



DYNAMIC EFFECTS OF MIGRANT REMITTANCES ON GROWTH: AN ECONOMETRIC MODEL WITH AN APPLICATION TO SOUTHEAST EUROPEAN COUNTRIES

MARIANA BĂLAN¹¹

Abstract: This paper presents a dynamic econometric model to study the impact of remittances on consumption, investment, output and imports.

Multiplier effects of exogenous shocks of remittances are estimated in the short and long term, with data from six Southeast European countries.

The analysis reveals a uniform country performance of instability and uncertainty, with great temporal and inter-country fluctuations of remittance effects.

Are highlighted the different inter-country priorities of remittances spending and an asymmetric impact on economic growth of remittances changes.

Keywords: Remittances, Migration, Economic Growth, Econometric Model, Southeast European Countries

JEL Classification: C33, C52, F22, O11, O15

Introduction

Migrant remittances are a significant and vital financial source for labor exporting countries, therefore the issue of their effects is of utmost importance. In many of the labor exporting countries, migrant remittances represent a very high proportion of their foreign exchange proceeds and an indispensable source for covering the balance of payments deficits.

There are more than 215 million international migrants in the world. Recorded remittances received by developing countries, estimated to be US\$325 billion in 2010, and constitute more than 10 percent of gross domestic product (GDP) in many developing countries.

Cross-country analysis and evidence from household surveys suggest that migration and remittances reduce poverty in the origin communities. Remittances lead to increased investments in health, education, and small businesses. At the same time, the loss of skills associated with migration can hamper development and delivery of

¹¹ Institute for Economic Forecasting-NIER, Romanian Academy, e_mail: dr.mariana.balan@gmail.com



basic services in sending countries. The diaspora of developing countries can be a source of capital, trade, investment, knowledge, and technology transfers.

So, recipients of these transfers typically spend the money on necessities such as food, housing, health care and educational expenses (Amuedo-Dorantes et al. 2007; Edwards and Ureta, 2003; Gitter and Braham, 2007; Valero-Gil, 2008). Moreover, remittances have helped receiving countries deal with financial distress and have been an important source of support during humanitarian crises (Savage and Harvey, 2007). Contrary to foreign direct investment, remittances have a direct impact on household incomes and, since there is no need of direct government intervention, remittances are less likely than foreign aid to end up in the hands of corrupt government officials (Kapur, 2004). In addition, remittances also represent a lucrative business for many banks and money transfer agencies.

However, remittance-related development programs are relatively new. In both the private sector and the development community, few organizations have made a concerted effort to use remittances to enhance their positive impacts on recipients. Since the beginning of the 1990's, emigration represents a significant phenomenon in

Southeast Europe

According to the "Migration and Remittances Factbook 2011", remittances are rapidly increasing in world from \$101.3 billion in 1995 to \$440.1 billion in 2010. The proportion of remittances to developing countries is also increasing, from 54.6% in 1995 (\$55.2 billion) to 74% in 2010 (\$325.5 billion).

Three East European countries are among the world's main recipients of remittances as percentage of gross domestic product (GDP), namely Moldova (23%), Serbia (13%) and Albania (11%).

Even if the question of the impact of remittances on recipient countries growth is still open, remittances represent an important source of external financing. They exceed international aid flows and, for some countries, the volume of foreign direct investments (Ratha, 2005).

This paper will try to respond empirically to some of these questions and estimate the relative effects of remittances and the time distribution of these effects for different sectors of the economy or macroeconomic variables that have a bearing on development and growth. The tool of our analysis is a macro-econometric model, which will be applied to a number of Southeast European Countries.

1. Remittances and Development: Some Preliminary Observations

Flows of workers' remittances to developing countries have grown steadily during the last 30 years. They have gone up from 55 billion dollars in 1995, to 192 billion in 2005 and about 325 billion in 2010. Remittances are only second to FDI as a capital flow towards developing countries, and substantially exceed both private debt flows and development aid (Figure 1).



