect the dependent variable were taken as independent variables. Import, export, poverty rate, cultivated agricultural area, agricultural production value, livestock value, animal product value, total house sales, unemployment rate, employment rate, gini coefficient, population growth rate, population density, suicide rate, marriage rate, divorce rate, age dependency ratio, total number of physicians, number of hospital beds, number of take-off and landing airplanes, number of tractors, number of automobiles, number of theater halls, number of movie theaters, number of theater seats, number of movie theater seats, household size, literacy rate and number of universities were used as the independent variables. Where necessary, independent variables were included in the models as per person or 100 or 1000 people and/or based on their logarithms. The dependent variable correlation matrices of these variables were examined, alternative models were tested, and a model was built with the most significant independent variables as follows:

$$NMR_{it}^{*}=\beta_1 UN_{it}+\beta_2 MT_{it}+\beta_3 POP_{it}+\beta_4 DIV_{it}+\beta_5 MAR_{it}+\beta_6 TR_{it}+\beta_7 AIR_{it}+v_{it} \quad v_{it}=\mu_i+u_{it} \quad (7)$$

Here, UNS: number of universities, MT: number of movie theaters, POP: population growth rate, DIV: divorce rate, MAR: marriage rate, TR: number of tractors, AIR: number of take-off and landing airplanes. Moreover, i represents the individual dimension (NUTS1, 12 regions), and t represents the time dimension (2008-2014). μ_i: individual effect, u_{it}: remainder disturbance, v_{it}: component disturbance. For the estimation of the abovementioned model, the estimation results of the classical ordered panel logit model, which assumes that there is not any individual effect, and the random effect ordered panel logit model, in which the individual effect is summarized within the random error definition, are seen in the following table.

Table 7. The Results

NMR$_{it}$	Classical Model		Random Effect Model	
	Coefficient	**Odds ratio**	**Coefficient**	**Odds ratio**
UN$_{it}$	-.4321385*	0.6491194	-.4321252*	0.6491281
MT$_{it}$	.0344355*	1.035035	.0344344*	1.035034
POP$_{it}$	2.738296*	15.46062	2.738104*	15.45765
DIV$_{it}$	.051174*	1.052506	.0511713*	1.052503
MAR$_{it}$	-.1448381*	0.8651624	-.1448286*	0.8651705
TR$_{it}$	-.0000197*	0.9999803	-.0000197*	0.9999803
AIR$_{it}$	-.0000148**	0.9999852	-.0000148**	0.9999852
LR test	120.02*		-	
Wald test	-		34.34*	
McFadden R^2	0.591		-	

Cox and Snell R^2	0.760	-
Nargelkerke R^2	0.835	-
LR test$^&$	1.69	

* and ** are 1% and 5% significance values, respectively.

As a result of the likelihood ratio (LR) test, which was conducted to test the validity of classical panel logit model, in other words, the existence of individual effect in the model, it is observed that H_0 hypothesis, which shows there is not any individual effect, cannot be rejected, therefore, the individual effect is insignificant. Looking at the estimation results of classical and random effect panel logit model, it is obvious that the parameter estimations are nearly the same. Based on the classical logit model results, the model is significant in general according to all the parameters as well as the results of Wald test. McFadden R^2 is 59%, the other R^2s are 76% and 83% respectively; therefore, the explanatory power of the model is high. It is found that, while number of universities, number of marriages, number of tractors and number of take-off and landing airplanes affect the upgrade of net migration rate negatively, number of movie theaters, population growth rate and number of divorces affect the upgrade of net migration rate positively. As this upgrade represents the negativity (increase) of net migration rate, all parameter signs are in line with the expectations.

An increase of one unit in the number of universities decreases the probability of upgrade in net migration categories by 0.4. The results show that with the increase in the number of universities in the region, the region does not let out immigrants in terms of education, but starts to let in immigrants, therefore, this is a factor that prevents the increase in net migration rate. An increase of 1% in marriage rate decreases the probability of upgrade in net migration categories by 0.1, and an increase of 1% in divorce rate increases the probability of upgrade in net migration categories by 0.05. Considering the marriage and divorce rates together, it can be said that marriage has a positive effect and divorce has a negative effect on the decrease of net migration rate. It was concluded that the increase in the number of tractors to create job opportunities and employment, and the number of take-off and landing airplanes which were the development indicators of a region decreased net migration rate into positive categories. Each increase of 1% in the population growth rate increases the probability of upgrade in net migration categories by 2.7. The higher the population growth rate is, the higher the difference between the migrations that are let in and let out. An increase of one unit in the number of movie theaters increases the probability of upgrade in net migration categories by 0.034. While the number of movie theaters generally displays the development of a region, it positively affects net migration rate as it creates a group who would like to take their chances in metropolis because of the fact that it is a window to the world.

6. Conclusion

The aim of the study, is to reveal the determinants of categorical net migration rate in NUTS1 region of Turkey with the help of ordered panel logit regression models. Within this scope, 30 independent variables such as social, economic, health, education and employment, which may have an effect on migration and have available data, were used. As a result of the conducted econometric analyses, the variables that had an effect on the dependent variable were uncovered. It was concluded that the number of universities, number of marriages, number of tractors

and number of take-off and landing airplanes in the region are the variables that reduced the dependent variable which is net migration rate consisting of 4 categories. The number of movie theaters, population growth rate and number of divorces are the variables that increase it.

Although the causes for incoming and outgoing migrations differ in each region based on years, considering the literature, unemployment and education generally have a significant role on migration except the causes such as earthquake, security problems, natural disasters, etc. that occur in some periods. However, as the investments in education, health and infrastructure made on the regions as well as the security problems have momentarily effects on migration, calculations, examinations and models have to be updated every year. In this study, the data collected with the aim of building a steady panel for all variables cover the period until 2014, and the remarks cover the period between 2008 and 2014. It is foreseen that the results will display minor changes when the years of 2015 and 2016 are included although they will be basically the same. For example, according to the Population and Housing Research of TUIK for 2011, twenty two percent of the outgoing migrations in Turkey are education-based. The number of universities in Turkey increased from 124 to 175 with a rate of almost 30 percent, and also recently the new universities continue to be founded. While this increase is observed in mostly metropolis, there are universities founded in all cities of Turkey as of today. This has been an opportunity for families that cannot provide education for their children in metropolis due to economic problems or other social reasons. Therefore, it was concluded that the increase in the number of universities, which was the basis for education-based migration, reduced the net migration rate. It is suggested to consider these points when discussing the policies in order to increase the success of remigration especially in metropolis.

7. References

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