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The impact of remittances on the receiving country: some evidence from Romania in European context

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ABSTRACT

The objective of this paper is to study the impact of remittances upon the origin country of emigrants. In order to achieve our purpose, we have performed a quantitative analysis by using econometric models to highlight the correlation and the causality between the studied variables. The empirical research focused on two directions: first, we studied if the remittances cycle is more stable over the business cycle than private capital flows and secondly, we analysed the influence of the inflow of remittances on the economic activity in CEE countries, with emphasis on Romania. Our results are in accordance with the recent studies in the field and conclude that the inflow of remittances is more stable over the business cycle but does not stimulate economic growth in Romania.

1. Introduction

Migration is a complex phenomenon with a multitude of economic, social, cultural and security effects. From an economic point of view, it is questionable who will replace the labour force left in the country, as well as whether the migrants will contribute economically to the development of the country of origin. The studies conducted by international organisations and by researchers revealed that migrants transfer funds in the home country to support their families. According to official data by the World Bank (2016), the remittances sent home by workers from developing countries reached in 2017 the amount of 466 billion USD representing over 70% from the worldwide flows.

The economic literature has paid increased attention to the influence of remittances upon the origin country of migrants, since the number of migrants and the amount of remittances have increased sharply over the last decades, worldwide. There are two categories of studies regarding the remittances: the first category considers the macroeconomic determinants of remittances (Leon-Ledesma & Piracha, 2004; Schiopu & Siegfried, 2006; Silasi & Simina, 2008) and the second category considers
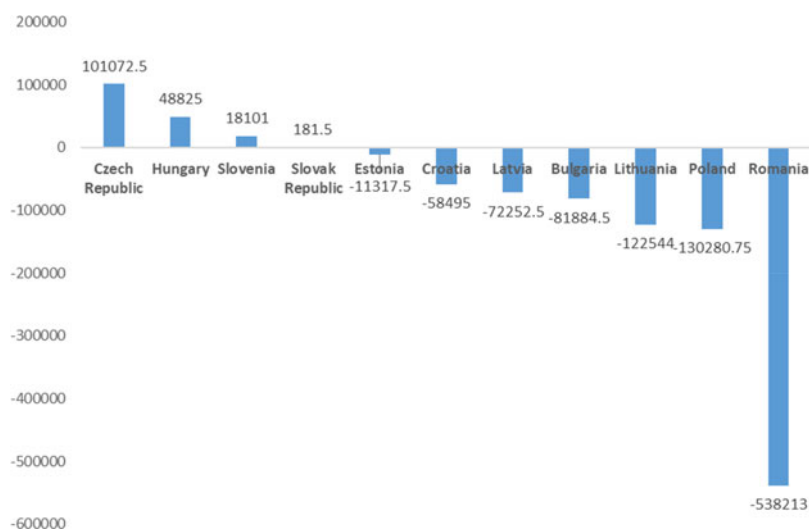
Figure 1. Net migration in CEE Countries, in the period 1996–2017 (the average values of five-year estimates).
Source: World Bank database (http://www.worldbank.org/)
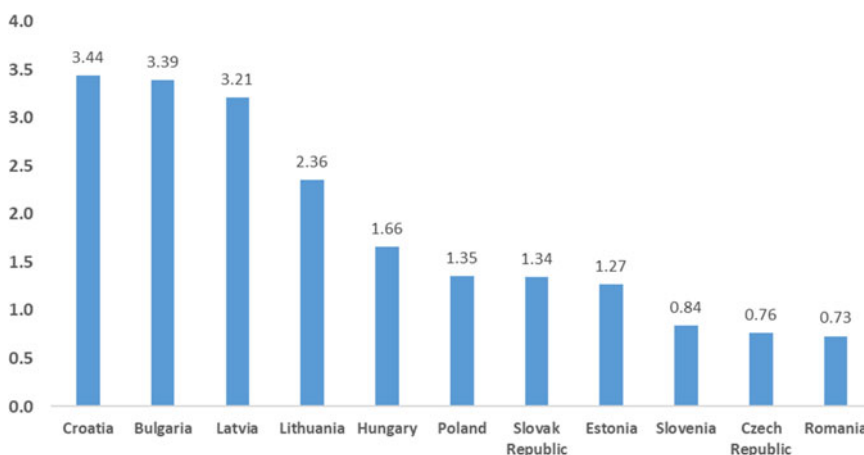
Figure 2. Remittances received in CEE Countries, in the period 1996–2017 (the average values).
Source: World Bank database (http://www.worldbank.org/)

the individual determinants of remittance motives (Rapoport & Docquier, 2005; De Sousa & Duval, 2010; Roman, 2013). In this context, we will refer to the first category of determinants and more precisely, our purpose is to study the effects of remittances upon the economic activity of receiving countries from Central and Eastern Europe (CEE) and in particular from Romania.

