The Determinants of Internal Migration In Turkey

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Abstract

Internal migration has had a great impact on Turkey's population dynamics for decades. According to the 2000 population census, nearly 28% percent of the population was born in a different province that they now reside in. This ratio goes up to 62% for Istanbul, a major province that has drawn migrants for years. Although, it is claimed in numerous studies that rural-urban migration that centers on a few urban areas seems to be the predominant pattern of internal migration, we aim to investigate further to see if new patterns of internal migration have emerged.

The immense socioeconomic differences between regions shape inter-regional migration. The dynamics of migration differ across regions as each region has its unique geographical and socioeconomic structure. However, previous studies suggest that despite these differences, there are common economic and social factors that affect internal migration.

Gender differences also have an important role in determining internal migration patterns, which is apparent when we consider the differences in reasons for migration between different genders. Although education levels have increased significantly for females over the last decade, marriage and dependent migration still overwhelm other relevant factors such as job seeking. This shows that one needs to distinguish between different genders when analyzing internal-migration.

Thus, this paper presents an empirical study on the determinants of internal migration in Turkey. Using data from the 1990 and 2000 population censuses, we present a descriptive analysis and estimate an extended gravity model of migration. We show that both economic factors such as income differentials and unemployment rates, and social factors such as presence of social networks have a significant impact on migration. Moreover, following in part the approach of family migration models, we examine the effect of uncertainty on migration in our model.

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1 Introduction

Internal migration plays an important role in the workings of the labor market, acting as an equilibriating mechanism between rural and urban sectors especially in developing economies. Moreover, the welfare improving effects of migration as a result of a transfer of labor from low productive to high productive areas has also been previously demonstrated in the literature(Ghatak, 1991).

However, recent research reveals that realizations from migration need not be always positive. Using data from the period 1963-1973, Tunali shows in his 2000 paper that returns from migration are negative for most migrants that moved within Turkey during that period. Both the migrants and the society as a whole face the consequences of these negative returns. As Lucas 1997 puts it:

> Such issues as the efficiency of labor use and consequences of migration for overall poverty are of paramount importance, even beyond any considerations of pressures on infrastructure stemming from rapid urban growth (p. 727).

Reduction in the standards of living in urban areas that are the focus of incoming migrants is one of the more serious social burdens that comes about. According to Keles (1996), 35% of the Turkish urban population in 1995 were living in shantytowns most of which lack even the most fundemental infrastructure such as piped water and electricity. As Cole and Sanders (1985) point out, even individually rational migration decisions may have severe adverse effects on the society as opposed to what traditional traditional theories of migration predict. For example, in Turkey for the years 1987 and 1994, Özmucur and Silber (2002) show that internal migration from rural to urban areas increased the income inequalities rather than acting as an equilibriating mechanism and closing the gap. Thus, a careful empirical study of internal migration in Turkey may help explain albeit high migration rates, why migration fails to act as an equilibriating mechanism across the country. Moreover, migration may be also used as a policy tool to tackle the problems of high population growth which may be less costly than attempts to promote family planning (Lucas, 1997).

In a country such as Turkey where strong heterogeneity is present in geographical, economic and social conditions throughout the country, internal migration becomes an important component that affects the population distribution and dynamics. According to the 2000 Population Census, out of the 6,692,263 people that changed their residency in the previous 5 year period, 4,768,193 migrated between provinces which corresponds to a 1.58% annual inter-provincial migration rate. Although this rate might seem relatively low when compared to Spain for example where according to the 1991 Census, approximetaly 2.29% of the population move between provinces annually (Garca Coll and Puyol, 1997), the gross number of migrants is overwhelming compared to the populations of most de-

veloped European states such as The Netherlands(16,306,000), Belgium(10,446,000) and Sweden(9,011,000). The fear of large-scale immigrations to Europe as a result of an expansion of the EU have been present since Portugal, Spain and Greece have applied for membership (Zimmerman, 1999). Altough different member states have different motivations behind this fear, the common reason is the adverse effects of the movement of relatively cheap job seekers to the EU. Thus, understanding the dynamics of internal migration in Turkey might prove to be crucial in determining both the size and effects for potential immigrations to Europe if Turkey were to be a part of the EU. Furthermore for the Turkish case, the effect of social networks on migration becomes a very important part of this question considering the large stock of Turkish citizens currently living in Europe, especially in Germany where around 2.7 million people of Turkish descent currently reside.

This study focuses on major economic and social causes of internal migration within Turkey. Relying on economic theories of migration , we attempt to determine the variables that affect gross migration across provinces. Using census data from 1990 and 2000 population censuses, we estimate a gravity equation of migration. Parallel to the recent empirical work on Turkey, (Gedik, 1997; Gezici and Keskin, 2005; Evcil et. al. 2006) we show that economic factors such as income differentials and job seeking, and the presence of social networks are significant determinants of inter provincial migration. Furthermore, we disaggregate our data to estimate the determinants of migration for the two genders seperately. Our results indicate that there is a substantial difference between male and female migration decisions, which may be attributed to family migration decisions rather than individual migration decisions. Finally to examine potential migrants behave under uncertainty we attempt to incorporate direct measures of risk in our gravity model following in part Daveri and Faini's (1999) approach.

This paper is organized as follows: In the next section we review some strands of existing literature on migration followed by related empirical work on Turkey. The third section consists of a description of our dataset, followed by a desrciptive analysis of the characteristics of migrants and the results from our estimations. The final section is reserved for conclusions and remarks.

2 Existing Literature on Internal Migration

2.1 Economic Theories of Migration

Economic theory's contribution to migration research has rapidly increased since the 1960s. However, the classical theories of migration may be traced back to Ravenstein's 1885 paper on the laws of migration. The fundemental assumption of the classical approach is that the migrant is an individual that maximizes utility subject to a budget constraint (Bauer and Zimmerman, 1999). The basic arguement is that labor migration arises due to the actual

wage differentials between regions. If there is a labor shortage in a certain region, then the wages are said to be above the equilibrium wage levels. On the other hand regions with excess labor supply face wages lower than the equilibrium wages. Thus this difference in wages between regions causes labor to migrate and until equilibrium in the labor market is attained and the larger the wage differentail the larger the flow of migration.

Perhaps one of the most influential contributions to migration research is by Sjaastad (1962) that introduces the human capital framework to migration reseach. Sjaastad's model, as suggested by the human capital framework, percieves the decision to migrate as an investment problem. In this framework, each potential migrant calculates the present discounted value of expected returns in all potential regions and migrate if the returns from a potential destination region minus the costs of migration is larger than the returns from staying at the location of origin (Zimmerman and Bauer, 2002). Every potential migrant evaluates risks and costs (which include psychological costs as well as monetary costs) individually based on her characteristics. According to this framework, the likelihood of migration decreases with age as the lifetime gains for older migrants are relatively small, increases with education levels, as higher education implies reduced risk due to better information collecting and processing, and risks associated with migration are expected to increase with distance as collecting relevant and true information will be relatively difficult for distant locations (Zimmerman and Bauer, 1999). This approach suggest that along with market variables such as unemployment rates, the characteristics of individuals should also be considered as large heterogeneity is bound to exist among migrants.

