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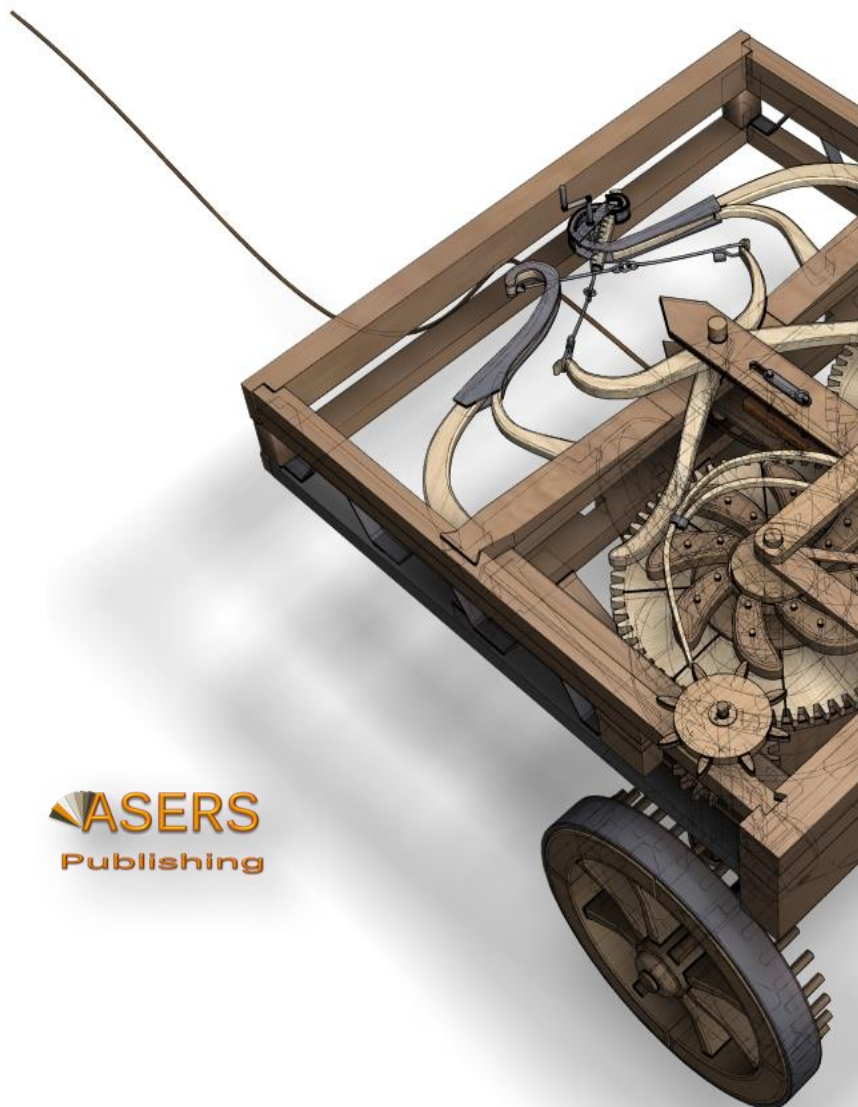
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THE LINK BETWEEN MIGRATION, REMITTANCES AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM ROMANIA

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Abstract.

The paper investigates the causal link between remittances and economic growth in Romania. Starting from the debates regarding the relative contribution of international migrants' remittances to sustainable economic development, this paper proposes an econometric analysis of the effects of remittances on the Romanian economy. The article shows that remittances have a positive effect on the current account of external balance of payments and they can replace external financial assistance flows, including foreign loans. Significant inflows of remittances can offset the current account deficit of the balance of payments, reducing the likelihood balance of payments crisis. At the same time remittances will increase aggregate demand, which has the effect of increasing inflation, currency appreciation and widening trade deficit. We showed also that remittances can exert positive influences on the process of investment, especially through the creation of numerous small enterprises.

Key words: migration; remittances; economic growth; investment

JEL Classification: F22; F24; O15; O47.

Introduction

Approached as a possible link between migration process and economic development, remittances topic raises a number of questions such as: What extent remittances can provide opportunities for investment for small business representatives such as individual entrepreneurs, firms with few partners, to whom it is limited the access to credit; Remittances can counteract procyclical effect of the economy through their ability to maintain or even increase in times of economic downturn of the countries? How can remittances create better and sustainable livelihoods for poorest people and how they can be better integrated in the national economy? How remittances can be combined with other funding mechanisms to potentiate economic development? What are the practices and policies that can enhance the development potential of remittances without discouraging migrants motivation to remit?

The crisis that manifested itself in the financial markets in 2008 led to a severe global economic recession that affected and still affects migrants and migration policies worldwide (Koehler, Laczko *et al.* 2010). With all the increased instability of the situation of migrants, remittances remained significant during and after the global economic downturn. Thus, they are maintained as an important source of income for families and play a crucial role of co-insurance or risk mitigation in tough times (Ratha 2013).

Remittances are invaluable sources of income and foreign exchange gain for many countries, especially those with barriers in terms of international trade. Among these developing countries, facing a continuous decline of the labor market, exporting labor in return for transfers of money represents an important component of the development strategy. The transfers are usually less volatile than private capital flows, and grow during a recession, helping to stimulate vulnerable economies (Ratha 2003). The probability that they reach in economic and social areas that are left relatively untouched by official development assistance and by private capital of foreign investors is high.

Moreover, remittances have proven to be a more sustainable source of foreign exchange for developing countries than other capital inflows such as foreign direct investment, public debt and official development assistance. However, the link between remittances and development remains complex, especially regarding the movement of people, which contributes to the spread of global interdependence at all levels - social, economic and political (Lubambu 2014).