We have chosen this country because, as empirical data shows, there is an atypical situation regarding the relation between the level of migration and the volume of the remittances. It is an interesting case because it is the only country in the CEE that registered the lowest level of net migration (Figure 1) and also the lowest level of remittances received (Figure 2).

To better understand the impact of remittances on the economy, first we had to correlate them to the phases of business cycles to see how the emigrants react in different situations (crises or economic boom) and after that we can study their influence on the main macroeconomic indicators. Consequently, the paper comprises two different hypotheses that are tested with two different methods, each specifically to the addressed issue.

The article contributes to the development of knowledge in the economic field by offering an extensive analysis of the literature regarding the positive effect and the negative effect of the remittances on the economy of the receiving countries. Another contribution is related to the empirical analysis that focused on the recent situation in Central and Eastern European countries which adds value to the existing studies.

The second part of this paper puts forward a short literature review regarding the aspects of migration, especially the cyclicality of the remittances received and their impact upon the receiving economies; the third part describes the research methodology used; the fourth part presents the main findings of the study and the last section concludes, gives some limitations and future research directions.

2. Literature review and hypotheses development

From the research done on migration and remittances we found different concepts of remittances: for the countries with low income; remittances are a finance of last resort used mostly for subsistence expenses; for the countries with medium income, the remittances are a part of a diversified portfolio of finance (Julca, 2013) and can stimulate the financial sector, if the amounts received are saved (Aggarwal, Demirgüç-Kunt, & Pería, 2010, Toxopeus & Lensink, 2008).

In this context our objective is to study the impact of remittances on the economy of the CEE countries that had a communist regime before 1990, because they fit into the two categories mentioned above: low income and medium income countries. To achieve our objective, first we studied how the emigrants react in different phases of the business cycle when the economy is vulnerable. Secondly, we studied if the money they send home has a significant impact on the economy in the short-run and on the long-run and which was the main channel through which it influenced economic growth.

2.1. The cyclicality of remittances

In the literature, the relationship between remittance and business cycle was studied by De, Islamaj, Kose, and Yousefi (2016) who consider that "If remittances are countercyclical, then they could help smooth macroeconomic fluctuations, and if they are procyclical, they could amplify business cycle fluctuations". According to Ratha (2007) the remittances tend to be more stable than private capital flows in the stages of a business cycle. The private capital flows are said to be moving pro-cyclically, but remittances have remained more resilient to the economic downturns in the receiving countries (Roman, 2013).

One of the reasons for the stability could be that the workers are concerned about their families that are at home (Oda, 2004), and their volume tends to be higher in times of economic recession or financial crises because migrants living abroad send more money home to help their families. (Yang & Choi 2007; Mohapatra, Joseph, & Ratha, 2012).

To continue the previous work and improve the literature on this subject, we formulated the following hypothesis, to be tested for the CEE countries:

H1. *The inflow of Remittances is more stable over the business cycle than private capital flows*

2.2. Remittances and the economic growth

In the literature in the field there are theoretical and empirical studies that have as their objective an answer to the question: What is the impact of the remittances upon the receiving economies?

These theoretical studies can be grouped by topic in: studies emphasising the positive impact of remittances on receiving countries and studies emphasising the negative impact of remittances on receiving countries. In the following tables, we briefly present the studies on remittances over the last ten years with positive (PE) and negative (NE) effects and their results.

In the first category of papers, the ones that found a positive effect of remittances over economic activity (Table 1), it was shown that when analysing the influence of remittances, the most used indicators were remittances and GDP, in absolute or relative value, to which other independent or control variables were added. As the amount of remittances has an impact on the economy, the indicators that affect it, identified by Lianos (1997) are: the level of income of migrants, the inflation rate, exchange rate, the interest rate and the number of migrants. Also another factor of influence is the economic conditions in both countries (Ahmed & Martínez-Zarzoso, 2016). For instance, De Sousa and Duval (2010) studied remittances flows to Romania, in the period 2005–2009, that were received from various sending countries. They concluded that "bilateral flows are positively influenced by both home and host countries' economic size and geographical distance".