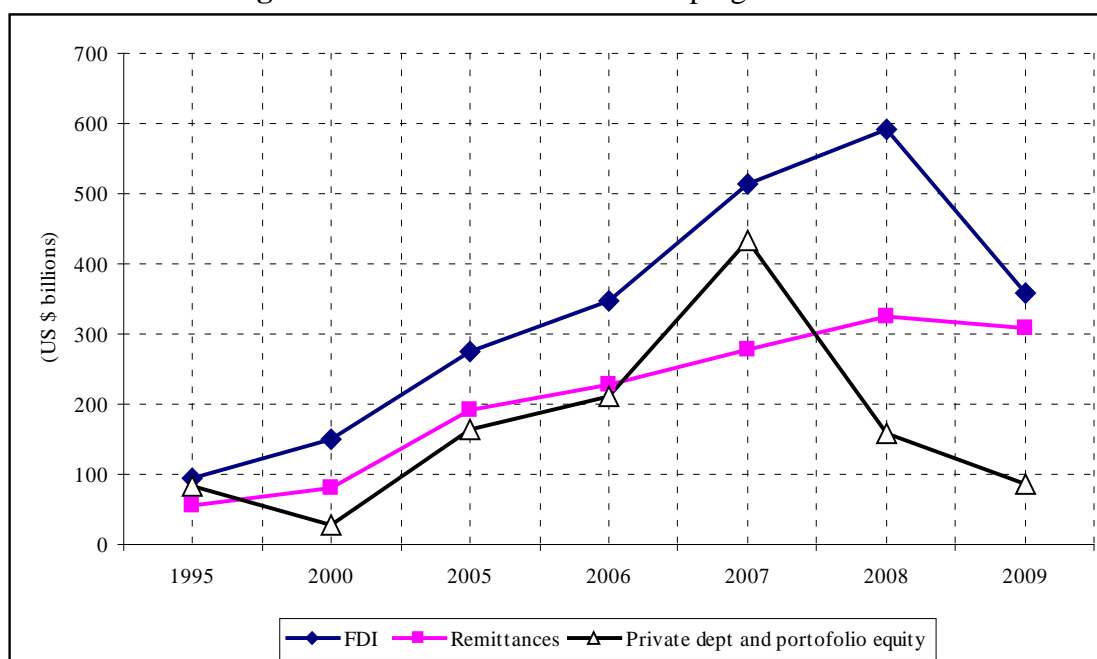
The substantial rise in officially recorded remittances over the last decade has in part been fuelled by increasingly intense migration and in part by an increasing use of formal channels of transmission for remittances. However, a precise estimation of total remittance flows is difficult for various reasons:

The lack of comparable migration figures across countries with different nationalization laws;

The different understanding of the specific components of remittance flows by different countries, and even by international organizations;

The still large share of remittances sent through informal channels, and thus going unrecorded, which may be even larger than formal remittances.

Figure 1 Resource Flows to Developing Countries



Data Sources: World Development Indicators database and World Bank Migration and Remittances Unit.

Migration has mixed effects on the economic conditions in the receiving country. Research on remittances and their impact in home country households and regions is abundant (Massey et al. 1998, or Taylor 1999). The most visible effects are summarized in the following points:

- Remittances augment the income and welfare of those relatives left behind in the home country, alleviating the poverty of the recipient (Adams and Page, 2003). Other authors argue that remittances may reduce recipients motivation to work, creating permanent financial dependency, and slowing down economic growth (Chami et al. 2003);



- Empirical evidence indicates that remittances tend to rise in times of economic downturns (Chami et al., and Ratha 2003);
- Remittances can also accelerate financial development in recipient countries, as remittance recipients are persuaded to turn their remittances into deposits with financial institutions, and more credit and savings products are developed to attend their demands for financing education, housing, investments, etc. Financial development, in turn, has positive effects on growth and development, both directly and indirectly by encouraging a more effective utilization of remittances;
- Large foreign exchange inflows, especially in small economies, can lead to exchange rate appreciation and lower export competitiveness;
- Low-skilled migration might represent a valuable safety valve for insufficient employment at home;
- A well-educated diaspora can improve access to capital, technology, information, foreign exchange and business contacts for firms in the country of origin. Both the return of expatriates and the maintenance of close contacts with high-skilled emigrants play an important role in the transfer of knowledge to origin countries, and the development of commercial networks and foreign investment opportunities;
- Remittances represent a source of savings and capital for investment in education, health and entrepreneurship, all of which have an effect in a shorter or longer term on productivity and employment, and ultimately on growth (Woodruff and Zenteno (2004) and Masey and Parrado (1998) find a positive impact of remittances on entrepreneurship in Mexico, Yang (2004) on education and entrepreneurship in the Philippines, Brown (1994) for business investment in Tonga and Western Samoa).

Even though investment in housing, health care and education are not perceived as productive investments, they can have an indirect effect on local production and employment opportunities through: consumption of local inputs and labor, improved household welfare and increased human capital, which positively affect the productivity of the workforce and have long term effects on growth. (Taylor (1999); Stahl and Arnold (1986); Durand, Parrado and Massey (1996)). The largest impact on growth and development, though, occurs when remittances fund productive investment.