1. Are Immigrant Remittance Flows a Source for Economic Development?

To assess the extent to which remittances contribute to economic development should be examined the effects at both microeconomic and overall impact on the economy and society in general. At the microeconomic level the impact is positive because financial remittances from abroad have provided a secure living for migrant families. Many people enjoy a higher standard of living, which would not be possible without remittances. However, the impact on the economy and society as a whole depends largely on whether remittance flows have been converted into productive investments. On the one hand there is a potential availability of migrants to invest. On the other hand, business is unattractive and often times even hostile, leading to failed efforts of migrants. Sometimes failures repeat and migrants lose confidence and hope in the success of their businesses. So they are forced by circumstances and the lack of alternatives to return to migration (CIVIS, IASCI, 2010).

Remittances may impact on economic growth in numerous ways:

- By changing the rate of capital accumulation. Remittances can not only increase the rate of capital accumulation, both physical and human, but also can reduce the cost of capital in the country of destination. Otherwise, additional loans may increase and lead to greater indebtedness. They may also have a role in stabilizing the economy or reducing volatility, and therefore reducing the risk premium that investors require it.

- By affecting total factor productivity growth. Remittances impact the efficiency of investment, depending on who is making the investment decision (Barajas *et al.* 2009). If the recipient makes the decision on behalf of the remitter, it is likely that the decision is not as efficient as one made by a skilled domestic financial intermediary in the case of formal capital inflow. Remittances may result in greater financial development. But they can also result in exchange rate changes – inflow of funds can result in ‘the Dutch disease’, i.e. currency appreciation and thus lower exports (Katsushi S. Imai *et al.*, 2012).

- Offsetting the additional demand for currency, following the development of foreign trade, remittances support maintaining exchange rate stability of the national currency and may even lead to currency appreciation. While foreign direct investment, portfolio investment and other capital flows to developing countries rise and fall cyclically, remittances have proved remarkably stable over a long period of time and even increased in response to economic crises. For example, remittances to developing countries continued to grow steadily in the years 1998-2010, when private capital flows have declined.

Money remittances made by migrants to their native country is an important source of foreign revenue for some developing countries and a substantial contribution to their GDP. Remittances can be used for imports of capital goods or provide investment funds for entrepreneurs. Also, remittances may increase family income needed to purchase consumer goods and services. Using remittances generate multiplier effects in the economy further, and if the spending, and if their savings. If saving, saving form counts: "keeping money at home", placing them in the banking system or other equivalent forms of saving and investment. Keep in mind that in an open economy, the multiplier effect is lower. In the case of remittance spending, has major importance supply structure covering solvent demand of recipients of remittances: if the offer consists of local products, the multiplier effect of remittances is greater than if they consume imported goods and services.

Migrants' savings behavior changes over time and is well-defined in the early stage of migration, when migrants often sacrifice their standard of living in order to save and remit more. Once it has been saved a certain amount of financial capital, migrants begin to change their savings behavior and remission. This change is

influenced by the fact that migrants live in an environment with higher standards of living obviously, than they know from home (especially if European destinations migration) but also because when remittance recipients reach a certain level of wealth, the family put less value on remitted money. Generally migrants begin to save more and to remit less.

Once families consumer demand is covered, remittances end up being saved, thus leading to increased savings. But for various reasons, mainly for psychological reasons, only part of the savings end up being saved in the banking sector. Some migrants savings are accumulated in cash and / or banking systems in the migration place. It is estimated that these savings withheld reach hundreds of millions of euros per year. Provided suitable incentives, guarantees and regulatory frameworks, these resources could be channeled into savings and investments in migrants' home countries, ultimately contributing to development (CIVIS, IASCI, 2010).

The channels through which remittances are transmitted to migrant workers can have positive effects on economic growth of their country of origin. Transmitted funds may finance investment dynamic or, when these financial resources are saved through financial institutions, local or international, this will generate a significant increase in the financial resources of these financial institutions. So, conditions will be created to increase the performance of these institutions by providing more loans to companies in their markets for short or long-term loans.

At the macroeconomic level, increasing the total capacity of investment funding determined by the entry of remittances in the country, plays a pro-cyclical role if migrant workers abroad have confidence in the local economic situation and if country's financial system encourages them to invest. At the same time, however, for some countries and under certain circumstances, remittances can play a role counter-cyclical, if the country of origin of migrant workers is a poor country, which is experiencing a period of economic crisis, these workers send more remittances to their families to help overcome these difficulties more easily (Hadeel Yaseen 2012).

One of the most important roles of remittances is their significant contribution to the fight against poverty. While increasing revenues it occurs also the reduction of the proportion of people living in poverty and even in the extreme poverty by meeting consumer demand family's receivers. We consider important to mention that foreign economic migration, with its complex characteristics, contribute broadly to poverty eradication under the concept of human poverty promoted by the United Nations, which examines poverty as a component of income poverty, emphasizing that equity, social inclusion, women's empowerment and respect for human rights are important for poverty reduction. Remittances contribute to economic growth in the long term when part of these funds is used to pay expenses for education and training for younger people from migrant families. As a consequence, in certain countries, remittances can in reality contribute to the accumulation of human capital, and then to the growth of total factor productivity of the local economy (Chami *et al.* 2003).

In this context we appreciate that the role that policies and institutions of countries receiving remittances have it is very important. Assuming that policies create incentives for investment in households and private economies in general, they will enhance international remittance flows. In a stimulating environment remittance will be used by their receptors to initiate business, to upgrade human capital (through spending on health care and education, etc.), and to save money in the formal financial system where the regulatory environment for business is properly, public sector corruption is low, and the financial sector is considered safe.