Most of the theoretical foundation of the migration literature in economics regarding developing countries relies on the seminal work of Harris and Todaro (1970) on rural-urban migration, which may be classified as an extension of the classical approach. Their model is based on the expected rather than actual wage differentials between the rural and urban sectors and the probability of finding a job for a potential migrant, which is determined by the unemployment rate in the urban sector. Therefore, the most important determinant of migration in this model is the wage differential weighted by the probability of finding employment in the destination. Acoording to the Harris-Todaro model, lower wage differentials between the two sectors imply lower migration rates, and higher probability of finding a job in the urban sector induces migraiton from rural to urban areas. Thus, rural development to reduce rural to urban migration may be suggested as a policy implicaiton to control migration. Some short-comings of the model are stated by Ghatak et. al. 1996 as follows:

- The model cannot explain the migration of uneducated and unskilled labor, which is quiet common in developing countries, due to for example population pressure on a fixed land.

- Individual decisions that are considered to be rational may have severe adverse effects socially. Migraition has positive social effects if labor transfer from rural to urban areas occur. However, in the Harris-Todaro framework, the net transfer of labor does not occur since urban unemployment is fixed.

- The suggestion to develop the rural sector to reduce migration may be more complex to implement, as an initial attempt to improve the rural areas will provide some people the funds with which to migrate rather than creating an incentive to stay.

The implications of information asymmetry between the potential employees and employers is also emphasized in the literature (Stark, 1991). Even if the potential migrant is fully aware of her skills, it is quiet likely that the employers in the destination region will not have full information about the migrants. This, according to Zimmerman and Bauer (1999), creates an asymetry that in the short-run implies a reduction in both the quality and quantity of migrants, which diminishes in the long-run as employers learn about the true skills of the workers and the workers receive wages accordingly.

The network models of migration offer a dynamic approach to migration(Massey and España, 1987; Massey, 1990a, 1990b;Bauer and Gang, 1998). Migration in these models is dynamic in the sense that, both the monetary and social costs of migration may be lowered by the increased information from previous migrants. Simply, the first mover to a region faces high costs and risks due to the lack of reliable information. However, the migrants which are related to the first mover (family, friends even people living in the same region) that follow her will have both reduced costs and risks due to the forming of a network. On top of providing better information, the first mover may aid in the job search of a migrant, thus increasing the probability of finding employment substantially (Yap, 1977). The convergence to equilibrium and thus reduction in the economic incentives of migration outweighs the positive network effects at a point, slowing and eventually stopping migration flows. In this framwork when compared to the classical approach, economic benefits and costs are rather less important than the the network effects. And they are harder to test since they offer a dynamic framework that every migrant affects both the social and economic structure in which the subsequent decisions are made (Zimmerman and Bauer 1999) Mincer (1978) shifts the focus from an individual to the family as a decision-making. According to this approach, on one hand the costs of migration increase with the size of the household and on the other hand the benefits of migration increase with the number of income earning members of the household. Mincer (1978) goes to show that "family ties" reduces migration, increases the income and employment of husbands whereas it has just the opposite effect on wives. Moreover, he shows that increased labor participation rates of women lead to more marital instability and reduced migration rates as a result of increase in "migration ties".

More recently, the new economics of migration literature that stems from Stark (1991) considers the family as a decision making unit under uncertainty. According to this framework, parallel to the theory of investments in finance, the migration decision is a result of risk diversification of families (Chen et. al. 2003). Families diversify the risks by spreading their assets (income earning members) to different locations. After migration takes place, the members of the family pool and share their income. Thus, in the presence of uncertainty and existence of imperfect correlations between potential locations, the migration decision of a member helps to diversify the risks of a family (Stark, 1991). Furthermore, according to this approach a high income variance at home is also an important determinant of migration. Therefore, high rates of migration without high wage and unemployment differentials may be attributed to uncertainty of income and income inequalites may force families to change the pattern of investments in children (Ghatak et. al. 1996).

2.2 Empirical Work on Turkey

Most empirical research based on aggregate that focuses on Turkish internal migration is conducted by urban planners, hence an emphasis on spatial issues rather than economic issues is observed. Using Turkish provincial migration data from 1970, 1980 and 1985 population censueses, Gedik 1997 points at some conflicting findings in migration literature for developing countries. Gedik shows that, although it is genereally claimed that in developing countries, push-factors such as low rural incomes, inadequate infrastructure, facilities, services etc. fuel out-migration, other factors such as education-skill and information level of the potential rural migrant; transportation and communication facilities and existance of previous migrants who are relatives, friends and people from the same village. In other words, information, ability to take risk and social networks are shown to be as important as the push factors.Moreover she goes on to show that against common beliefs that rural to urban migration is the dominating pattern in developing countries, in Turkey urban to urban migration has surpassed rural to urban migration and furthermore, there is a substantial amount of urban to rural return migration. She also tells that a functional relationship with migration and distance cannot be obtained and that the effect of distance dies down after very short distances (around 40 km from the village to province center) and agents prefer to go to one of the three metropolises(Istanbul, Ankara, Izmir) regardless of distance. As a result of this observation, she claims that psychological distances seem to be more meaningful than the physical distances and if there relatives, friends and people fromthe same village have migrated are present at a distant location, then that location is preferred to a closer location.

In a more recent study, Gezici and Keskin(2005) analyze the interaction between regional inequalities and internal migration in Turkey. Using data from the 1990 population

census, through a least squares regression they find that the Industrial Workforce, Annual Estimated Population Growth, GNP to be significant determinants of the net migration rate. Furthermore, through the use of dummy variables, they test six additional hypotheses on net migration speed. They show that being located in a western region, the level of socioeconomic development of a province (as measured by the State Planning Organization), being located on a coastal area, being developed in terms of industry and tourism, and having developed provinces as neighbors have a positive impact on net migration speed, while terrorism has a negative effect.

In a related study, using 1990 and 2000 census data, Evcil, et. al. 2006 show that, even in the least developed regions of Turkey, urban to urban migration has taken the place of rural to urban migration. Moreover, using stepwise regressions on 1990 and 2000 data, they point at economic factors such as differentials in GNP, to be the most significant determinants of net migration rates among a set of economic and social variables.