From the other category of papers (Table 2), Chami, Fullenkamp, and Jahjah (2003, 2008) found a negative impact of remittances on growth in both studies. In his study, Abbas, Masood, and Sakhawat (2017) identified variables that have negative and positive influences on remittances, indicating that their effects may differ on macroeconomic indicators.

Many studies focused on migration from Central and Eastern European countries, and on the influence of remittances upon the origin country of migrants (Pirvu & Axinte, 2013; Noja & Moroc, 2016). From the data of the National Institute for Statistics and from other studies the main destination countries of Romanian emigrants are the developed countries in the European Union: Spain (Săseanu & Petrescu, 2011), Italy, Germany and France (Matichescu, Dragan, & Lucheș, 2017). The Romanians working abroad have become, due to their remittances, one of the most important foreign direct investors (in 2017 Remittances were 2.02% of GDP while Foreign Direct Investments were 2.33% of

Table 1. Short synthesis of main studies regarding remittances with positive effects (PE) on the economy.

Authors	Objective	Country, Period	Main indicators	Results
Abbas et al. (2017)	The impact of macroeconomic, financial and political factors on remittances	Pakistan 1972–2012.	Income (GDPR) Inflation rate Interest differential Real effective exchange rate Financial liberalization index Foreign debt as % of GDP Government stability	PE of financial liberalization on remittances flow.
Alam, Wasim, and Ahmad (2017)	The economic determinants of workers' remittances	Pakistan 1975–2016	Workers' Remittances GDP Interest Rate, Exchange Rate Gold Prices, Development Expenditures Stock Market Performance Political Stability	PE with the increase in GDP, development expenditures, gold prices, depreciation of local currency and political stability
Batu (2017)	Temporary inflows of workers' remittances positively affect GDP per capita, while a permanent increase of remittances does not	81 countries, 1970–2012	GDP, GNP Consumption Investment Trade balance/GDP Remittance Remittance/GDP	PE in investment and output.
Chirila and Chirila, (2017)	The impact of remittances have on the economic development, investments and exports	Romania, 1994–2015	GDP Remittances Investment Exports	PE in imports, an appreciation of the exchange rate, exports less competitive, economic growth
Cooray and Mallick (2013)	The fluctuations in remittance flows over the international business cycles	116 countries, 1970–2007	Remittance inflow/GDP Remittance outflow/GDP Remittance net flow/GDP Volatility of GDP growth Inflation volatility Exchange rate volatility Money supply /GDP Investment-GDP ratio	PE with the growth volatility in host countries
De Sousa and Duval (2010)	The role of geographic distance for bilateral remittances	Romania 2005–2009	Remittance GDP Exchange rate Unemployment Distance	Bilateral flows are positively influenced by both home and host countries' economic size and geographical distance
Di Marco, Marzovilla, and Nieddu (2015)	The relationship between remittances and business cycle, the reason of sending remittances	Philippines, 1977–2013	Remittances GDP	PE on remittances depend on the positive fluctuations in the GDP, the existence of a pro-cyclic effect on GDP, the reasons of remittances can change over the time
Giuliano and Ruiz-Arranz (2009)	The interaction of remittances and financial development	100 countries, 1975–2002	GDP per capita growth LogInGDP Remittances/GDP Dep/GDP Gov Fiscal Balance Inflation	PE on growth and investment
Jackman (2014)	Investigates the business cycle properties of remittances	Caribbean countries (Barbados, Dominica, Jamaica, Trinidad and Tobago), 1970–2009	Remittances Real GDP	PE by the domestic business cycles in Barbados and Jamaica and for Dominica Trinidad and Tobago PE by US business cycle

Table 1. Continued.

