Internal Migration in Romania. Revisiting the Harris-Todaro Model of Migration

Ecaterina TOMOIAGĂ
Faculty of Economics and Business Administration, Babeş-Bolyai University, Romania
ecaterina.tomoiaga@econ.ubbcluj.ro

Monica Ioana POP SILAGHI
Faculty of Economics and Business Administration, Babeş-Bolyai University, Romania
monica.silaghi@econ.ubbcluj.ro

Abstract

This study provides up-to-date empirical evidence of the Harris-Todaro model of migration. Through this model it is stated that people migrate from rural areas to urban zones because expected wages are higher in urban areas and, also, they migrate where the probability of finding a job is higher and there are low levels of unemployment rate. In this regard, we took one country under consideration for testing this hypothesis and this country is Romania. The data used in the study consisted in a balanced panel database for all rural and urban areas from Romania, for the interval of time 2002-2021. By applying period seemingly unrelated regression equation is reached the conclusion that the basic model of Harris-Todaro holds in the case of Romania. People migrate because of push factors (low income and high unemployment rate in the origin) and pull factors (high income and low levels of unemployment rate in the destination). Also, the extension of the Harris-Todaro model is confirmed. Some policy implications based on our results are provided.

1. Introduction

Most of the movements of the population are made internally. Migration from rural to urban areas is specific for countries with low and middle levels of income. Moreover, for those countries which experience rapid economic growth or structural changes migration is more likely to be expected (Liu & Dang, 2019).

In the literature there are more approaches that explain the rural to urban migration. The first attempt belongs to Ravenstein (1885, 1889). He states that migration takes place from rural areas to neighbouring cities which expand. Thus, migration is stimulated by socio-economic development, and is driven mostly by economic reasons (Bunea, 2011). Another approach was developed in 1966 by Lee. This is the push-pull theory of migration, which states that people are pushed by unfavourable conditions from the area of origin and are pulled by favourable conditions in the area of destination (Lee, 1966). In 1970 another model of rural-to-urban migration was developed by Harris and Todaro. This model states that people are moving from rural to urban areas because the expected wages are higher in

urban zones than wages from rural areas and, also, people take into consideration the unemployment level when they decide to migrate (Harris & Todaro, 1970).

In this paper we want to study the rural to urban migration in Romania by following the basic version of the Harris-Todaro model. We include the wages from rural and urban areas, and the unemployment rate from rural and urban areas.

Pop Silaghi and Ghatak (2011) studied internal migration for the case of Romania at the interregional level. The interval of time studied is 1995-2005. By applying cross-section seemingly unrelated regressions estimation and considering time effects it was confirmed that Romanians are moving from rural to urban areas due to differences in wages. Before taking into account the periods of restructuration of the economy, there were obtained unexpected results. These unexpected results came from the fact that Romania had just left the communist regime and in the period of time considered people lost their jobs and they wanted to reduce the cost of living. So, they migrated in that period from urban areas to rural areas, it was a return migration phenomenon. We differentiate by this research through the fact that we use rural urban areas and not regions to study the rural-to-urban migration. Moreover, we use an up-to-date database, which consists of using data for the interval of time 2002-2021. We obtain different results.

The paper is structured in five sections, including this one with some introductory aspects. The next section contains the review of the literature. Section 3 presents the basic Harris-Todaro model of migration, which we use in our research. Data description and empirical results are detailed in the fourth section. Finally, the last section comes with some conclusions.

2. Literature Review

Over time, researchers studied the rural-urban migration following the Harris-Todaro model and extensions of it. In this sense, in the current section we will present an overview of the literature in what regards testing the Harris-Todaro model.

A study which took into consideration more countries in the world was undertaken by Issah et al. (2005). They developed and tested an extended version of the Harris-Todaro model of migration in the case of developing countries. This extended version included, besides the wage differences, the infrastructure as influencing migration. Through a comparative static analysis, it was obtained that when there exist differences between urban and rural infrastructure, then people are forced to migrate from rural to urban zones. Also, wages are influencing people's migration decision. People move in urban areas because of difference of income compared to those received in the rural areas.

Petrov (2007) analysed the Harris-Todaro model in the case of 20 northern divisions of Canada. The interval of time studied was 1996-2001. Results suggest that the Harris-Todaro model is valid for North-to-South migration in Canada. They state that in future research there should be taken into consideration as drivers of migration the high costs of moving and climate conditions.