3 Determinants of Migration

3.1 Data, Geographical Scale and Units

Throughout this study we define a migrant to be a person over the age of 4, who has changed her permanent residency during five-years, between two consecutive population census days. Emprical works on migration may be classified into two as relying on micro-level(individual) and macro-level(aggregate) data. The data used in our analyses and estimations fall into the second category. Our principal sources of data are from the population censuses of 1990 and 2000, supplied by the Turkish Statistical Institute (TURKSTAT). The dataset is the most detailed province level data available covering periods 1985-1990 and 1995-2000. An important note about our dataset is that the frequency of population censuses have decreased from 5 to 10 years after the 1990 census of population.

Turkey is divided into 26 regions according to The Nomenclature of Territorial Units for Statistics (NUTS) level 1 classification and 12 regions according to the NUTS level 2 classification. Most of the variables used in this study are at province (il) level, which corresponds to NUTS level 3. Note that the number of provinces were not constant over the period we are concerned with. The number of provinces have increased from 67 to 73 between 1985 and 1990, and 73 to 81 from 1990 until the 2000 census. The list of the new provinces and the provinces they were seperated from are given in the table below.

3.2 Desriptive Statistics and Characteristics of Migrants

Starting from 1950s, migration has shaped the population distribution in Turkey, implying a dramatic population shift between villages and cities. On the other hand, the flow of

1990		2000	
New Prov.	**Org. Prov.**	**New Prov.**	**Org. Prov.**
Aksaray	Niğde	Bartın	Zonguldak
Bayburt	Gümuşhane	Ardahan	Kars
Karaman	Konya	Iğdr	Kars
Kırıkkale	Ankara	Yalova	Istanbul
Batman	Hakkari	Karabük	Zonguldak
	Mardin	Kilis	Gaziantep
	Siirt	Osmaniye	Adana
Şırnak	Hakkari	Düzce	Bolu
	Mardin		
	Siirt		

Table 1: List of New Provinces. 1985-1990, 1990-2000

migration has changed significantly since the 1950s. In the early stages, rural to urban migration appeared to be the dominant migration pattern in Turkey . Flow of migrants from rural to urban areas that has started in the fifties as a result of the changes in the economic and social structure in rural areas has been considered frequently in the literature (Tekeli, 1998). In the later periods though, rural to urban migration significantly slowed and urban to urban migration has increased remarkably to become the predominant migration pattern. Furthermore, high urbanization rates brought about by rural to urban migration have dropped in the recent years. During the 1965-1970 period, the population growth in Turkey was 2.5% whereas the urbanization rate was 6.03%. These rates have decreased to 1.62% and 4.67% consecutively in 2000 (Evcil et. al. 2006) and moreover, the share of urban population (where urban refers to areas with population of 20,000 or more) has reached 64.9% in 2000. Thus, one may claim that the urbanization period has significantly slowed and rural to urban migration pattern has given way to urban to urban migration (Tekeli 1998).

Looking at the general map of inter-provincial migration for the periods in question, 1985-1990 and 1995-2000, we observe that acoording to the 1990 census of population, out of 73 provinces, 20 had positive net migration. Whereas, in 2000 this number was 23 out of 81 provinces (Figure 2). Furthermore, looking at net migration rates from the two periods, we observe a more or less similar distribution of migrants for both periods (Figures 3,4).

Both the characteristics of migrants and market variables play a significant role in the migration decision (Pissarides and Wadsworth, 1989). We first give here a descriptive analysis of the charactersitics of migrants. As an initial investigation, we look at the statistics for the reasons for migration from the 2000 population census(Note here that they were not available in 1990). Reasons for migration statistics are important in the

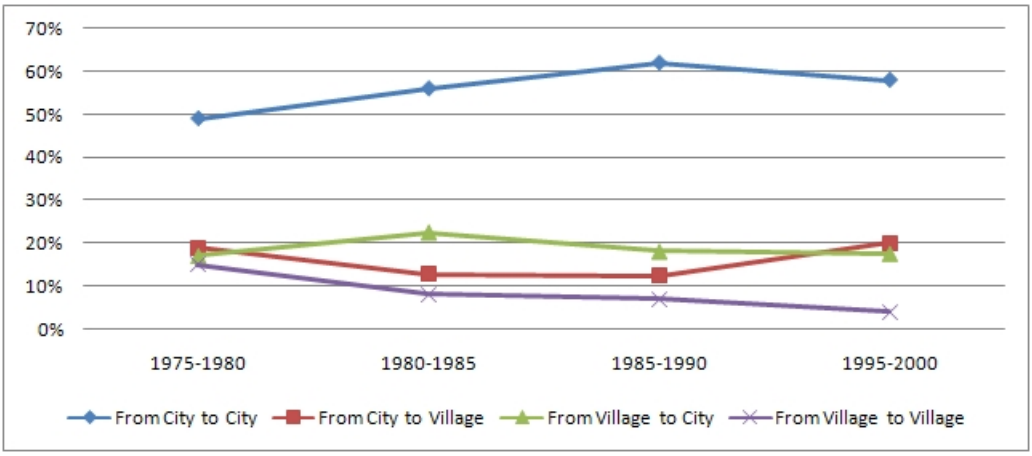

Figure 1: Proportion of migrated population by places of residence, Source: TURKSTAT (2000)

sense that they help to distinguish between labor migrants and individuals moving for other reasons. In Turkey, migration related to a member of the household seems to be the most important reason for migration as 26% of migrants move related to a household member. This is followed by job seeking with 20.31%, designation and appointment with 13.59% and education with 11.71%. However, when we anaylze the two genders seperately, we see a different picture. For male migrants, the most dominant reason is job seeking with 28.45% followed by migration related to a member of the household with 17.25% and designation and appointment with 16.58%. For females on the other hand, migration related to a family member and migration due to marriage together make up 53.24% of the female migrants whereas job seeking females consitute only 9.94% of the female migrants. The difference in the reasons for migration between the two genders may suggest that males, especially as the head of the household are the income seekers in Turkey. Whereas a large part of females are dependents in terms of migration and move along with the family.

When we examine the characteristics of migrants in Turkey, we see that they are consistent with the ones presented in traditional views on migration which suggest that migrants are young, and well-educated individuals (Ghatak et. al., 1996). First, looking at the age structure of migrants, we see that migrants between the ages 15 and 29 make up of more than half of the migrants. Compared to the whole population, for both periods, the "youngest" and "oldest" age groups consitute a significantly lower percentage of migrants, but on the other hand, the ratio of migrants aged between 15-29 (especially for the 20-24 age group) overwhelm the same ratio for the whole population.