3. Brief presentation of the model

The model used for quantifying the impact of remittances on economic growth comprising four major features, that is, i) be demand oriented; ii) be aggregate enough to have room for a number of different countries, offering comparable estimates and setting aside detailed individual or sectoral characteristics; iii) satisfy a certain



minimum of accepted econometric standards; and, iv) make good theoretical sense, compatible with the kind of economies to which it will be applied.

The model adopted consists of three behavioral equations, namely, a consumption function, an investment function and an imports function, and a national income identity.

With this model can be determined the short-run effects of an exogenous shock of remittances on these four endogenous variables and the effect of the remittances on economic growth.

For the countries in the sample considered, for the consumption function, was considered the relation:

$$C_t = a_0 + a_1 Y_t + a_2 C_{t-1} \quad (1)$$

where C is private consumption,
 Y is GDP and remittances,
 t is the time considered.

For investment, was considered that they are a positive function of income (Y) and a negative function of a lagged capital stock (K_{t-1}), allowing some time for investment to adjust to that stock:

$$I_t = b_0 + b_1 Y_t + b_2 K_{t-1} \quad (2)$$

For the import equation, was considerate the relation:

$$M_t = c_0 + c_1 Y_t + c_2 Y_{t-1} + c_3 M_{t-1} \quad (3)$$

and

$$Y_t = C_t + I_t + G_t + X_t - M_t + R_t \quad (4)$$

The dynamic characteristic of the model emerges from the introduction of lagged endogenous variables into the equations (1-3).

The reduced form expression of the structural equations (1) - (4) is:

$$\Gamma_{jt} = \alpha_0 + \alpha_1 C_{t-1} + \alpha_2 Y_{t-1} + \alpha_4 K_{t-1} + \alpha_5 G_t + \alpha_6 X_t + \alpha_7 R_t \quad (5)$$

where Γ can be any of the endogenous variables C, I, M, Y

α_j ($j = \overline{1,7}$) are the partial derivatives of the endogenous variable Γ_j , with

respect to any predetermined variable V , i.e. $\alpha_j = \frac{\partial \Gamma_{jt}}{\partial V_{jt}}$ and the estimates of these

parameters may be obtained, most frequently, directly by OLS from equation (5) (or by TSLS method).

If considered as variables in equation (5) are discrete, then the partial derivatives of this equation is equivalent to $\Delta \Gamma = \alpha \Delta V$, which tells that α is a multiplier, called "impact multiplier", that represents the magnitudes of direct and indirect effects of a unit change in any predetermined variable V on any endogenous variable Γ of the system, in the first year of the change in V .



4. Estimated Macroeconomic Effects of Remittances

The model is estimated and is applied individually to 6 countries: Albania, Bulgaria, Republic of Moldova, Romania, Ukraine, Bosnia and Herzegovina, and Hungary. In the top 10 emigration countries¹² are some countries of Southeast Europe: Ukraine, Romania, Bosnia and Herzegovina and Albania.

For Albania, in 2010, the stock of emigrants (1438.3 thousand persons) represents 45.4% of population, and the destination countries are: Greece, Italy, the former Yugoslav Republic of Macedonia, the United States, Germany, Canada, Turkey, the United Kingdom, France, Australia.

Bulgaria have migrants in Turkey, Spain, Germany, Greece, Italy, Moldova, the United Kingdom, the United States, Romania, Canada, and in 2010, the stock of emigrants: was 1200.6 thousands, which represents 16% of their population

Republic of Moldova, with a population of 3.6 million persons (in 2009), have 770.3 thousands migrants in 2010 (the stock of emigrants as percentage of population is 21.5%), and the most important destination countries are: the Russian Federation, Ukraine, Italy, Romania, the United States, Israel, Spain, Germany, Kazakhstan, and Greece.

According with Development Prospects Group, World Bank; UNPD 2009, Romania, it ranked the position 18 in Top Emigration Countries, with 2.8 millions emigrants, which would represent 13.1% of the Romanian population. For Romanian, the preferred countries for emigration are: Italy, Spain, Hungary, Israel, the United States, Germany, Canada, Austria, France and the United Kingdom.

Ukraine, the fifth country in Top Emigration Countries (stock of emigrants was 6563.1 thousands in 2010), ranks the position 21 in the world in terms of remittances received (5.3 US\$ billions).

In Bosnia - Herzegovina the stock of emigrants as percentage of population was, in 2010 38.9% (1461.0 thousands migrants), so, occupying the 12th place in the first 29 countries with high percentage of emigrants in the population. 13% of GDP represent the remittances received by this country.