A country with such strong policies should be able to achieve a higher gain of international remittances (Catrinescu *et al.* 2006).

There is a widespread consensus in the scientific literature regarding the extremely poor quality of data on transfers of funds in the form of remittances. It is well known that many funds are transmitted through "informal" channels, such as service providers, transport providers, or through friends and family and not recorded in the balance of payments of many countries. In this situation, efforts to measure remittances are limited and official estimates greatly underestimate the actual flows.

2. Remittance and Migration Flows in Romania

More than 3 million Romanian have emigrated (constituting itself in 17% of the population), an important part of them choosing as destination the European Union. The first years after the fall of communism were characterized by emigration mainly based on ethnic criteria, the next period having as main destinations Spain, Canada and the United States (Chindea *et al.* 2008). After Romania joined the European Union (2007) and obtained the free movement of persons, specific to single market integration, migration of Romanians soared, the main destinations for Romanians being Italy, Spain, Germany and Hungary. These should be viewed with caution because, on the one hand the data relate only to Romanian citizens legally registered in the Member States, on the other hand some countries lacking relevant information. Thus, it should be noted that INS estimate the number of Romanian immigrants is only 2.5 million, while the World Bank and UN estimates the number of Romanian emigrants to 3.4 million persons. These differences can be explained by the fact that INS evaluate only the number of declared official, who spend more than 12 months abroad.

Every time talking about the exodus of Romanians present productivity losses, at the pension fund or the health problems caused by the departure abroad of the approximately 3.4 million people, showing that, potentially, every Romanian is a loss for the Romanian economy, but in any analysis must take into account the actual conditions, proving that not enough jobs are generated in Romania.

Romanians working abroad sent during 2006-2015 about 50.872 billion dollars in the country, the best years being 2007 and 2008, and the weakest in 2015, 2014 and 2010, according to World Bank data and estimates. The number of Romanian immigrants was 2.769 million in 2010, representing 13.1% of the total population, reaching 3430 in 2015, representing 17.2% of the total population according to World Bank data (Worldbank, 2016).

The amounts that Romanians abroad send to their relatives in the country today are much lower. The economic crisis has affected Romania, so many countrymen have decided to "spend" crisis abroad, where, although revenues are lower than during the boom, are still above the average in the country.

The amount of remittances grew strongly in 2005-2008, from 4.733 billion dollars in 2005 to 6.673 in 2006, 8.461 billion dollars in 2007 and 9.285 billion dollars in 2008. Subsequently, the amount fell sharply to 4.928 billion dollars in 2009, a level of 3.879 billion dollars in 2010 due to the economic crisis. A strong downward trend has been maintained in recent years, reaching 3.381 billion in 2014 and 3230 in 2015 (Worldbank, 2016).

Latest analysis of NBR show that Romanians remittances from abroad remained low after 2011, being one third lower than before the crisis. Money inflows of current transfers channel, mainly remittances, reached in 2011 about 4 billion euros. The latest World Bank data shows that still approximately 3.4 million Romanian are living and working abroad now.

Before the crisis, their remittances to the country represented a genuine power consumption, but the eurozone crisis has almost halved remittances.

There are two views on the effects of remission for the receiving country: a negative one - which highlights the dependence of the country of origin induced by remissions from abroad and distortions in the development process; the other one positive - remissions is a strong element of avoiding poverty and a source of economic development (Taylor 1999).

Both the quantity and destination of migrant's remission is determined on mobility strategies and plans to return to the country, which in turn depends on their expectations regarding the development of policy and the economic environment in Romania.

Reverse flow of remission - meaning remittances of foreign immigrants in Romania - even though record low values cannot be neglected. Especially since most of these outputs are determined by citizens from third countries, they should not be neglected citizens of third countries probably will lose as a result of subsequent amendments of EU immigration policy.

Remittances from various categories of income from work is distinguished by two main sources: income from employment based on bilateral agreements between Romania and other countries, concluded between the authorities, and income from employment by forms of direct / indirect labor relations (legal / semi-legal) or from other sources, transferred into the country through the banking system.

National Bank of Romania highlights cash flows either group of labor income (if the sender explicitly has specified amounts origin of performance of an activity based on a labor contract) or category of private transfers of individuals.

Transfers from workers abroad are much more significant if we take into account informal transfers. Absent from the information system in the field, especially "restrictions" banking system (banking system underdeveloped and disincentives for deposits / money transfers made by individuals) and fiscal (high taxation of labor income) discourages the declaration of full income, so statistical records take into account amounts 2-3 times lower than those actually obtained. But even in these conditions the total amount of transfers exceeded many times the volume of FDI. We therefore appreciate that, in the short term, for the national economy and to the persons involved is more effectively "export" temporary labor. This situation is not peculiar to Romania, meets also in other countries, including in transition (IOM, 2003a). The decision to send money home through formal or informal ways depends on a number of factors. One factor is the monetary cost of the transfer, along with the speed and delivery reliability. Migrants in most cases are using official channels to send money home, particularly fast transfer services.

Must be mentioned the existence of a public transfer effect, with global, regional and local effect on budgets concerned. Depending on the laws in force in the host country and bilateral agreements between states or special institutions will induce, most likely in Romania, a reduction in the volume of transfers to public social security, due to the decline in the number of taxpayers.

The economic impact of transfers result from the manner and efficiency of use in their home countries. Most of them is used to satisfy basic needs of subsistence, followed by spending on education, business investment of securities, acquisition of durables and starting small businesses. All these uses of remittances have a positive

impact on economic growth, either through positive influence on aggregate demand and production through consumption, either through savings and investment, which ultimately will help increase national income per capita.