The main difference between the two periods is the increase in the ratio of migrants aged between 20 and 24. In connnection with this observation, if we look at the changes

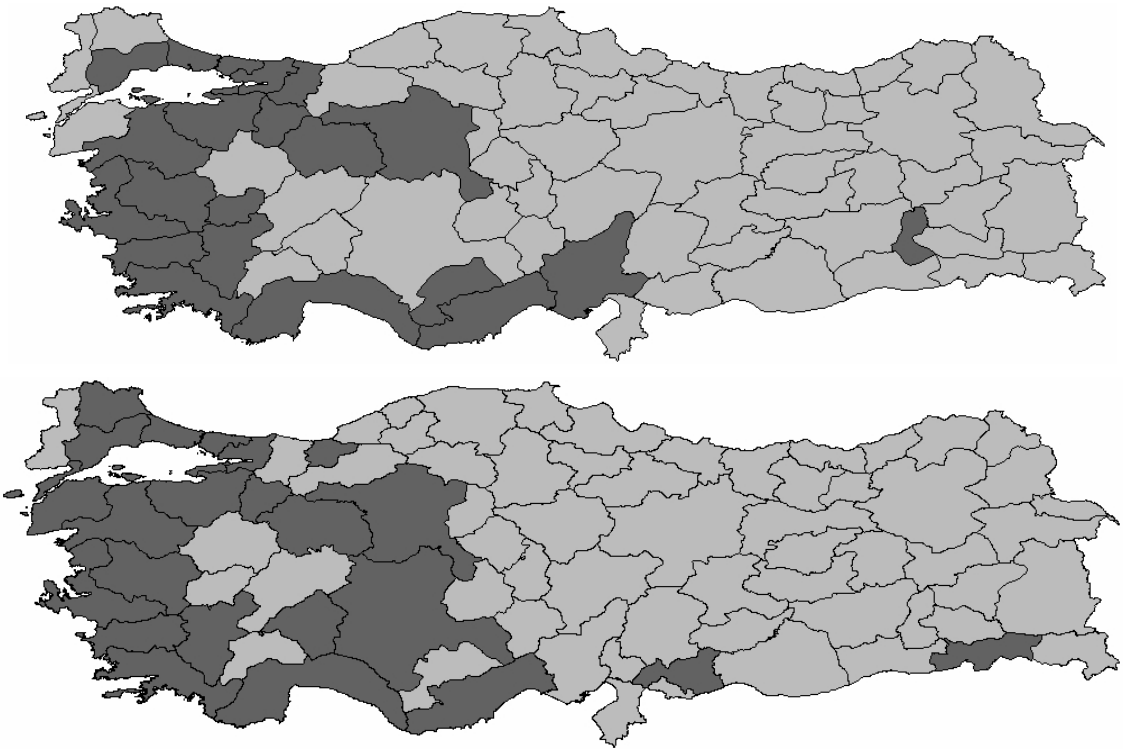

Figure 2: Positive Versus Negative Net Migration,1990 & 2000, *Source: TURKSTAT (1990,2000)*

in the whole population versus the changes in the migrant population for the four age groups covering ages between 15 and 39, we may claim that the average age for a migrant is dropping.

There is also evidence to support that migrants on average are better educated than the general population. Looking at the composition of education levels for bothThe ratio of illiterate migrants is lower than the population and share of the two highest levels of education in the literate population are above those of the general population. Moreover, the increase in these two ratios for migrants from 1990 to 2000 is more than the increase for the whole population.

Employment is a key issue in migration theories. Pissarides and Wadsworth (1989) show that being unemployed may make it more likely for an individual to move. The unemployment rates of Turkish migrants are about one percent higher than the average population for the two periods considered with 6.71% and 9.44% consecutevely. Although the increase in unemplomet rates are parallel to that of the population, there is a great difference in the increase of unemployment rates among male and females. While in 1990 for female migrants, the unemployment rate was lower than males, in 2000 the unemplomet rate for females more than doubled to surpass the unemployment rate for males. However, it is also important to note here that labor force participation differs

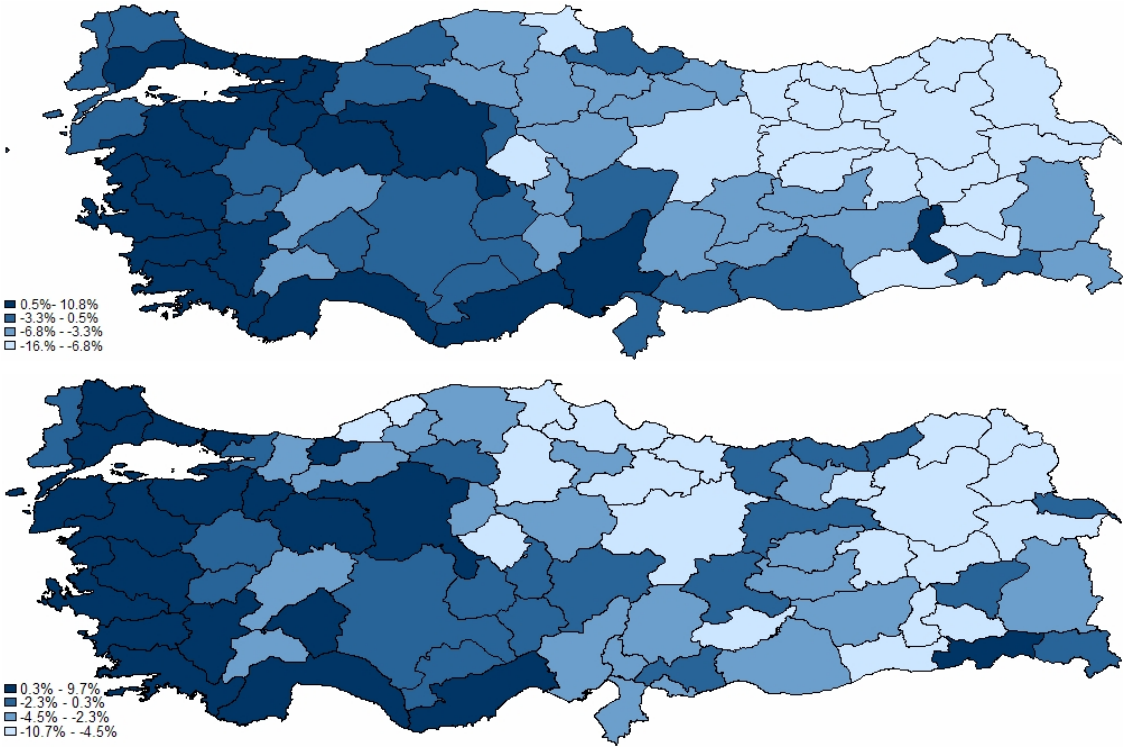

Figure 3: Net Migration Rates, 1990, 2000 *Source: TURKSTAT (1990, 2000)*

significantly among the two genders with 79.3% for males and 29% for females in 2000 for the whole popualation, and 76.3%, 34.5% for male and female migrants consecutively.