In Hungary, the number of emigrants in 2010 was 462.7 thousands (4.6% as percentage of population). Characteristic for this country is leaving a large number of physicians: (3,694 or 10.9% of physicians trained in the country¹³).

In most of the labor exporting countries considered, the volume of remittances increased after 2004 (until 2008) and significant increases registered in Romania and Ukraine (Table 1). After 2004 (until 2008), there were significant increases in remittances, the highest recorded in Romania and Ukraine. Triggering the economic and financial crisis determined the reduction of remittances in all countries analysed, since 2009, the most pronounced registered in Romania (47%)

¹² Migration and Remittances, Factbook 2011

¹³ Source: Bhargava, Docquier, and Moullan 2010



Table no.1 Remittances as a proportion (%) of GDP in selected Southeast European Countries

Country		Albani a	Bosnia and Herzegovina.	Bulgaria	Hungary	Republic of Moldova	Romania	Ukraine
Remittances / GDP (%)	2003	15.47	20.9	8.31	0.35	24.58	0.21	0.66
	2004	15.88	20.74	6.81	1.67	27.14	0.17	0.63
	2005	15.81	18.76	5.58	1.75	30.79	4.77	0.69
	2006	15.1	17.47	5.17	1.81	34.68	5.48	0.77
	2007	13.72	17.73	4.02	1.65	34.04	5.01	3.17
	2008	11.51	14.78	3.62	1.61	31.33	4.59	3.2
	2009	10.89	12.71	3.21	1.76	22.27	3.02	4.32
	2010	10.8	13.24	3.36	1.95	22.65	2.79	3.88
Volume of remittances (in millions of current USD)	2007	1468	2700	1694	2280	1498	8542	4530
	2008	1495	2735	1874	2520	1897	9381	5769
	2009	1317	2167	1558	2277	1211	4928	5073
	2010	1285	2228	1602	2514	1316	4517	5289

Data source: The Economic Statistics Database, <http://www.economywatch.com>

The data used are annual figures of the period 2003-2010. All figures are obtained from The World Bank (Migration and Remittances Factbook 2011) and the Economic Statistics Database. The estimates of the model are presented in Table 2.

Table no.2 Structural Regression Coefficients (TSLS estimates)

		Albania	Bosnia and Herzegovina	Bulgaria	Hungary	Republic of Moldova	Romania	Ukraine
Consumption	a_0	-104.5 (-0.852)	223.4 (1.929)	325.1 (2.013)	-1323.5 (-1.295)	-378.5 (-0.325)	7562 (2.987)	4358.4 (2.0110)
	a_1	0.301 (2.963)	0.265 (2.359)	0.225 (2.1560)	0.352 (1.956)	0.398 (5.14))	0.542 (7.826)	0.411 (3.215)
	a_2	0.456 (3.758)	0.584 (3.251)	0.385 (2.864)	0.621 (2.651)	0.523 (4.96)	0.096 (1.251)	0.185 (1.963)
	R^2	0.926	0.915	0.875	0.921	0.941	0.952	0.892
	DW	2.061	1.693	1.951	1.935	1.915	1.634	1.725
Investment	b_0	1863.2 (2.564)	-105.3 (-0.986)	3524.8 (2.789)	25631.2 (2.965)	705.4 (0.019)	-1850.3 (-1.152)	-2513.2 (-1.198)
	b_1	0.152 (1.206)	0.325 (3.981)	0.287 (2.961)	0.365 (2.631)	0.35 (4.381)	0.348 (2.951)	0.258 (2.015)



		Albania	Bosnia and Herzegovina	Bulgaria	Hungary	Republic of Moldova	Romania	Ukraine
	b_2	-0.182 (-2.53)	-0.038 (-1.624)	-0.012 (-2.012)	-0.021 (-1.23)	-0.039 (-1.05)	-0.048 (-1.375)	-0.041 (-1.206)
	R^2	0.824	0.734	0.725	0.756	0.814	0.791	0.698
	DW	1.722	1.562	1.795	1.571	1.32	1.325	1.425
Imports	c_0	564.2 (1.201)	201.3 (1.282)	635.2 (1.945)	1235.9 (1.075)	1027.2 (1.105)	155.6 (0.425)	278.3 (1.181)
	c_1	0.301 (2.052)	0.415 (1.624)	0.382 (1.723)	0.325 (2.001)	0.256 (1.56)	0.081 (0.489)	0.176 (0.985)
	c_2	0.725 (3.520)	0.812 (3.412)	0.769 (4.052)	0.865 (7.016)	0.431 (2.581)	0.759 (2.125)	0.743 (2.541)
	c_3	-0.123 (-1.506)	-0.298 (-1.625)	-0.284 (-1.732)	-0.211 (-1.629)	0.071 (0.841)	0.056 (0.365)	-0.062 (0.42)
	R^2	0.879	0.891	0.846	0.924	0.942	0.881	0.795
	DW	1.923	2.398	2.014	1.987	1.562	1.752	1.832

Source: Estimates of the author

The size of remittances and their annual changes determine the magnitudes of overall effects on growth of macroeconomic variables considerate.