Ghatak et al. (2008) investigated the rural-urban migration in Poland. They followed a modified version of the Harris-Todaro model. They included in the model besides wage and unemployment differentials, the distance, housing, healthcare, road provision, and

educational level. The interval of time studied was 1995-2001. The data were processed by applying seemingly unrelated regression equations and it was obtained that in Poland the internal migration is low. However, the internal migration which exists is determined by economic factors. Also, it was found that the small number of houses is an essential factor that explains the low level of migration. Health was not taken into consideration by Polish people when it comes to migration. However, regions in destinations with a good road infrastructure and education level lead to more migration.

Mulhern and Watson (2010) studied the interregional migration from Spain. In the study was used an extended version of the Harris-Todaro model, by including prices of houses and infrastructure as influencing internal migration. By applying fixed effects model and seemingly unrelated regression equations on data from the interval of time 1990-2000 it was obtained that difference in wages determined internal migration. We have to mention that for prices of houses it was an insignificant coefficient and for infrastructure it was obtained an unexpected sign. So, in the case of the internal migration of Spanish people, economic factors (wage, unemployment, distance) influenced it.

Hagen-Zanker and Azzarri (2010) made research in Albania on the topic of internal migration. Albania was a communist country until 1990 and migration was forbidden. So, this country had the most population living in rural areas from Europe. After the fall of the regime, all types of migration were encountered. By applying the propensity score matching approach and the instrumental variable approach to data from a survey implemented in 2005 it was obtained that the Harris-Todaro model is confirmed. That means people migrate due to income differentials between rural and urban areas and, also, go in urban areas with low levels of unemployment rate. Also, it was found that at the intern level, mostly young people migrate.

Sanders and Brown (2012) studied how the creation of special economic zones influenced the decision to migrate from rural to urban areas in the Philippines. Three intervals of time were analysed: 1990-1995, 1995-2000, and 2000-2005. Through spatial analysis there was obtained that workers from rural areas with low wages migrate in urban areas which offer high salaries. More specific, they are moving in more urbanized areas in which PEZA (Philippine Economic Zone Authority) and BCDA (Base Conversion Development Authority) programs have designated SEZ (Special Economic Zones) as the location of highly subsidised economic development programmes.

Ishtiaque and Ullah (2013) wanted to find what factors influence rural-to-urban migration in Dhaka, the biggest city in Bangladesh. Through survey and focus group discussions there were collected the data and analysed by multivariate techniques. Results of the estimations reveal that 52% of people who participated in the study are temporary migrants and 48% of people are permanent migrants. Also, the study confirms the Harris-Todaro model because people migrate due to differences in wages in rural and urban areas. Besides this, people also move because of natural disasters, lack of jobs, financial crises, the influence of members of the family, job availability, gaining easy access to the city's informal economy, bright lights of the city, and occupation in rural areas origin.

Eshetu and Beshir (2017) conducted research regarding rural-urban migration in Ethiopia. The data were collected through a survey in 2016 and by using descriptive statistics and a Probit model was obtained that mostly young people, with ages between 15 and 25 years old, have the tendency to migrate. Also, people who are more educated and not married are more likely to move from rural to urban areas. Moreover, the Harris-Todaro model was confirmed, people migrate because of economic reasons, and it is more likely to find a job

in urban zones. They run from poverty from rural areas, or for education, which is more accessible in urban places. Additionally, they want to begin a business in urban areas. In the same study it was reported that females migrate more on short distances.

Oyvat and wa Gĩthĩnji (2020) made a study in the case of Kenya to find the behaviour of migration by following an extended version of the Harris-Todaro model. This analysis is based on data collected through a survey conducted in the period of time 1998 and 2005-2006. The empirical estimations were made with simple and multinomial probit models and was obtained the following results: the extension of the model of Harris-Todaro was confirmed, people from areas with an unequal distribution of land are more exposed to migrate in urban zones, education has a positive impact on rural-urban migration, age and religion have a negative impact on migration, marriage leads to migration, which means that women migrate in the same direction as their husbands. Besides rural-to-urban migration, in Kenya exists also rural-to-rural migration. The reasons for migration from a rural area to another rural zone are income and marriage.