Authors	Objective	Country, Period	Main indicators	Results
Lartey (2017)	The impact of remittances on economic growth in beneficiary countries through exchange rate policy	135 developing and transition countries, 1970–2007	Remittances (% of GDP) Remittances GDP per capita growth Exchange rate regime Population growth Government spending Inflation Investment Domestic credit	PE under flexible exchange rate regimes, PE under a fixed exchange rate regime in less financially developed countries
Simionescu and Dumitrescu, (2017)	The impact of remittances on economic growth, private consumption, private investments and the government tax revenue	74 developing countries, 1989–2015	GDP per capita GDP Private consumption Private investment Remittances received Population annual growth Deposits' interest rate Real interest rate Government Tax Revenue	PE with economic growth and private consumption expenditure.
Williams (2017)	The effect that remittances have on democratic institutions	Sub-Saharan Africa, 1975–2014:	Remittances per capita Trade Per capita GDP Population Urbanization Infant mortality Life expectancy	PE in increasing schooling and reducing poverty

GDP), which are considered a large source of external financing. (Gradi, 2014 and Bucevska, 2011). Under those circumstances, there are more and more questions about the way those remittances influence not only the migrants' families that were left behind, but also the economic development of the country.

To contribute to the development of the literature for the CEE countries, we formulated the second hypothesis:

H2. *The inflow of Remittances has a significant influence on the economy of the receiving country*

3. Research methodology

To study the effects of migration and in particular the impact of remittances on the economic activity of the receiving country, an econometric analysis was made using annual data series from theWorld Bank, for a time span of 21 years (1996–2017). We collected the information regarding gross domestic product (GDP), the inflow of remittances (Remit), the inflow of foreign domestic investments (FDI), the rate of investment (Inv), the value of the export of goods and services (Exp), the final consumption expenditure (Cons) and the estimated five years' values of net migration for the countries in Central and Eastern Europe (CEE). We used Stata 13 software for the testing and estimation of the econometric analysis.

The empirical research began with the study of the dynamics of remittances (as % of GDP), net migration and the GDP per capita (expressed million USD at constant prices) in the CEE countries. In this context, we observed an atypical situation regarding the relationship between the number of emigrants and the volume of received remittances in the case of Romania, which we have chosen to compare and contrast its results with the other CEE countries.

Table 2. Short synthesis of main studies regarding remittances with negative effects (NE) on the economy.

Authors	Objective	Country, Period	Main indicators	Results
Abbas et al. (2017)	The impact of macroeconomic, financial and political factors on remittances	Pakistan, 1972–2012	Income (GDPR) Inflation rate Interest differential Real effective exchange rate Financial liberalization index Foreign debt as % of GDP Government stability	NE of inflation, government debt and foreign debt
Bettin et al. (2017)	The effect of structural characteristics, macroeconomic conditions, and adverse shocks in recipient economies upon international remittances	103 Italian provinces and 79 developing countries, 2005–2011	Remittances GDP Population Ratio of domestic credit to the private sector over GDP Official aid per capita External debt Growth rate of the migrant stock	NE in business cycle in recipient countries
Chami et al. (2003)	Cross-country study of workers' remittances	83 countries, 1970–1998	Remittances Real GDP per capita Investment rate Rate of inflation, The ratio of net private capital flows to GDP.	NE of remittances on economic growth
Chami et al. (2008)	Identify the macroeconomic consequences of remittances and empirical examination of the macroeconomic effects of remittances	108 countries, 1970–2004	GDP Growth per capita Remittances	NE of remittances on economic growth, even in the most underdeveloped financial system
De et al. (2016)	The behavior of remittances over the business cycle	109 countries, 1980–2012	GDP constant GDP per capita GDP deflator Remittances Private household consumption Foreign direct investment Exchange rate regime	NE on country-specific consumption and output growth, but the remittances are a more stable financial input like foreign direct investments.
Frankel (2011)	Remittances can be equated with capital flows to some countries.	64 pairs of countries 1979–2005	Remittances Difference in Cyclical position GDP per capita unemployment Product Population	NE with output fluctuations (NE to the cyclical position in the receiving country)

To validate the first hypothesis, (H1) *The inflow of Remittances is more stable than the inflow of foreign direct investment over the business cycle*, we would use Hodrick-Prescott high-pass filter (HP filter) that extracts the cyclical component (c_t) of the time series by minimising the following equation:

$$\min_{\tau_t} \left(\sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} \left[(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}) \right]^2 \right) \qquad (1)$$

Where τ_t is the trend, y_t is the time series for: Gross Domestic Product (GDP), Remittances (Remit) and Foreign Direct Investment (FDI) and λ is the multiplier that

controls the frequency of the extracted series which took the value 6.25 for annual data (Curea-Pitorac, 2018).