The economic effect of remittances thus depend mainly on how they are used. Gains from working abroad have multiple destination:

- domestic consumption in the host country for the maintenance and restoration of working capacity: food, housing, clothing;
- transfers in the country as the form of currency. This will be used for different purposes:
 - For current consumption - support the family, including children's education, health care. These are household consumer expenditure conducted domestically. They are found (not explicitly) in household final consumption;
 - Savings and investment in durable goods: home, land, other assets (household equipment, automobiles, agricultural machinery and tools). Some of these (home) contributes to increasing national wealth;
 - Starting some microbusinesses or setting up family associations for profit (agrotourism cultural tourism, various types of services in rural and urban areas - repairs, maintenance, collection and processing of agricultural products in small factory located in rural areas etc.).

It is well to know that much of such money transfers are consumed in Romania for household current expenses, stimulating domestic demand for goods and services, but concentrate through imports rather than domestic products, less competitive in quality and / or price.

3. The Effects of Remittances on the Key Macroeconomic Variables

The model used is a modification of Glytsos' model (2002a, 2002b and 2002c). It is a model that quantifies the effects of remittances on the key macroeconomic variables such as private consumption (C), investment (I), import (M) and income (Y). There are three behavioral equations, namely the consumption function, the investment function and the import function as well as the national income function.

The structure of the model is presented as follows:

$$C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 C_{t-1} \quad (1)$$

$$I_t = \beta_0 + \beta_1 Y_t + \beta_2 K_{t-1} \quad (2)$$

$$M_t = \gamma_0 + \gamma_1 Y_t + \gamma_2 M_{t-1} \quad (3)$$

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

where: Y stands for the sum of the GDP and the remittances (R); K stands for the gross domestic market of investments; G stands for government expenditure while t indicates time. In this model, C, I, M and Y are endogenous variables. The consumption equation is based on a model of partial adjustment. Investment is supposed to be a positive function of income as a substitute for profit and a negative function of the capital stock left. Import is a function of the income level while lagged import is an indicator of adjusting expectations. In the models with simultaneous equations, estimations based on the ordinary least squares (OLS) method are biased and inconsistent due to the correlation between the explanatory endogenous variables and the stochastic perturbation terms. In this case, the two stage least squares (TSLS) technique gives estimations which are consistent and efficient (Intriligator *et al.* 1996).

A fundamental hypothesis of the classic regression model is the one according to which right-hand-side variables (ex. explanatory variables) are not correlated with the model's innovations. (see <http://www.cnp.ro/user/repository/econometrie.nivel1.v3.2.pdf>). If this hypothesis is violated, both the OLS estimator as well as the WLS estimator (Weighted LS) are inconclusive. Hence, there is a series of well-known situations in which right-hand-side variables are correlated with innovations. A few classic examples emerge when:

- there are endogenously determined variables in the right-hand side of the equation as in the case of simultaneous equation models.
- right-hand-side variables are measured with errors as in the case of using proxy variables to approximate other unnoticeable variables.

For simplicity, we shall refer to those variables correlated with the residues as endogenous variables while those variables which are not correlated with the residues we shall refer to the as exogenous or predetermined variables.

The standard approach for the cases in which right-hand-side variables are correlated with residues is to estimate the regression equation by using the instrumental variables method. The idea behind the instrumental

variables is to find a set of variables called instruments of instrumental variables capable of fulfilling the following conditions:

- they are relevant, that is to say they are correlated with the explanatory variables in the equation;
- they are exogenous, that is to say they are not correlated with the errors.

These instrumental variables are used to eliminate the correlation between the right-hand-side variables and the innovations of the regression equation.

The **Two-stage least squares (TSLS)** method is a special case of the instrumental variables method. As the name implies, there are two distinct stages within the TSLS method. The first stage involves estimating an OLS regression for each variable of the model depending on the set of instrumental variables. The second stage represents a regression of the original equation with all variables substituted by values resulting from the first-stage regressions. The coefficients of this regression are the TSLS estimators of the regression model's parameters.

In order to calculate the TSLS estimator we must have at least as many instruments as equation coefficients. For econometric reasons any right-hand-side variables which are not correlated with errors should be included as instruments. The C constant is always an appropriate instrument so that Eviews shall add it to the list of instruments.

In order to check the hypotheses of the regression model we shall use **the homoscedasticity hypothesis of the residual variable**. To verify this hypothesis, we shall be using the White test. White (1980) obtained a consistent estimator of the heteroscedasticity of the variance-covariance matrix which gives accurate estimations of the standard errors of the linear regression model's parameters in the presence of unknown heteroscedasticity. Eviews gives the option to use the White estimator for the standard errors instead of the standard OLS formula for their calculation. If following the White test, a connection between the analyzed variables comes out then the errors of the model are heteroscedastic, otherwise they are homoscedastic. The Glejser test shall be used as well.

The model presented is estimated for Romania using annual data for the period between 1995 and 2015 with the help of the TSLS model.

Estimations for the TSLS model are presented in table 1 which can be found below. Table 1a presents the estimations resulted for the consumption equation; table 1b also presents the estimations resulted for the investment equation while table 1c presents the estimation resulted for the import equation of the structural model. The variables introduced in the model have been logarithmated beforehand.

