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A Re-examination of Lowry's Hypothesis for Turkish Case

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**A RE-EXAMINATION OF LOWRY'S HYPOTHESIS
FOR TURKISH CASE**

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Abstract

The results of this paper imply that Gedik's argument on the Lowry's hypothesis is not valid for Turkish case, migration patterns do not approximate those estimated for the developed countries. The findings of the paper can be summarized as follows: (1) The correlation coefficient between net-migration and out-migration rates was found to be -0.855 for all provinces. For provinces with positive net-migration, it was found to be -0.185 , but statistically insignificant. It was -0.938 for provinces with negative net-migration. (2) The correlation coefficient between net-migration and in-migration was 0.945 for provinces with positive net-migration and 0.799 for all provinces. (3) The correlation coefficient in- and out-migration rates was -0.370 for all provinces, 0.136 for provinces with negative net-migration and 0.146 for provinces with positive net-migration, but statistically insignificant.

1. INTRODUCTION

Lowry's (1966) hypothesis indicates the predominance of in-migration and the relative insignificance of out-migration with regard to the net-migration rates. In the literature, there has been a body of studies which attempted to empirically test the Lowry's proposition, following Lowry's study (Alonso, 1971, 1972; Beale, 1969; Cordey-Hayes and Gleave, 1973, 1974, 1975; Kriesberg and Vining, 1978; Plane, Rogerson and Rosen, 1984; Gedik, 1992).

One of the previous empirical studies was provided by Gedik (1992). Gedik investigated the hypothesis for Turkey during the periods of 1965-70, 1975-80 and 1980-85. Her findings were contrary to the findings for developed countries. Her findings on the Turkish case demonstrated that out-migration rate was more related to net migration than was the case for in-migration rate. So, the correlation coefficient between net-migration and out-migration rate was -0.81, -0.88 and -0.76, respectively. For in-migrations rate, it was 0.44, 0.52 and 0.35. In the same study, Gedik has argued that in the future Turkish case will come to resemble the developed countries since she expected that a) out-migration will depend more on demographic characteristics than on push-factors, b) out-migration rate will increase as the urban centers become attractive, and c) net migration will be determined by in-migration (Gedik, 1992, p. 418).

The main objective of this study is to re-examine both Lowry's hypothesis and Gedik's argument on the hypothesis for the Turkish case over the period of 1985-90 by employing both correlation and regression analyses. Another objective of the study is to compare our findings with those of Gedik in terms of the validity of the Lowry's hypothesis.

2. METHODOLOGY AND DATA

In this study, two different techniques were used to determine the effects of migration on the urban growth. The first one is regression analysis and the second one is correlation analysis. In the regression analysis, the general model was specified as follows.

$$Y_i = \alpha + \beta X_i + \varepsilon_i \quad (1)$$

This general simple regression equation was run under different measures of dependent and independent variables constituting seven alternative models.

- **Model 1:** In this model, the dependent variable of the regression equation (Y) represents net-migration quantities while independent variable (X) represents both in-migration and out-migration quantities, separately. This regression equation was run for 61 provinces (which is called Model 1A), for 17 provinces that have positive net-migration quantity (Model 1B) and for 44 provinces that have negative net-migration quantity (Model 1C). Therefore, in Model 1 six different regression equations have been constructed and run.
- **Model 2:** This model uses migration rates instead of quantities in the Model 1. Six regression equations were again constructed and run in this model. The models were named Model 2A for all of 61 provinces, Model 2B for 17 provinces that have positive net-migration rate and Model 2C for 44 provinces that have negative net-migration rate.
- **Model 3:** In this model, the data were restricted only for 16 provinces that have a population over 700.000. Measuring unit for independent and dependent variable in this model is migration rate.
- **Model 4:** Data of this model only cover 23 provinces that have a population between 400.000 and 700.000. Measuring unit is again migration rate.
- **Model 5:** The provinces that have a population under 400.000 have been included in the data set. Measuring unit is again migration rate.
- **Model 6:** This model is a modified version of Model 1. The sample data used in Model 1 have been categorized as male and female. So, four new explanatory variables were obtained. They are in-migration quantity for male migrants, in-migration quantity for female migrants, out-migration quantity for male migrants and out-migration quantity for female migrants. These new series were included into the regression equation as explanatory variables, separately. In this general model, the data were used under three different categories. Model 6A represents 61 provinces, Model 6B for 17 provinces that have positive net-migration rate and Model 6C for 44 provinces that have negative net-migration rate.

- **Model 7:** In this model, measuring unit is migration rate. Therefore, this model can be thought as a modified version of Model 2. In this model again, four new explanatory variables were constructed and each of them has been included in the regression equation as an explanatory variable. As in Model 6, depending on the data three different models were constructed and run. They are Model 7A for 61 provinces, Model 7B for 17 provinces that have positive net-migration rate and Model 7C for 44 provinces that have negative net-migration rate.

All data used in this study come from “*The Census of Population 1990, Social and Economic Characteristics of Internal Migration by Permanent Residence*” published by State Institute of Statistics of Turkey.