	1990		2000	
Age Group	**Population**	**Migrants**	**Population**	**Migrants**
5-9	13.67%	11.84%	11.04%	8.21%
10-14	13.65%	10.76%	11.24%	7.60%
15-19	12.32%	13.20%	11.78%	14.08%
20-24	10.10%	15.88%	10.93%	22.86%
25-29	9.54%	16.72%	9.63%	15.83%
30-34	8.09%	10.03%	8.19%	9.24%
35-39	6.91%	6.66%	7.93%	6.61%
40-44	5.52%	4.37%	6.65%	4.60%
45-49	4.36%	2.94%	5.50%	3.48%
50-54	4.00%	2.18%	4.44%	2.49%
55-59	3.84%	1.86%	3.36%	1.58%
60-64	3.20%	1.44%	2.99%	1.17%
65+	4.79%	2.11%	6.31%	2.23%

Table 2: Age Structure, *Source: TURKSTAT (1990), (2000)*

	1990		2000	
Education Level	**Population**	**Migrants**	**Population**	**Migrants**
Illiterate	14.14%	11.78%	9.80%	6.49%
No Degree	17.45%	14.44%	23.00%	15.54%
Primary Sch.,Junior High Sch.	64.43%	58.62%	50.96%	43.29%
High School	12.90%	17.17%	18.43%	27.32%
Higher Education	5.11%	9.73%	7.58%	13.84%

Table 3: Education Levels *Source: TURKSTAT (1990), (2000)*

Table 4 sheds light to the employment status of migrants. First, notice that out of the employed people, there are significanly more regular casual employees and less unpaid family workers in migrants compared to the whole population in both periods. This is in support of the hypothesis that income differentials are a strong motivation for migrants. Moreover, again we need to differenciate between the two genders. As in 2000 for example, while only 4.64% of employed male migrants were unpaid family workers, 34.59% of females had this status. This might suggest as evidence supporting the hypothesis that males rather than females are the income seekers in Turkey. Differenciating between genders is also crucial when we consider the economic activities of migrants.

Male				
	1990		2000	
Employment Status	**Population**	**Migrants**	**Population**	**Migrants**
Regular/Casual Employee	50.10%	80.19%	54.47%	85.01%
Employer	1.96%	1.74%	3.58%	1.72%
Self Employed	30.66%	13.39%	28.15%	8.63%
Unpaid Family Worker	17.26%	4.66%	13.78%	4.64%
Female				
	1990		2000	
Employment Status	**Population**	**Migrants**	**Population**	**Migrants**
Regular/Casual Employee	17.71%	60.36%	24.28%	61.33%
Employer	0.23%	0.46%	0.90%	0.82%
Self Employed	7.29%	6.57%	5.98%	3.26%
Unpaid Family Worker	74.77%	32.60%	68.84%	34.59%

Table 4: Employment Status, *Source: TURKSTAT (1990), (2000)*

A significant part of the population is involved with agriculture, especially considering females. However for migrants this portion is relatively small, while all other economic activies constitute a higher portion of the migrant population. Male migrants concentrate on community, social and personal services, trade, manufacturing, agriculture and construction. While female migrants concentrate on agriculture, social and personal services, manufacturing followed by trade related activities (Table 5).

Male				
	1990		2000	
Economic Activity	**Population**	**Migrants**	**Population**	**Migrants**
Agriculture	37.72%	10.72%	32.86%	10.38%
Mining	0.86%	0.97%	0.56%	0.54%
Manufacturing Ind	14.84%	17.59%	16.01%	14.03%
Electricity, Gas, Water	0.50%	0.53%	0.54%	0.49%
Construction	7.84%	14.68%	7.10%	10.17%
Trade, Restaurants, Hotels	11.46%	12.59%	13.08%	11.00%
Transport,Communication,Storage	4.92%	4.98%	4.77%	3.27%
Financial and Related	2.59%	3.92%	3.28%	3.81%
Community, Social, Personal Services	18.47%	32.42%	21.62%	46.31%
Female				
	1990		2000	
Economic Activity	**Population**	**Migrants**	**Population**	**Migrants**
Agriculture	82.07%	43.03%	75.64%	42.09%
Mining	0.02%	0.06%	0.03%	0.04%
Manufacturing Ind.	6.66%	12.81%	6.62%	11.14%
Electricity, Gas, Water	0.07%	0.18%	0.09%	0.13%
Construction	0.13%	0.47%	0.21%	0.31%
Trade, Restaurants, Hotels	1.64%	3.81%	3.66%	5.71%
Transport,Communication,Storage	0.46%	1.48%	0.67%	1.22%
Financial and Related	1.83%	4.96%	2.80%	5.07%
Community, Social, Personal Services	6.88%	32.32%	10.23%	34.28%

Table 5: Economic Activity, *Source: TURKSTAT (1990), (2000)*

3.3 Econometric Estimations And Results

3.3.1 A Gravity Approach To Internal Migration In Turkey

In this section, in light of the existing economic theories of migration and the desrciptive analyses in the previous section, we define and estimate a gravitational model of migration.

The gravity model of migration defines migration flows to be a function of origin and destination specific repulsive and attractive factors combined multiplicatively with some form of distance deterence function. Basic macro migration equation form of the gravity model may be written as:

$$M_{ij} = A_i B_j f(D_{ij}) \tag{1}$$

The subscripts i, j denote the areas of origin and destination respectively, M_{ij} is the number of migrants that have moved from i to j, D is the distance between i and j which affect migration flows in some monotonic inverse function $f(.)$, and A_i and B_j are origin and destination specific push and pull factors (Molho, 1986).

The most attractive feature of the gravity model is its generality. Although the gravity model fails to contribute to migration theory directly, it presents a general framework which makes it possible to test a significant number of the ideas presented by migration theories empirically. Though a gravity model can be formulated to reflect many features stated by different strands of the theory, the main arguement against the gravity model is that the aggregation in the model implicitly fails to incorporate the heterogeneity present in the population.

The gravity model may be derived through a system of demand and supply equations(Zimmerman and Bauer, 1999; Karemera et. al. 2000):

$$M_{ij} = f(S_i, D_j, C_{ij}) \tag{2}$$

The migration flow M_{ij} from the origin province i to the destination province j is a function of supply-push factors at home S_i, demand-pull factors in the destination D_j and the costs associated with moving from i to j, C_{ij}, which takes place of the distance deterrence function presented in the basic gravity model.