After we obtained the cyclical component for the indicators we would employ the methodology used by Sayan (2006) and calculated the contemporaneous cross-correlations and asynchronous correlations (the remittances and foreign direct investment cyclical component was used at time t-1, t and t + 1) between them to identify the nature of the co-movement: procyclical, countercyclical or acyclical. This method would enable us to identify how the remittances received and the inflow of foreign direct investments respond to cyclical fluctuations.

The empirical research performed for the second hypothesis, H2. *The inflow of Remittances has a significant influence on the economy of the receiving country,* was made for 11 CEE countries: Bulgaria (BGR), Czech Republic (CZE), Estonia (EST), Croatia (HRV), Hungary (HUN), Lithuania (LTU), Latvia (LVA), Poland (POL), Romania (ROU), Slovak Republic (SVK) and Slovenia (SVN).

To test this hypothesis, we would analyse the evolution of the indicators over the economic activity using descriptive statistics, correlations and variables dynamics, construct the regression model and apply a series of pre-estimation test that determined the type of regression we used.

Adapting the methodology from Giuliano and Ruiz-Arranz (2009) and Bettin and Zazzaro (2012) we started with an OLS regression to first determine the nature of remittances and the main channel through which it influences the economic growth. The following regression model was tested for each country.

$$\text{GDP}_{it} = \alpha_{it} + \beta_1 \text{Remit}_{it} + \beta_2 \text{Inv}_{it} + \beta_3 \text{Remit} * \text{Inv}_{it} + \varepsilon_t \quad (2)$$

The dependent variable was the rate of change of the real GDP per capita; the independent variable was the remittances (Remit) received because the main objective is to study the impact of remittances on the economy. To control for endogeneity, we addressed the problem of omitted variable by adding in the model four control variables, that have an impact on GDP/cap: Foreign Direct Investments (FDI), Investment rate (Inv), Export of goods and services (Exp) and Final consumption expenditures (Cons). In consequence, the regression model was the following:

$$\text{GDP}_{it} = \alpha_{it} + \beta_1 \text{Remit}_{it} + \beta_2 \text{FDI}_{it} + \beta_3 \text{Inv}_{it} + \beta_4 \text{Exp}_{it} + \beta_5 \text{Cons}_{it} + \varepsilon_t \quad (3)$$

Where α_t represents the constant term (or intercept), β_1 to β_3 are the coefficients of the explanatory variable, ε_t is the error term, i represents each CEE country and t represents the analysed years (1996–2017).

The pre-estimation testing began with Augmented Dickey Fuller unit-root test to check for stationarity; the multicollinearity for the independent variables was determined by variance inflation factor (VIF), and the Breusch-Pagan/Cook-Weisberg test was used to check for heteroscedasticity. Also, we checked for serial correlation in the disturbance with Breusch-Godfrey LM test and for autoregressive conditional heteroscedasticity (ARCH) with LM test.

To study the causal relation between the variables, we would start with defining an autoregressive vector (VAR) for the empirical study, because we want to capture the

linear interdependencies between the past lags of the variable itself and past lags of the other variables. From the lag-order selection test it was revealed that the model has two lags and the Johansen tests showed cointegration among variables so we had to extend the VAR model to a vector error correction model (VECM). In this way we will be able to identify the short-run and the long-run relationship between variables (Golitsis, Avdiu, & Szamosi, 2018). The model is the following:

$$\Delta yt = \alpha\beta'yt - 1 + \sum_{t=1}^{p-1} \Gamma_i \Delta t_{t-i} + \varepsilon t \tag{4}$$

Where y_t represents the vector of the endogenous variables, α and β are the parameter matrices with rank $r < k$, Γ_i the matrices of parameters, ε_t is a vector of normally distributed errors and t represents the analysed years (1996–2017).

The robustness analysis would include post-estimation tests, like Lagrange-multiplier test for autocorrelation in residuals and Granger causality Wald test. Also, the stability condition of estimates was checked obtaining the eigenvalue roots of the companion matrix.