3. EMPIRICAL RESULTS

Table 1 reports the coefficient estimates of the regression equations in Models 1-5. When all of 61 provinces are included into the sample, the relationship between net migration and in-migration is found to be positive and statistically significant. For out-migration, the coefficient estimate is statistically significant but negative. These estimates indicate that net-migration rate is almost equally related to in- and out-migration rates in Turkey. The finding of Model 2A that does not support Lowry’s hypothesis is consistent with the results of Gedik in terms of the coefficient sign. However, the evidence, at least at this point, does not validate the expectation of Gedik for Turkey.

When the sample data are restricted only to the provinces with net in-migration, the coefficient estimate is found to be positive for in-migration, negative for out-migration. However, the negative relationship between out-migration and net-migration is statistically insignificant at any acceptable level. The findings on this sample also contradict the results and expectations of Gedik. Model 2C that consists of 44 provinces with net-out migration indicate that the statistically significant relationship exists only for the out-migration. In this model, the relationship between net-migration and in migration is estimated to be positive. But it is not significant. The overall results of Model 2 can be summarized as follows:

- (a) the relationship between net-migration and in-migration is positive and significant both for all provinces and for the provinces with net in-migration.
- (b) the relationship between net-migration and out-migration is negative and significant both for all provinces and for the provinces with out-migration.

In addition to Model 2, Models 3-5 are constructed and run separately by categorizing the provinces in terms of the size of population. According to all three models, the effect of in-migration on net-migration is positive. However, when the coefficient estimates are compared in terms of the size, it is easily observed that the effect of in-migration on net-migration increases as the population of the provinces decreases. The same models also imply that out-migration rate affects net-migration rate. The effect is found to be negative and significant in all three models. In this case, it is also found that the effect of the out-migration rate on net-migration rate decreases as the population decreases. From the overall findings of Model 3-5, it is possible to conclude that population size of the provinces is not sensitive to the validity of Lowry's hypothesis. So, the results of all three models confirm the findings of Model 2A that employs all 61 provinces; negative effect of out-migration and positive effect of in-migration on net-migration rate.

Table 2 presents the regression coefficient estimates of Models 6-7. The difference between models 1-2 and models 6-7 comes from the sample used to estimate the regression equations. In models 6-7 sample data are divided as male and female population. Model 6 employs unit of quantity while the unit in Model 7 is rate as in Model 2. Therefore, Models 6 and 7 can be compared to Models 1 and 2, respectively. According to estimation results, Models 6 and 7 do not differ from Models 1 and 2 respectively in terms of validity Lowry's hypothesis.

TABLE 1. Results of Regression Analysis of Models 1-5

	Coefficient estimates of In-migration ($\hat{\beta}$)	Coefficient estimates of out-migration ($\hat{\beta}$)
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Model 1		
Model 1A	0.705 ^a	1.485 ^a
Model 1B	0.676 ^a	1.981 ^a
Model 1C	-0.117	-0.766 ^a
Model 2		
Model 2A	1.429 ^a	-1.320 ^a
Model 2B	0.951 ^a	-0.561
Model 2C	0.617	-0.951 ^a
Model 3		
	1.287 ^a	-1.732 ^a
Model 4		
	1.371 ^a	-1.390 ^a
Model 5		
	1.515 ^a	-1.151 ^a

Note: "a"; statistically significant at 1% level.

TABLE 2. Results of Regression Analysis of Models 6-7

	Coefficient estimates of in-male-migration ($\hat{\beta}$)	Coefficient estimates of in-female-migration ($\hat{\beta}$)	Coefficient estimates of out-male-migration ($\hat{\beta}$)	Coefficient estimates of out-female-migration ($\hat{\beta}$)
Model 6				
Model 6A	1.148 ^a	1.345 ^a	2.115 ^a	2.702 ^a
Model 6B	1.114 ^a	1.306 ^a	2.477 ^a	3.306 ^a
Model 6C	-0.340	-0.107	-1.040 ^a	-1.275 ^a
Model 7				
Model 7A	2.483 ^a	2.857 ^a	-2.485 ^a	-2.727 ^a
Model 7B	1.759 ^a	1.958 ^a	-0.039	-1.654
Model 7C	0.753	1.897 ^a	-1.777 ^a	-1.865 ^a

Note: "a"; statistically significant at 1% level.

TABLE 3. Correlation Coefficients of Models 1-5

	In-migration-Net-migration	Out-migration-Net-migration	In-migration-Out-migration
Model 1			
Model 1A	0.857	0.704	0.970
Model 1B	0.996	0.962	0.982
Model 1C	-0.062	-0.890	0.511
Model 2			
Model 2A	0.799	-0.855	-0.370

Model 2B	0.945	-0.185	0.146
Model 2C	0.216	-0.938	0.136
Model 3			
	0.918	-0.773	-0.458
Model 4			
	0.836	-0.826	-0.381
Model 5			
	0.650	-0.911	-0.279