Busso et al. (2021) studied rural-to urban migration in Brazil following the Harris-Todaro model and its extensions. All the data used in the study were collected from the Institute of Geography and Statistics for three periods of time: 1991, 2000, and 2010. Through empirical estimation was obtained that only extensions of the Harris-Todaro model were confirmed. These models included labour informality and housing markets. More precisely the wage from the urban informal sector determines people to come from rural areas, even though in urban areas exists a risk of high unemployment. On the other hand, there exists high levels of the cost of living in urban areas, which counteracts the attractiveness of high wages in urban areas.

Another study was realized by Sancar and Akbaş (2022) in order to test the relationship between labour migration, rate of urbanization and the unemployment rate in the case of 12 regions from Turkey. The interval of time taken into consideration was 2008-2019 and with panel data models it was obtained that the Harris-Todaro model validates only in 6 regions. The conclusion of the study was that the model tested is applicable only in regions of Turkey that are developed from the social point of view and, also, from the financial sector perspective.

Compared with these studies presented in the literature review section and in the introduction section (papers for Romania) we offer an up-to-date estimation for the basic Harris Todaro model and its extensions employing period seemingly unrelated regressions for rural-urban migration in the case of Romania. Besides the variables from the basic model, we employ also variables such as the number of hospitals, number of houses, and length of roads from urban areas.

3. The Model

In what follows we present the model of migration developed by Harris and Todaro (1970). From this model we will start our study. It states that people migrate from rural to urban areas because of differences in wages from rural sector and urban sector. In other words, differences in wages from agricultural sector and from manufacturing sector.

This model proposes a closed economy. This means that all agricultural goods and manufacturing items are traded internally. The function of the agricultural and manufacturing production has the next structure:

$$X_A = q(N_A, \overline{L}, \overline{K_A}), \text{ q'>0, q''<0,} \tag{1}$$

where X_A - the production of the agricultural goods,

N_A – rural workers who are making these products,

$\overline{L}$ – the availability of land which is fixed,

$\overline{K_A}$ – the capital stock which is fixed

q' is the function of q derived in relation with N_A

$$X_M = f(N_M, \overline{K_M}), \text{ f'>0, f''<0,} \tag{2}$$

where X_M – the production of the manufactured goods,

N_M – the labour force (urban residents and migrants from rural areas) who produce these goods,

$\overline{K_M}$ – the capital stock which is fixed,

f' – is the function of f derived in relation with N_M

The terms of trade are formulated as the price of goods from the agriculture in terms of the goods that are manufactured. So, we can write the determination of the price:

$$P = p\left(\frac{X_M}{X_A}\right), \text{ p'>0,} \tag{3}$$

where P – terms of trade.

So, the real wage from the agriculture field is exactly the value of marginal work in agriculture expressed as goods manufactured.

$$W_A = P*q' \tag{4}$$

When it comes about real manufacturing wage it is equal to marginal product of labour is manufacturing due to the fact the producers from urban zones want to maximise their profit. Moreover, this wage is compelled to be bigger than or similar to the urban fixed minimum wage.

$$W_M = f' >= \overline{W_M}. \tag{5}$$

The migrants who come from rural areas do not take into account the minimum income as reference in the decision of migration. They keep in mind the fact that they cannot find a job in urban areas, and they use the idea of the expected income. In this regard, the decision of migration is determined by the minimum income multiplied by the chances of finding a job in urban zones. These chances are designed by $\frac{N_M}{N_u}$, where N_u represent the urban residents and rural migrants. This fraction shows how many workers from the entire labour force are hired in urban zone and if it exists unemployment then the ratio is smaller than one. Thus, the expected urban income used by migrants in the process of decision is:

$$W_u^e = \frac{\overline{W_M}*N_M}{N_u}. \tag{6}$$

There exists a labour constraint which sustain that the labour force working in the agriculture (N_A) in addition with the total urban workers must be equal with the sum of

endowments of labour from rural areas ($\overline{N_R}$) and residents from urban areas ($\overline{N_u}$), which is equal with the total labour endowment ($\overline{N}$).

$$N_A + N_u = \overline{N_R} + \overline{N_u} = \overline{N} \tag{7}$$

The condition of equilibrium is:

$$W_A = W_u^e \tag{8}$$

The equation from above comes from the hypothesis that migration into the urban zones is a positive function of expected wage differentials between urban and rural areas, which can have the following form:

$$N_u = \Psi\left(\frac{\overline{W_M * N_M}}{N_u} - P * q'\right), \ \Psi' > 0, \ \Psi(0) = 0 \tag{9}$$