Table 1. Estimation of the macro econometric model using the Two Stage Least Squares method

Explanatory variable	Consumption	Investment	Import
Y_t	0.4163	0.5409	0.5748
$C_t(-1)$	0.4748	–	–
$I_t(-1)$	–	0.4431	–
$M_t(-1)$	–	–	0.3949
Constant	1.1984	-0.4989	-0.1103
Adjusted R^2	0.9967	0.9890	0.9946
Durbin Watson	1.6450	1.6093	1.8733
Number of observations	20	20	20
Instrumental variables	$\hat{Y}, C(-1)$	$\hat{Y}, I(-1)$	$\hat{Y}, M(-1)$

Note: $\hat{Y} = Y - \text{residual value}$

Table i

Dependent Variable: LC
 Method: **Least Squares**
 Date: 10/13/16 Time: 15:37
 Sample (adjusted): 1996 2015
 Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.801187	0.150464	5.324760	0.0001
LC(-1)	0.120019	0.139041	0.863196	0.4000
C	0.593938	0.261733	2.269251	0.0366
R-squared	0.997875	Mean dependent var		11.81876
Adjusted R-squared	0.997625	S.D. dependent var		1.150544
S.E. of regression	0.056076	Akaike info criterion		-2.786735
Sum squared resid	0.053457	Schwarz criterion		-2.637375
Log likelihood	30.86735	Hannan-Quinn criter.		-2.757578
F-statistic	3990.718	Durbin-Watson stat		0.781363
Prob(F-statistic)	0.000000			

Table ii

Dependent Variable: LC
 Method: **Two-Stage Least Squares**
 Date: 10/13/16 Time: 19:47
 Sample (adjusted): 1996 2015
 Included observations: 20 after adjustments
 Instrument specification: LY-RESID LC(-1)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.416315	0.208374	1.997920	0.0620
LC(-1)	0.474817	0.192425	2.467541	0.0245
C	1.198476	0.353046	3.394674	0.0034
R-squared	0.997057	Mean dependent var		11.81876
Adjusted R-squared	0.996710	S.D. dependent var		1.150544
S.E. of regression	0.065991	Sum squared resid		0.074031
F-statistic	2873.409	Durbin-Watson stat		1.645077
Prob(F-statistic)	0.000000	Second-Stage SSR		0.125231
J-statistic	4.82E-35	Instrument rank		3

He has chosen the significance level of 10%.

In order to verify the validity of the regression equation, furthermore we shall use two tests regarding the residual variables of the model.

Verification of heteroscedasticity amidst residual variables using the Glejser test:

Heteroskedasticity Test: Glejser

F-statistic	2.082577	Prob. F(2,17)	0.1553
Obs*R-squared	3.935860	Prob. Chi-Square(2)	0.1397
Scaled explained SS	3.947871	Prob. Chi-Square(2)	0.1389

Test Equation:
 Dependent Variable: ARESID
 Method: Least Squares
 Date: 10/13/16 Time: 19:49
 Sample: 1996 2015
 Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.071927	0.180763	-0.397910	0.6956
LY	0.147241	0.103917	1.416912	0.1746
LC(-1)	-0.145502	0.096027	-1.515219	0.1481
R-squared	0.196793	Mean dependent var		0.045981
Adjusted R-squared	0.102298	S.D. dependent var		0.040875
S.E. of regression	0.038728	Akaike info criterion		-3.527009
Sum squared resid	0.025498	Schwarz criterion		-3.377649
Log likelihood	38.27009	Hannan-Quinn criter.		-3.497852
F-statistic	2.082577	Durbin-Watson stat		1.282111
Prob(F-statistic)	0.155251			

The value of **Chi-Square** is 0.13 > 0.05, in consequence the errors of the model are not heteroscedastic. Verification of heteroscedasticity amidst residual variables using the White test:

Heteroskedasticity Test: White

F-statistic	1.730219	Prob. F(2,17)	0.2070
Obs*R-squared	3.382564	Prob. Chi-Square(2)	0.1843
Scaled explained SS	2.510294	Prob. Chi-Square(2)	0.2850

Test Equation:

Dependent Variable: RESID^2
 Method: Least Squares
 Date: 10/13/16 Time: 19:50
 Sample: 1996 2015
 Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000861	0.013031	0.066072	0.9481
LY^2	0.000645	0.000649	0.993080	0.3346
LC(-1)^2	-0.000698	0.000639	-1.091851	0.2901
R-squared	0.169128	Mean dependent var		0.003702
Adjusted R-squared	0.071379	S.D. dependent var		0.005443
S.E. of regression	0.005245	Akaike info criterion		-7.525459
Sum squared resid	0.000468	Schwarz criterion		-7.376099
Log likelihood	78.25459	Hannan-Quinn criter.		-7.496302
F-statistic	1.730219	Durbin-Watson stat		0.976886
Prob(F-statistic)	0.207033			

The value of **Chi-Square** is 0.18 > 0.05, in consequence the errors of the model are not heteroscedastic.

The above results are generated using Eviews 8; the 2nd stage of the TSLS method can be accomplished using two methods: the first method has the role to express the Ct endogenous variable as function of \hat{Y} instrument and the predetermined C(-1) variable in the dialogue box of the equation in order to generate a result using the OLS method as shown by table 1a i; the second method expresses the endogenous variable depending on all independent variables of the structural equation using them as instruments within the "instruments list box", the instrumental \hat{Y} variable and the exogenous predetermined C(-1) variable in order to generate a TSLS result as shown by table 1a ii. For both methods the estimations of the coefficients are the same; nevertheless, the statistical tests for estimating the validity of parameters and the presence of the serial correlation (values of t-statistic, R², d-statistics etc.) are different in both cases. The results show that the second method is more effective because it improves the statistical and econometrical tests for determining the level of significance and validity of the regression equation. As it concerns the estimations resulted in the case of coefficients, we can see that all coefficients are significant at the significance level of 10% and they point out the expected positive theoretical correlations between the dependent variable C and the independent variables Y and C(-1).