TABLE 4. Correlation Coefficients of Models 6-7

	In-male-migration -Net-migration	In-female-migration -Net-migration	Out-male-migration -Net-migration	Out-female-migration -Net-migration	In-male-migration -Out-male-migration	In-female-migration -Out-female-migration
Model 6						
Model 6A	0.963	0.965	0.783	0.755	0.922	0.899
Model 6B	0.993	0.991	0.956	0.936	0.984	0.978
Model 6C	-0.159	-0.041	-0.786	-0.795	0.731	0.632
Model 7						
Model 7A	0.779	0.834	-0.826	-0.804	-0.298	-0.352
Model 7B	0.943	0.937	-0.007	-0.273	0.316	0.069
Model 7C	0.179	0.392	-0.907	-0.878	0.232	0.077

Figure 1: Scatter Diagram for Full Sample **Figure 2:** Scatter Diagram for Male

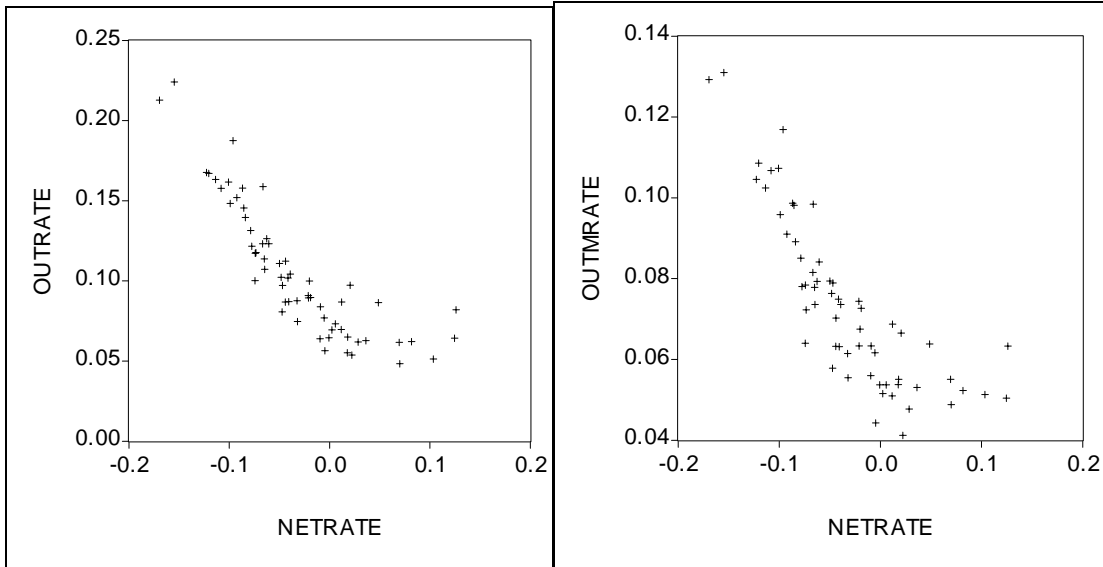
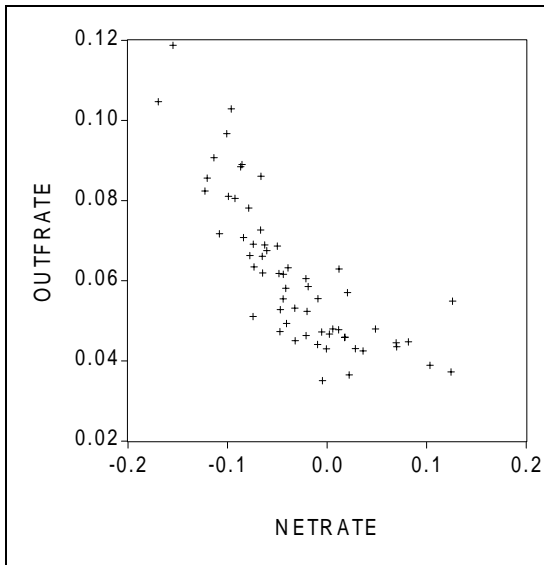


Figure 3: Scatter Diagram for Female



4. CONCLUSION

In this study, the validity of Lowry's hypothesis, in-migration rate is more effective than out-migration in determining the net-migration rate, was empirically investigated for the Turkish case over the period of 1985-1990. Another purpose of the study was to test the argument of Gedik (1992) on the hypothesis for Turkish case. The techniques used to test the proposition are regression and correlation analyses. In regression analysis, 7 alternative models in terms of the measures of dependent and independent variables were constructed and run under the Ordinary Least Squares.

The study found that the relationship between net-migration rate and in-migration rate is positive and statistically significant for both 61 provinces and 17 provinces with net in-migration rate. In addition, the relationship between net-migration rate and out-migration rate was found to be negative and significant both for 61 provinces and 44 provinces with net out-migration rate. These results imply that Lowry's hypothesis is not valid for Turkey over the period of 1985-1990. Net migration rate is determined by in- and out-migration rates together. Second, the results are consistent with those of Gedik for the period of 1965-1985. Third, the results of the study do not confirm expectation and argument of Gedik for the Turkish case. Gedik has argued that in the future it is possible that the Turkish case will come to resemble the developed countries and therefore validate the Lowry's hypothesis. But, the hypothesis is still invalid for the Turkish case.

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