The fundemental supply and demand functions for migrants and the migration function may be defined as follows (Karemera et. at., 2000):

$$S_i = b_0 y_i^{b_1} n_i^{b_2} \tag{3}$$

$$D_j = c_0 y_j^{c_1} n_j^{c_2} \tag{4}$$

$$M_{ij} = \frac{a_0 S_i^{a_1} D_j^{a_2}}{C_{ij}^{a_3}} \tag{5}$$

Where $y_i(y_j)$ is the income in the province of origin(destination) and $n_i(n_j)$ is the size of the population of the province of origin(destination). and C_{ij} in Equation 5 represents the costs assosicated with moving from i to j. The exponents in the equations are the migration elasticities. The multiplicative nature of the model allows for linearizing through taking natural logarithms. Thus, taking logs on both sides the double log base model to be estimated becomes:

$$\ln M_{ij} = \beta_0 + \beta_1 \ln POP_j + \beta_2 \ln POP_i + \beta_3 \ln INC_j + \beta_4 \ln INC_i + \beta_5 \ln DIST_{ij} + z(.) \tag{6}$$

Our dependent variable m_{ij} is the gross migration flow between the province of origin i and destination j with $i \neq j$. We have used gross rather than net migration flows since if in and out migration flows are correlated, net migration cannot seperate the push and pull factors responsible for the gross migration flow in both directions (Zimmerman, 1999).

We control for the popuations of the origin (POP_i) and destination (POP_j) in our regressions, both of which are expected to have a positive effect on migration. CPI weighted GDPs are used as our income variables INC_i and INC_j. It has both theoretically and

empirically been shown numerous times that lower income at the province of origin would push people out to provinces with higher income.

We use the distance measured by the the length of the roads in kilometers between two provinces as a proxy for $DIST_{ij}$, the cost associated with moving from province i to province j. An increase in the distance between two provinces is expected to discourage migration from province i to province j, as increased distance would imply both increased physical and psychological costs associated with moving.

$z(.)$ is a function that includes all the economic and social attributes of the sending and receiving provinces apart from those defined in our supply and demand equations (Schultz, 1982). After identifying the elements of $z(.)$ our extended gravity equation that we estimate becomes:

$$\ln M_{ij} = \beta_0 + \beta_1 \ln POP_j + \beta_2 \ln POP_i + \beta_3 \ln INC_j + \beta_4 \ln INC_i + \beta_5 \ln DIST_{ij} + \beta_6 U_j + \beta_7 U_i + \beta_8 YNG_i + \beta_9 SCH_i + \beta_{10} NW_{ij} + \beta_{11} REG + \beta_{12} IST \quad (7)$$

U_i and U_j are the unemployment rates of the origin and destination provinces respectively. Although it is common practice to include unemployment rates to incorporate employment opportunities in migration models in a simple manner, some conflicting emprical results regarding unemployment rates and migration are present in the literature. Opposite of what the theory predicts, some studies find that the correlation between migration flows and unemployemnt are positive (Fields, 1979; Pissarides and McMaster, 1990). Fields, 1976 attributes this ambiguity to mainly to the use of aggregate data and the fact that general unemployment rates belong to "the entire stock of workers". Keeping this in mind, in line with the theory, we expect that a rise in the unemployment rates of the province of origin will have accelerate out-migration from that province and a rise in the unemployment rate of the province of origin will deter migration to that province.

YNG_i represents the share of young people in the population. Namely, it is the ratio of persons aged between 12 and 25 to the whole population in the sending province, which expected to be positively correlated with migration. According to the human capital framework, as younger agents have a longer life expectancy, the present value of income diffrences is greater thus a higher rate of migration is expected as the ratio of young people increase in a province. However, Lucas 1997 points at a slightly different pattern regarding age and migration based on the Rogers-Castro curve. According to the Rogers-Castro curve, the peak of migration occurs in early adult years and falls sharply after the early twenties, a fact contradicting with the human capital framework. SCH_i is our human capital variable, which is proxied by average years of schooling in the province of origin, again consistent with the human capital framework, we expect average years of schooling to have a positive effect on migration. It is important to note here that, Zimmerman

and Bauer, 1999 point that the results about the coefficients of these variables should be approached with caution. As schooling and age are individual characteristics and human capital framework is based on an individual decision, the use of aggregate data may "mask" some features of the individual migration decision.

One of the key variables in our regression is NW_{ij} the stock of people that have migrated from province i to j prior to the period of question. This variable measures the impact of social networks on internal migration. Lucas, 1983 p. 743 states that:

> A substantial amount of evidence indicates an empirical regularity: persons having access to kinship and other networks at a place of destination are more likely to choose that place.

The presence of networks may effect potential migrants from several angles. First, presence of networks greatly reduces psychological costs associated with migration and financial costs associated with resettling. Furthermore strong network ties also enhance information available to migrants, which both plays a role in the migration decision and substantially speeds up the job search process (Lucas, 1997). Therefore, not only do we expect that the coefficient of NW_{ij} to be positive, considering the strong family and local ties in Turkey, we expect the magnitude of this coefficient to be high in particular.

REG and IST are dummy variables that measure within region migration and migration to Istanbul respectively. We expect both of these geographic dummy variables to have a positive effect on migration.The interesting question here would be the difference between the two periods in question for these two variables especially for the IST dummy since although Istanbul has been the main destination for migrants for several decades, it would be interesting to see if this bias is starting to die down.

Because our data is restricted only to two consecutive periods, we pooled the data to estimate both the base model and our extended gravity model. The results are presented in the table below. The first two columns contain the results of our base model estimations and the last two columns are from the estimation of the extended model. The variables in the first column are the estimation results for the year 1990 and the variables in the second column represent the change in these variables for the year 2000. Since migration affects the economic conditions in the sending and receiving regions the data used in our estimations are drawn from the previous years of question, the base years of migration (Fields, 1979). Thus to estimate gross migration flows for the year that occured between 1985 and 1990, we used the data from the 1985 census. As previously mentioned, the frequency of population censuses has decreased from 5 to 10 years in 1990 as a result, although the gross migration flows from the 2000 census cover the years 1995-2000, we had to take 1990 as our base year for the migraton flow and used data from the 1990 census. Working with data from previous periods causes a difference in the number of

observations since the number of provinces have increased from 67 to 73 from 1985 to 1990 and from 73 to 81 between 1990 and 2000. To tackle this problem, rather than dropping the new provinces, we assigned the new provinces the data from the provinces they were seperated from.