Estimating these effects can be achieved by two methods: i) calculate the effects of current and past remittances on current year's value of the variables concerned,

ii) calculate the overall impact of a current change of remittances on current and future variables, over a number of years.

If you consider the last method, then, quantify the impact of remittances on the variables considered, can be achieved using the relationship:

$$\Delta \Gamma_t = \sum_{k=0}^n \frac{\partial \Gamma_t}{\partial R_{t-k}} \cdot \Delta R_{t-k} \quad , \text{ by adding, } \Rightarrow$$

$$\sum_{t=1}^n \Delta \Gamma_t = (\Delta R_t) \sum_{k=0}^n \frac{\partial \Gamma_t}{\partial R_{t-k}}$$

(6)

where $\frac{\partial \Gamma_t}{\partial R_{t-k}} = \alpha_k$ is the multiplier of year k,

ΔR_{t-k} is the actual change of remittances between year (t-k) and {(t-k)-1},

Γ_t is any of the endogenous variables: C, I, M and Y,

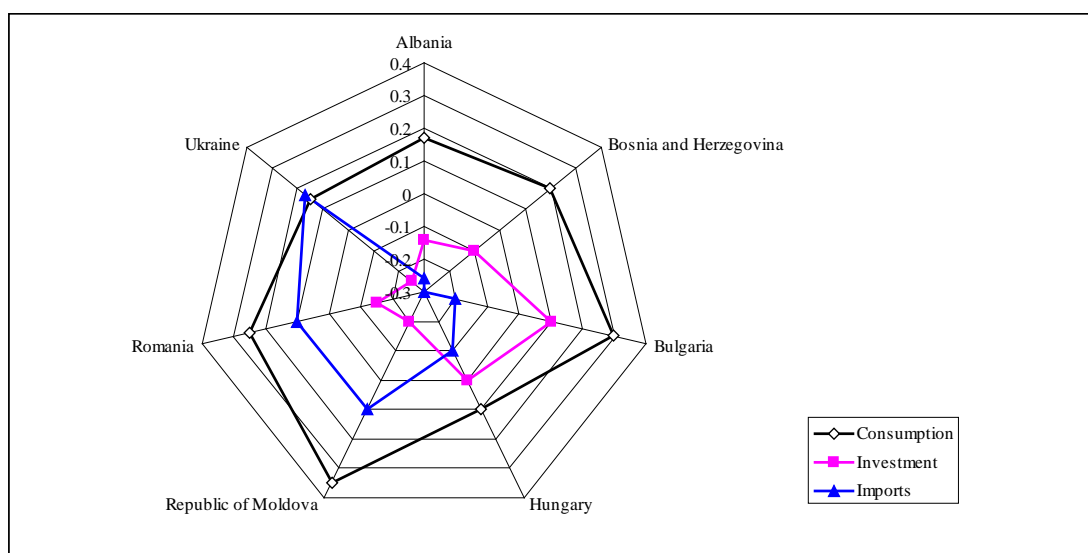
$k = \overline{1, n}$ represent the number of years over which the effects of remittances are distributed,



Δ is the difference over two consecutive years.

Based on the presented relations, were estimated the effects induced by changes in current and previous years' changes of remittances on current year's indicators considered in the period 2008-2010 (Figure 2).

Figure 2 *Effects of Current and Past Years' Changes of Remittances on Current year's Consumption, Investment, Imports*



Source: Estimates of the author

All induced growth rates, positive or negative, are below 1 per cent, demonstrating very weak effects. These results were expected given that all countries have crossed economic and financial crisis.

Conclusions

The estimated model offers the opportunity of assessing the particularities of the countries involved. Using the lags in the model allows determining the time distribution of the effects of remittances on the endogenous macroeconomic variables. Estimates made using the model allowed the determination of the correlation between remittances and growth rates of consumption, investment and import in southeastern Europe countries considered. Thus, it was emphasized a strong correlation between the growth rate of remittances with the rate of consumption, and lower with the import. In considered countries, remittances have insignificant influence on investment. During 2008-2010, remittance changes played an almost insignificant factor in moderating the recession.



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