Table 1b i

Dependent Variable: LI

Method: **Least Squares**

Date: 10/13/16 Time: 19:52

Sample (adjusted): 1996 2015

Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.733761	0.209295	3.505870	0.0027
LI(-1)	0.286922	0.170808	1.679791	0.1113
C	-1.208951	0.802182	-1.507078	0.1501
R-squared	0.990664	Mean dependent var		10.83784
Adjusted R-squared	0.989566	S.D. dependent var		1.344232
S.E. of regression	0.137310	Akaike info criterion		-0.995676
Sum squared resid	0.320517	Schwarz criterion		-0.846316
Log likelihood	12.95676	Hannan-Quinn criter.		-0.966519
F-statistic	901.9803	Durbin-Watson stat		1.309375
Prob(F-statistic)	0.000000			

Table 1b ii

Dependent Variable: LI

Method: **Two-Stage Least Squares**

Date: 10/13/16 Time: 20:55

Sample (adjusted): 1996 2015

Included observations: 20 after adjustments

Instrument specification: LY-RESID LI(-1)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.540920	0.219747	2.461561	0.0248
LI(-1)	0.443128	0.179274	2.471785	0.0243
C	-0.498942	0.840694	-0.593488	0.5607
R-squared	0.990198	Mean dependent var		10.83784
Adjusted R-squared	0.989045	S.D. dependent var		1.344232
S.E. of regression	0.140696	Sum squared resid		0.336523
F-statistic	856.2560	Durbin-Watson stat		1.609334
Prob(F-statistic)	0.000000	Second-Stage SSR		0.432306
J-statistic	2.29E-35	Instrument rank		3

In order to verify the validity of the regression equation, furthermore we shall use two tests regarding the residual variables of the model.

Verification of heteroscedasticity amidst residual variables using the Glejser test:

Heteroskedasticity Test: Glejser

F-statistic	1.658411	Prob. F(2,17)	0.2198
Obs*R-squared	3.265099	Prob. Chi-Square(2)	0.1954
Scaled explained SS	4.002027	Prob. Chi-Square(2)	0.1352

Test Equation:

Dependent Variable: ARESID

Method: Least Squares

Date: 10/13/16 Time: 20:57

Sample: 1996 2015
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.965345	0.544270	1.773651	0.0940
LY	-0.253104	0.142004	-1.782377	0.0926
LI(-1)	0.210306	0.115891	1.814687	0.0873
R-squared	0.163255	Mean dependent var		0.089495
Adjusted R-squared	0.064814	S.D. dependent var		0.096337
S.E. of regression	0.093163	Akaike info criterion		-1.771456
Sum squared resid	0.147548	Schwarz criterion		-1.622097
Log likelihood	20.71456	Hannan-Quinn criter.		-1.742300
F-statistic	1.658411	Durbin-Watson stat		1.157672
Prob(F-statistic)	0.219807			

The value of Chi-Square is 0.19 > 0.05, in consequence the errors of the model are not heteroscedastic. Verification of heteroscedasticity amidst residual variables using the White test:

Heteroskedasticity Test: White

F-statistic	1.528967	Prob. F(2,17)	0.2451
Obs*R-squared	3.049101	Prob. Chi-Square(2)	0.2177
Scaled explained SS	3.417822	Prob. Chi-Square(2)	0.1811

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/13/16 Time: 20:57
Sample: 1996 2015
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.108728	0.080338	1.353386	0.1937
LY^2	-0.002584	0.001713	-1.508748	0.1497
LI(-1)^2	0.002626	0.001625	1.615733	0.1246
R-squared	0.152455	Mean dependent var		0.016826
Adjusted R-squared	0.052744	S.D. dependent var		0.030409
S.E. of regression	0.029597	Akaike info criterion		-4.064837
Sum squared resid	0.014891	Schwarz criterion		-3.915477
Log likelihood	43.64837	Hannan-Quinn criter.		-4.035680
F-statistic	1.528967	Durbin-Watson stat		1.178109
Prob(F-statistic)	0.245123			

The value of Chi-Square is 0.21 > 0.05, in consequence the errors of the model are not heteroscedastic.

The estimation methods of results in tables 1b i and 1b ii for the regression equation of investment are similar to those obtained for the regression equation of consumption. As it concerns the estimations obtained in the case of coefficients, we can see that all coefficients are significant at the significance level of 50% and they point out the expected positive theoretical correlations between the dependent variable I and the independent variables Y and I(-1). According to the specialty literature, there should be a negative correlation between the dependent variable I and the predetermined independent variable I(-1), but this theory does not apply to this study.

Table 1c i

Dependent Variable: LM
Method: Least Squares
Date: 10/13/16 Time: 21:08
Sample (adjusted): 1996 2015

Included observations: 20 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.971503	0.220099	4.413937	0.0004
LM(-1)	0.066508	0.182733	0.363963	0.7204
C	-1.340455	0.698855	-1.918073	0.0721
R-squared	0.995984	Mean dependent var		11.31785
Adjusted R-squared	0.995512	S.D. dependent var		1.300862
S.E. of regression	0.087151	Akaike info criterion		-1.904869
Sum squared resid	0.129120	Schwarz criterion		-1.755509
Log likelihood	22.04869	Hannan-Quinn criter.		-1.875712
F-statistic	2108.113	Durbin-Watson stat		1.043040
Prob(F-statistic)	0.000000			

Table 1c ii

Dependent Variable: LM

Method: Two-Stage Least Squares

Date: 10/13/16 Time: 21:30

Sample (adjusted): 1996 2015

Included observations: 20 after adjustments

Instrument specification: LY-RESID LM(-1)

Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LY	0.574828	0.262152	2.192723	0.0425
LM(-1)	0.394947	0.217552	1.815411	0.0871
C	-0.110357	0.829295	-0.133074	0.8957
R-squared	0.995217	Mean dependent var		11.31785
Adjusted R-squared	0.994654	S.D. dependent var		1.300862
S.E. of regression	0.095113	Sum squared resid		0.153790
F-statistic	1764.162	Durbin-Watson stat		1.873365
Prob(F-statistic)	0.000000	Second-Stage SSR		0.233602
J-statistic	6.97E-37	Instrument rank		3

In order to verify the validity of the regression equation, furthermore we shall use two tests regarding the residual variables of the model.