Base Model			**Extended Model**		
Variable	1990	Δ2000	Variable	1990	Δ2000
POP_j	0.719***	0.153***	POP_j	0.652***	0.177***
	(0.0295)	(0.0341)		(0.0274)	(0.0322)
POP_i	1.067***	-0.140***	POP_i	1.073***	-0.187***
	(0.0295)	(0.0335)		(0.0334)	(0.0371)
INC_j	0.157***	-0.0614***	INC_j	0.155***	-0.0616***
	(0.0199)	(0.0230)		(0.0182)	(0.0211)
INC_i	-0.168***	0.140***	INC_i	-0.327***	0.294***
	(0.0218)	(0.0244)		(0.0309)	(0.0337)
$DIST_{ij}$	-0.468***	-0.0419	$DIST_{ij}$	-0.295***	-0.0557*
	(0.0252)	(0.0308)		(0.0279)	(0.0333)
		Observations: 11736	U_j	-5.149***	-1.784**
		R^2: 0.631		(0.796)	(0.888)
			U_i	3.125***	-1.315
				(0.900)	(0.998)
			YNG_i	4.042***	0.901
				(0.857)	(1.049)
			SCH_i	0.0780***	-0.111***
				(0.0294)	(0.0333)
			NW_{ij}	1.37***	0.649*
				(0.197)	(0.370)
			REG	0.763***	-0.157**
				(0.0613)	(0.0724)
			IST	1.826***	-2.169***
				(0.131)	(0.193)
					Observations: 11736
					R^2: 0.684

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Regression Results (Total)

Looking first at the results for the base model, all the variables have the expected signs and are significant at 1% level for the first period. The model explains 64% of the variation in gross migration. Apart from the negative change in the migration elasticity of distance, change in all the variables in the the second period are significant. The change in both of our income variables are not only significant but also are such that they show the impact of income on migration has been lowered for 2000.

Moving to our extended gravity model, all the estimated coefficients are statistically significant at 1% level and have the expected signs. The extended model explains the variation around 5% better. Looking at changes in the variables for 2000, we observe

that except for the age variable and the unemployment rate of the province of origin, all variables have significantly changed in 2000. Starting with our population variables, while the positive effect of the population of the receiving province seems to have increased, the effect of the population of the province of origin has decreased. Both the positive effect of income in the destination province and the negative impact of income in the province of origin have become significantly less effective. On the other hand the negative effect of the unemployment rate of the destination province has increased. The positive impact of our network effect variable has increased however this change is significant only at the 10% level. The effect of both Istanbul and regional dummies have significantly decreased pointing that migrants are considering a wider set of alternative locations besides Istanbul and close within region provinces. In comparing the base and extended gravity models, it is also important that only the negative impact of distance on migration drastically decreases when we extend our equation, while the coefficients of population and income variables are more or less the same in both variables. This shows that, the negative effect of costs of migrating decrease with our additional variables such as schooling and the network effects variable as the theory predicts.

The difference between the characteristics of male and female migrants was briefly pointed out in the previous section. To further pursue that point, we have disaggregated our data to estimate the determinants of gross number of male and female migrants seperately. Since males seem to constitute a greater percentage of labor migrants, our initial expectations would be that the effects of the economic variables and schooling to be stronger for males. Although we still expect that the income variables have an impact on female migraiton, we moreover expect the effects of distance variable and the regional dummy to be stronger for females, which would suggest the closer inter-provincial marriage motivation of females. Marriage in developing economies is important in the sense that it may be thought as a form of insurance especially for rural families (Rosenzweig and Stark, 1989). Placing family members may help diversify the income sources if there is a large variance between two locations, as in-laws are a major source of income especially in rural areas.

Except for the population variables, schooling and the share of young people in a province which are proxies for individual characteristics, all the independent variables are for the general population as we assume that agents observe the unemployment rates, the existing stock of migrants and income of the population as a whole rather than gender specific values. Moreover, both the unemployment rates and income of females might be misleading due to the high number of females working as unpaid family workers and low labor participation rates due to the fact that most females who are working as unpaid family workers are not registered in the labor force.

The variables in the base model for both genders are highly statistically significant

Base Model			**Extended Model**		
Variable	1990	Δ2000	Variable	1990	Δ2000
POP_j^m	0.759***	0.157***	POP_j^m	0.688***	0.181***
	(0.0289)	(0.0332)		(0.0269)	(0.0315)
POP_i^m	1.094***	-0.119***	POP_i^m	1.063***	-0.138***
	(0.0289)	(0.0327)		(0.0319)	(0.0354)
INC_j	0.107***	-0.0741***	INC_j	0.111***	-0.0766***
	(0.0189)	(0.0219)		(0.0174)	(0.0203)
INC_i	-0.200***	0.133***	INC_i	-0.315***	0.256***
	(0.0215)	(0.0239)		(0.0281)	(0.0304)
$DIST_{ij}$	-0.431***	-0.0222	$DIST_{ij}$	-0.264***	-0.0440
	(0.0242)	(0.0294)		(0.0271)	(0.0322)
		Observations: 11736	U_j	-5.116***	-1.365
		R^2: 0.639		(0.764)	(0.848)
			U_i	3.301***	0.138
				(0.842)	(0.921)
			YNG_i^m	1.890***	-0.0930
				(0.432)	(0.550)
			SCH_i^m	0.0829***	-0.122***
				(0.0251)	(0.0297)
			NW_{ij}	1.38***	0.480
				(0.195)	(0.348)
			REG	0.718***	-0.167**
				(0.0596)	(0.0701)
			IST	1.762***	-2.039***
				(0.129)	(0.185)
					Observations: 11736
					R^2: 0.689

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Regression Results (Male)

and have the expected signs. The model explains the variation in the gross number of migrants for males slightly better than females. Comparing the coefficients in the two models for the first period, all of our economic variables except for the unemployment rate of the receiving province, are stronger for females. This may be explained by the fact that males only bring their families if the economic conditions in the destination province strong enough to support the whole family. On the other hand, the effect of schooling is both weaker and not as significant for females as it is for the males. Furthermore, the effect of the share of the young female population seems to be close to three times as it is for males, females seem to be more effected by distance and within region migration dummy is stronger for females. This also is in support of the above remark, as males venture further to seek jobs or higher income, females move with the family or for marriage purposes to closer destinations.