The equilibrium relationship will be (Harris & Todaro,1970):

$$Pq' = \frac{\left(\frac{f'}{P}\right) * N_M}{N_u} \tag{11}$$

4. Data Description and Empirical Results

In *Figure 1* we present the evolution of Romanian migrants from rural to urban areas, for the period of time 1990-2022. We can see that in 1990 the number of migrants was extremely high, around 500,000 migrants. The high level of immigrants from rural to urban in 1990 contributed to the raise of the population in urban areas, which means more competition in the labour market and an increase of the unemployment in urban areas due to restructuring. So, in 1991 the number of rural migrants decreased drastically, reaching a total of 132,360. So, fewer people started to come from rural areas to cities. Also, we can observe that the evolution of rural migrants was relatively constant in the period 1992-2022.

Figure 1. Rural-Urban Migration in Romania.
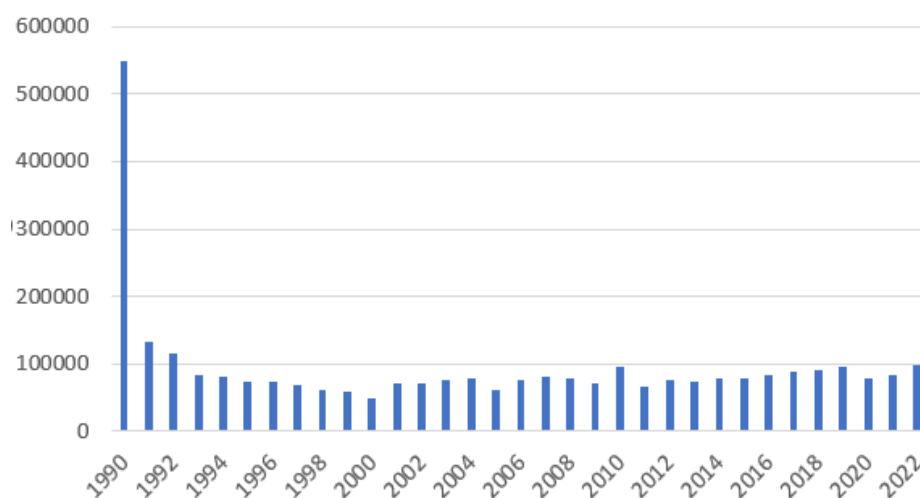
Source: Own processing based on data extracted from INSSE.

Our interest is to study empirically the migration of people from rural areas to urban areas in the case of Romania. In this regard, we construct a balanced panel database for all urban and rural areas of Romania. All the data we included in the study were extracted from the National Institute of Statistics of Romania (INSSE) for the interval of time 2002-2021. The dependent variable is represented by the number of rural migrants. As independent variables we included the income from both rural and urban zones, the unemployment rate from rural and urban zones. The level of income represents all monetary income, regardless of its source.

Following Ghatak et al. (2008) and Pop Silaghi and Ghatak (2011) we apply seemingly unrelated regression equations (SUR). To be more specific we employ period SUR on our data. In **Table 1**, we show the results of the empirical estimation for the basic model of Harris-Todaro. We obtain a negative sign for the coefficient of the income level from rural areas and a positive sign for the coefficient of the income level from urban areas. This means that the number of migrants will decrease if the income in the origin increases, and the number of migrants will increase if the level of income in the destination area increases. So, Romanians migrate from rural to urban areas because of high income in cities and low income in agriculture. The coefficient of the unemployment rate from rural zones is positive. When the unemployment rate is high in the origin (rural areas), then the level of migration from rural zones will increase. Regarding the coefficient of the number of unemployed persons from urban areas is negative, as expected. When the unemployment level in cities increases then the migration level decreases. All variables are significant from the statistical point of view. Both, push effects and pull effects count in the decision to migrate. Compared with the previous paper (Pop Silaghi and Ghatak, 2011) these results are different since both push and pull effects matter. On previous period (1995-2005) results have shown that people migrate especially due to push factors. With time (for our period 2002-2021), this pattern changes as people started to look at income and unemployment in destination as well which means that they may be not so desperate to leave the country according to push effects, but they look carefully at the conditions in urban areas as well.