Verification of heteroscedasticity amidst residual variables using the Glejser test:

Heteroskedasticity Test: Glejser

F-statistic	1.594664	Prob. F(2,17)	0.2319
Obs*R-squared	3.159420	Prob. Chi-Square(2)	0.2060
Scaled explained SS	3.728349	Prob. Chi-Square(2)	0.1550

Test Equation:

Dependent Variable: ARESID

Method: Least Squares

Date: 10/13/16 Time: 21:33

Sample: 1996 2015

Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.620788	0.497101	1.248817	0.2287
LY	-0.125814	0.156558	-0.803627	0.4327
LM(-1)	0.088921	0.129979	0.684120	0.5031

R-squared	0.157971	Mean dependent var	0.061727
Adjusted R-squared	0.058909	S.D. dependent var	0.063902
S.E. of regression	0.061991	Akaike info criterion	-2.586170
Sum squared resid	0.065329	Schwarz criterion	-2.436810
Log likelihood	28.86170	Hannan-Quinn criter.	-2.557013
F-statistic	1.594664	Durbin-Watson stat	2.182481
Prob(F-statistic)	0.231889		

The value of Chi-Square is 0.20 > 0.05, in consequence the errors of the model are not heteroscedastic.

Verification of heteroscedasticity amidst residual variables using the White test:

Heteroskedasticity Test: White

F-statistic	0.903276	Prob. F(2,17)	0.4238
Obs*R-squared	1.921195	Prob. Chi-Square(2)	0.3827
Scaled explained SS	2.449169	Prob. Chi-Square(2)	0.2939

Test Equation:
 Dependent Variable: RESID^2
 Method: Least Squares
 Date: 10/13/16 Time: 21:33
 Sample: 1996 2015
 Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.086826	0.060352	1.438665	0.1684
LY^2	-0.001983	0.001635	-1.213145	0.2417
LM(-1)^2	0.001782	0.001526	1.168128	0.2589

R-squared	0.096060	Mean dependent var	0.007690
Adjusted R-squared	-0.010286	S.D. dependent var	0.014820
S.E. of regression	0.014896	Akaike info criterion	-5.437922
Sum squared resid	0.003772	Schwarz criterion	-5.288562
Log likelihood	57.37922	Hannan-Quinn criter.	-5.408765
F-statistic	0.903276	Durbin-Watson stat	1.824785
Prob(F-statistic)	0.423826		

The value of Chi-Square is 0.38 > 0.05, in consequence the errors of the model are not heteroscedastic.

The estimation methods of results in tables 1c i and 1c ii for the regression equation of import are similar to those obtained in the case of the regression equation of consumption. As it concerns the estimations obtained in the case of coefficients, we can see that all coefficients are significant at the significance level of 10% and they point out the expected positive theoretical correlations between the dependent variable M and the independent variables Y and M(-1).

The above formulas used to establish the impact and the dynamic multipliers come from the reduced form of the equations expressing the endogenous variables as a function of the predetermined variables in the model. The dynamic effects on the endogenous variables of the shocks within the exogenous variables are pointed out in table 2. In the paper of Intriligator *et al.* (1996), to which Tansel and Yasar refer in their study, the dynamic multipliers can be derived from the equations in their final form for the endogenous variables which are obtained through continuous substitutions for the dynamic terms.

Table 2. The impact and dynamic multipliers for the quantification of the effect of modifications with respect to remittances.

	Impact multipliers		Dynamic multipliers	
	Year 1	Year 2	Year 3	Year 4
Consumption	α_1 / A	$P (\alpha_1 / A)$	$P^2 (\alpha_1 / A)$	$P^3 (\alpha_1 / A)$
Investment	β_1 / A	$M (\beta_1 / A)$	$M^2 (\beta_1 / A)$	$M^3 (\beta_1 / A)$
Import	δ_1 / A	$N(\delta_1 / A)$	$N^2 (\delta_1 / A)$	$N^3 (\delta_1 / A)$
Income	$((\alpha_1 + \beta_1 - \delta_1) / A) + 1$	$((P (\alpha_1 / A) + M (\beta_1 / A) - N (\delta_1 / A))$	$((P^2 (\alpha_1 / A) + M^2 (\beta_1 / A) - N^2 (\delta_1 / A))$	$((P^3 (\alpha_1 / A) + M^3 (\beta_1 / A) - N^3 (\delta_1 / A))$
	$A = 1 - \beta_1 - \alpha_1 + \delta_1$	$M = \beta_2 (1 - \alpha_1 + \delta_1) / A$	$N = \delta_2 (1 - \alpha_1 - \beta_1) / A$	$P = \alpha_2 (1 - \beta_1 + \delta_1) / A$

Table 3. Time distribution of the effects of percentage changes in remittances within the endogenous variables

	Impact multipliers		Dynamic multipliers	
	Year 1	Year 2	Year 3	Year 4
Consumption	0.6740	0.5357	0.4258	0.3384
Investment	0.8758	0.7278	0.6049	0.5027
Import	0.9306	0.5576	0.3341	0.2002
Income	1.6191	0.7059	0.6966	0.6409

α_1 = Marginal propensity to consume = 0.4163

α_2 = Marginal impact of previous consumption on current consumption = 0.4748

β_1 = Marginal propensity to invest = 0.5409

β_2 = Marginal impact of capital stock on investment = 0.4431

δ_1 = Marginal propensity to import = 0.5748

δ_2 = Marginal impact of previous imports on the current imports = 0.3949

δ_2 = Marginal impact of previous income on the current imports = 0.3949

The values of the above indicators are quite high in comparison with the values determined by Glytsos (2005).