Base Model			Extended Model		
Variable	1990	Δ2000	Variable	1990	Δ2000
POP_j^f	0.749***	0.165***	POP_j^f	0.676***	0.196***
	(0.0317)	(0.0367)		(0.0298)	(0.0351)
POP_i^f	1.100***	-0.215***	POP_i^f	1.074***	-0.211***
	(0.0324)	(0.0368)		(0.0358)	(0.0401)
INC_j	0.161***	-0.000710	INC_j	0.159***	0.00254
	(0.0216)	(0.0251)		(0.0201)	(0.0234)
INC_i	-0.192***	0.213***	INC_i	-0.328***	0.313***
	(0.0240)	(0.0270)		(0.0351)	(0.0387)
$DIST_{ij}$	-0.557***	-0.0675**	$DIST$	-0.361***	-0.0706**
	(0.0265)	(0.0327)		(0.0294)	(0.0356)
		Observations: 11736	U_j	-4.433***	-2.468***
		R^2: 0.634		(0.849)	(0.956)
			U_i	4.456***	-1.205
				(1.055)	(1.203)
			YNG_i^f	4.603***	-3.922***
				(1.264)	(1.503)
			SCH_i^f	0.0449**	0.0122
				(0.0215)	(0.0257)
			NW_{ij}	1.34***	0.775**
				(0.197)	(0.382)
			REG	0.812***	-0.123
				(0.0646)	(0.0778)
			IST	1.839***	-2.400***
				(0.137)	(0.203)
					Observations: 11736
					R^2: 0.680

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Regression Results (Female)

3.3.2 Migration Under Uncertainty

We incorporate the effect of uncertainty in our model through direct measures of risk, income correlations and variance. Here we consider the family as a decision making unit rather than a risk-neutral individual. The main idea is that migration may be viewed as an opportunity to diversify risks for the family through allocating its members to alternative locations where incomes are highly but not positively correlated. As a result, migration may occur even if there are no significant income differentials present between home and alternative destinations. Building on this idea, Daveri and Faini (1999) derive a model of family migration under uncertainty. The important features of their theoretical model are: Non-zero correlation between incomes earned in different locations, concave mobility costs (which ensure that all members of the family migrate to the same location) and heterogeneous tastes for location across households (which ensures that different families

from the same location migrate to different locations) (Daveri and Faini, 1999). The two propositions they derive from their theoretical model are as follows (Daveri and Faini, 1999, pp. 602,603):

Proposition 1 *A rise in the correlation of incomes earned at home and at an outside region leads to a decline of migration to that region and an increase in migration to an alternative outside region*

Proposition 2 *A rise of home income variability has in general an ambiguous effect on total migration as well as migration to any destination i. However, the following sufficient conditions hold:*

1. *If ρ_D and ρ_F are both negative, then higher income variability at home results in higher total migration;*

2. *If $\rho_i < 0$ and $\rho_i < \rho_j$, with $j \neq i$, then higher income variability at home results in a rise of migration to destination i.*

To understand the first proposition, suppose that the correlation between the destination of origin and an alternative region i increase, making i a less attractive location to diversify risk, and the marginal benefit of moving to i decreases. Thus this results in an increase in migration to another alternative location j, where $j \neq i$.

ρ_D and ρ_F in sufficiency condition for the second proposition are the correlations between home and alternative destinations D and F. Similarly ρ_i is the correlation between destination i and ρ_j is the correlation between destination j. The second proposition points that unless the sufficiency conditions hold, the effect of the income variance at home is ambigious.

Daveri and Faini, test their model using province level panel data on emigrations from Southern Italy to two alternative destinations, Northern Italy(The domestic destination) and Germany (The foreign destination) using direct measures of risk, namely correlations of income between home and the domestic and foreign destination incomes, and income variance at home. They estimate migrations from Southern Italy to Northern Italy and Germany seperately, controlling for expected income and other factors such as unemployment, age, education, home income variance and shares of the population working in agriculture and construction. Their results show that the first propositon holds for both domestic and foreign emigrations.

We extend our gravity model based on this approach. On top of the extended gravity model we previously estimated, we include the home variance α_i, ρ_{ij} the correlation between the income of the province of origin and income at province j and the correlation between the income of province of origin and the rest of the country excluding province

j, ρ_{iC}. The idea behind including ρ_{iC} is that it covers all the alternative destinations apart from province j. All of our risk variables are calculated over the previous ten years of question. Parallel to Daveri and Faini 1999, we expect that a rise in ρ_{ij} will decrease migration to j so it has a negative sign and an increase in ρ_{iC} will have just the opposite effect.

Extended Gravity Model Under Uncertainty		
Variable	1990	Δ2000
POP_j	0.608***	0.243***
	(0.0278)	(0.0333)
POP_i	1.092***	-0.126***
	(0.0348)	(0.0403)
INC_j	0.148***	-0.0615***
	(0.0180)	(0.0210)
INC_i	-0.309***	0.212***
	(0.0317)	(0.0364)
$DIST$	-0.283***	-0.0749**
	(0.0279)	(0.0333)
U_j	-4.993***	-2.286***
	(0.789)	(0.886)
U_i	3.198***	-1.560
	(0.907)	(1.008)
YNG_i	4.331***	0.0184
	(0.853)	(1.053)
SHC_i	0.0810***	-0.0873***
	(0.0292)	(0.0338)
NW_{ij}	1.34***	0.666*
	(0.216)	(0.378)
REG	0.757***	-0.152**
	(0.0608)	(0.0720)
IST	1.903***	-2.246***
	(0.133)	(0.193)
ρ_{ij}	0.286***	-0.353***
	(0.0307)	(0.0366)
ρ_{iC}	-0.331***	0.357***
	(0.0362)	(0.0582)
α_i	-0.0000839	0.000149
	(0.000332)	(0.000332)
		Observations: 11736
		R^2: 0.688
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 9: Regression Results, Model Under Uncertainty

Looking at the results, we observe that not only signs of both the variables of interest are opposite of our expectations, but also they are highly significant for the first period. Furthermore, when we extend our equation to include risk measures, the explanatory increase in the explanatory power of the model is only 0.4%. However, when we look at the changes for the year 2000, we observe that the coefficients of both of the correlation variables change significantly. The magnitude of the change is such that when we add up the estimated values for our coefficients, we observe that for the year 2000, the signs of the coefficients turn out to be consistent with our expectations. This may be due to the fact that as information became more available for the later period, families started

considering the second moment of income as well as the first. However, the results of our extended uncertainty model may not be reliable due to the use of highly aggregated data.

4 Conclusion and Remarks

In this study, we have provided an overview of the determinants of internal migration in Turkey. First, using data from the 1990 and 2000 population censuses, we gave a desrciptive analysis of the characteristics of Turkish migrants. These statistics show that the characteristics of Turkish migrants are in line with the stylized facts about migrants. That is, they are income seekers who are younger and better educated when compared to the whole population. However, there is a significant difference between the two genders.

Based on our gravity equation estimations, we can conclude that the results on Turkey's internal migration are more or less parallel to the suggestions of several strands of theory. That is, income differentials, distance, unemployment rates, age, achooling presence of social networks and distance play an important role in migration. Moreover there is a difference among genders in the determinants of migration. Although our regression results cannot clearly point at males as the dominant income seeker and females as dependent migrants, we believe that this is a point that needs to be elaborated.

The effect of uncertainty is incorperated in our model using direct measures of risk. Although the results for the year 2000 are as expected and income correlations seem to play a significant role on migration, these results should be approached with caution due to the use of aggregate data.

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