Table 1. The basic model

Variable	Results
lnincome_origin	-2.560535***
	(0.136225)
lnincome_dest	2.593499***
	(0.138005)
unemployment_rate_origin	0.057503***
	(0.009979)
unemployment_rate_dest	-0.038311***
	(0.006453)
C	6.261734***
	(0.059139)
R-squared	0.329923
Adjusted R-squared	0.326634
Observations	820

Note: Standard errors in parentheses ***$p < 0.01$
Source: Authors' own calculation in EViews

We perform some robustness check by adding a dummy variable, which control for the periods with crisis (see **Table 2**). More precisely for the years 2009 (financial crisis) and 2020 (pandemic). Our model remains robust.

Table 2. Robustness check

Variable	Results
lnincome_origin	-1.483497***
	(0.129501)
lnincome_dest	1.511596***
	(0.131582)
unemployment_rate_origin	0.033124***
	(0.009835)
unemployment_rate_dest	-0.048792***
	(0.007229)
dummy_crisis	0.509383***
	(0.019877)
C	6.525300***
	(0.063693)
R-squared	0.467654
Adjusted R-squared	0.464384
Observations	820

Note: Standard errors in parentheses ***$p<0.01$. Source: Authors' own calculation in EViews

In what follows we test an extension of the Harris-Todaro model, by including, besides the income level and unemployment rate from origin and destination, also the number of houses and hospitals per 1000 inhabitants, and the length of roads (see ***Table 3***). We obtained the expected results for the income level and unemployment rate from rural and urban areas. Moreover, the coefficients of the number of hospitals, the number of educational units and the length of roads from urban zones are all positive. This means that for Romanians are important the living conditions in the destination, besides the economic aspects. All variables are significant from the statistical point of view. Also, in ***Table 3*** we report the results for the robustness check. We test the robustness of the extended model by controlling for the years of crisis in the period of time taken under consideration (2009 and 2020).

Table 3. Extension of the Harris-Todaro model

Variable	Results	Robustness check
lnincome_origin	-2.572941***	-1.473514***
	(0.129945)	(0.124712)
lnincome_dest	2.608688***	1.504216***
	(0.131512)	(0.126661)
unemployment_rate_origin	0.046552***	0.021424**
	(0.010603)	(0.010463)
unemployment_rate_dest	-0.016248***	-0.028677***
	(0.006235)	(0.006994)
houses	0.002067***	0.001988***
	(0.000426)	(0.000424)
hospitals	6.912697***	6.718903***
	(1.889380)	(1.982394)
lnroads	0.356042***	0.357887***
	(0.085227)	(0.084494)
dummy_crisis		0.509107***
		(0.019247)
C	3.080577***	3.360221***
	(0.615397)	(0.608644)
R-squared	0.403211	0.529907
Adjusted R-squared	0.398066	0.525270
Observations	820	820

Note: Standard errors in parentheses ***$p<0.01$; **$p<0.05$. Source: Authors' own calculation in EViews

5. Conclusions

To sum up, we obtained that the model Harris-Todaro is confirmed in the case of Romanians. That means people migrate because of income differentials between rural and urban areas. Regarding the unemployment rate from both origin and destination we obtained the expected signs. Which means that people when migrate are looking to the level of unemployment in the origin and destination areas. Moreover, besides the economic factors people take into consideration the infrastructure and local conditions.

Internal migration from Romania is determined by push factors, i.e. low wages in rural areas and high level of unemployment rate, and pull factors, such as high wages in the urban areas and low levels of unemployment rate. Also, better living conditions (more houses and hospitals, or good infrastructure) attract migrants from rural zones.

In this regard, policymakers should encourage regional economic development in the rural areas in order to minimize the wage differences between rural and urban zones. There should be stimulated job creation in rural areas by offering more financial support in agriculture or tourism. Also, should be made more investments in the infrastructure from rural areas in order to attract more people to live there.

As further research there can be included some demographic factors as influencing migration, such as age, marital status, and family size. These factors are important because they can provide more insights of the composition of the migrant population and can be understood much better their needs. Also, can be employed comparative analysis with other countries which are similar to Romania, to have a better perspective on characteristics of internal migration.

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