Conclusion

The dynamic multipliers for income are obtained by adding up the consumption and investment multipliers and by dropping the ones for import (Tansel and Yasar 2010). The dynamic multipliers determine the effect of a percentage change in remittances in year 1, with no additional increase in the following years, all other predetermined variables remaining unchanged. The results indicate the fact that the impact of remittances on consumption, investment and income is positive both in the short and in the long run. This positive impact and the dynamic effect of remittances on consumption and investment is in line with the reason of altruism and self-interest. Remittances are directed towards the increase in the welfare of emigrant's family members, who comes back home even during economic crises. Also, as emergency option, the emigrants send money back home to secure their wealth because they consider this practice to be the best option in terms of investment. The impact of remittances on consumption has a faster effect than the one on investment which reduces; the reason behind this fact is that a larger portion of remittances is consumed to that detriment of savings in order to satisfy future consumption needs. The changes in consumption, investment and import, generated by remittances, are reflected in the evolution

of income. The impact multiplier for income is significant. As it concerns import, we can draw the conclusion that a part of remittances is used to finance further import.

From a political point of view, any decision made by the government to reduce the flow of remittances towards the economy will have a negative effect on the economic growth; this is due to the fact that the reduction of remittances diminishes both consumption and investment and jeopardizes their role as an integrative part of the economic growth. Any decision leading to the inflow of remittances will have a positive effect on these variables.

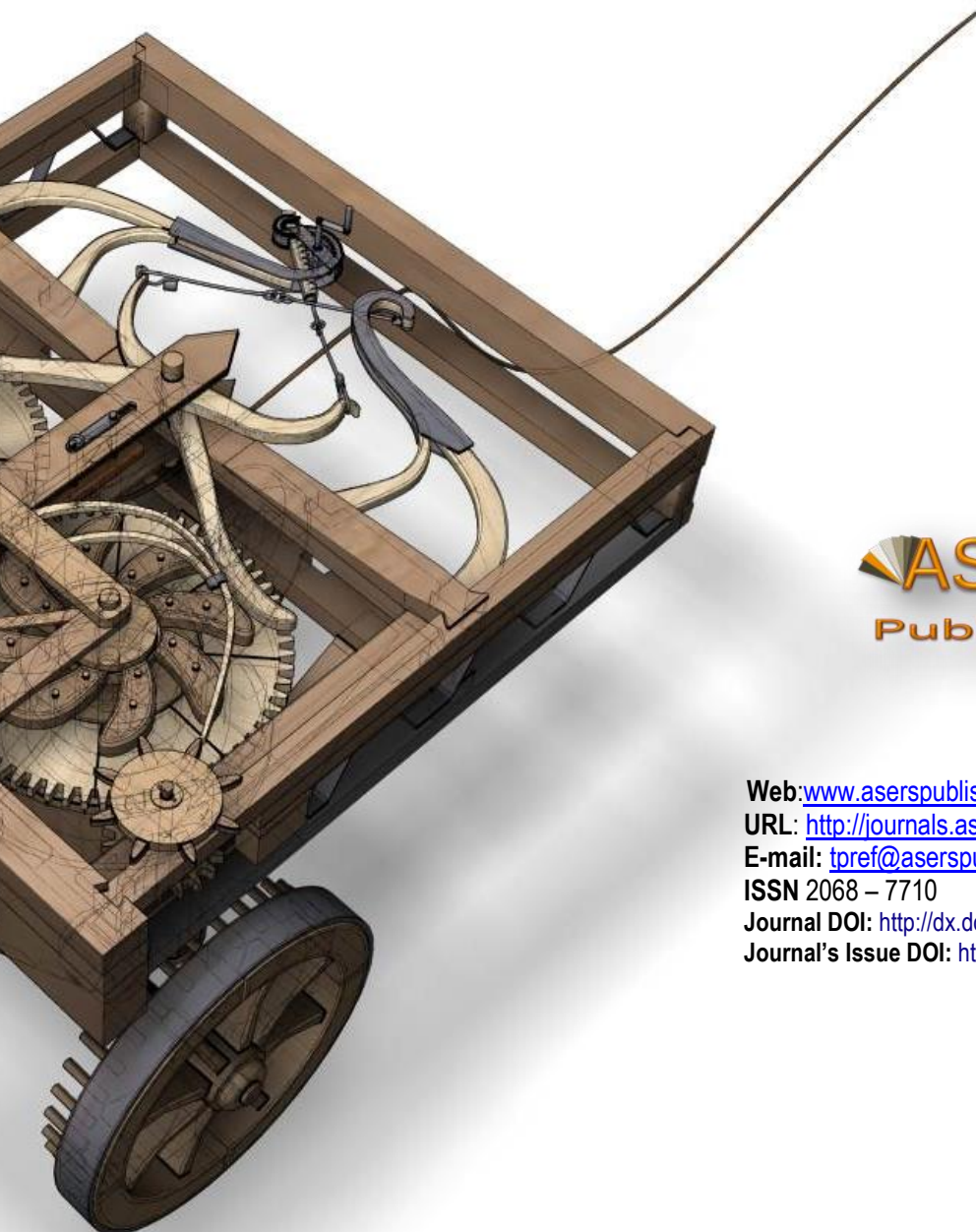
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