4. Results and discussions

4.1. Descriptive analysis

To ensure a high degree of comparability from the perspective of economic development, we focused the empirical analysis on the countries from Central and Eastern Europe (CEE), the former socialist ones. Data series regarding the inflow of the remittances (as percent of GDP), showed (Figure 2) that the average value for the studied period varied from 3.44% of GDP (in Croatia) to 0.73% of GDP (in Romania). The first notable feature was that almost all of them registered a high level of inflow of remittance. The first three places were held by Croatia, (3.44% of GDP), Bulgaria (3.39% of GDP) and Latvia (3.21% of GDP) and in the last place was Romania (0.67% of GDP).

The more developed countries have a positive net migration, which means that the number of immigrants was higher than the number of emigrants, and the developing countries have a negative value of net migration. In CEE, only four countries had a positive value of net migration: Czech Republic, Hungary, Slovenia and Slovakia (Figure 1).

Given the registered values of the remittances, we compared them with net migration and expected a direct correlation between them. The countries that registered a high percentage of remittances should have a larger number of emigrants, and thus a negative net migration. This was the case for almost all of them, except Romania, which registers the lowest level of remittances received and also the lowest level of net migration.

In search for an explanation for this atypical situation we studied the real GDP per capita for all CEE countries. The indicator was expressed in million USD at constant prices with the base year 2010. In Figure 3, the average value of the indicator for the period studied was presented, from the highest levels of GDP per capita
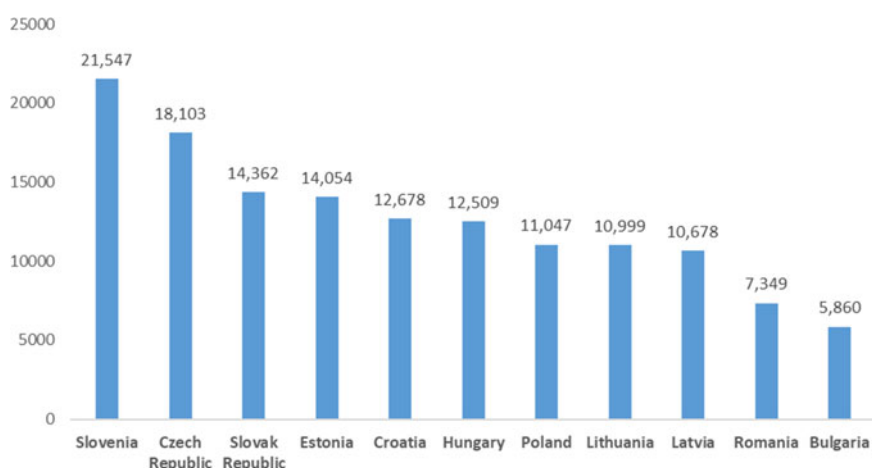
Figure 3. Real GDP per capita in CEE Countries, in the period 1996–2017 (constant millions USD, the average values).
Source: World Bank database (http://www.worldbank.org/)

(Slovenia and Czech Republic) to the lowest levels of GDP/cap (Romania and Bulgaria).

A possible explanation for this situation is that the inflow of remittances entered the country on informal channels, and in reality the volume is much higher, as suggested by a survey of the Romanian Institute of Evaluation and Strategy (IRES) realised in the period 2006–2015. Another reason could be the high levels of the non-observed economy in Romania. It is well known that in Romania the level of the underground economy is still high (Imbrescu, 2007), above the EU average, and the value of remittances has been transferred to an increasing proportion by informal means (50% in 2004, OECD, 2006).

The descriptive statistics of the variables used to test the second hypothesis (the growth rate of real GDP per capita, remittances, foreign direct investment (FDI), investment rate and export of goods and services) are presented in Table 3. The average value of the remittances in the studied period among the CEE countries was 1.85% of GDP; it varied from 0.72% (ROU) to 3.43% (HRV). The average value of FDI was 5.04% of GDP, with a minimum value of 1.93% (SVN) and maximum 10.17% (HUN). The investment rate recorded an average value of 25.62%, the lowest rate was 21.07% (LTU) and the highest was 30% (CZE). Regarding the value of export, it varied among countries from 33.35% (ROU) to 73.09% (SVK) with an average value of 54.62% of GDP.

4.2. The cyclical characteristics of remittances in CEE countries

To validate the first hypothesis which claims that the remittances are more stable over the business cycle than private capital flows, we performed contemporaneous correlations with time lag of the cyclical components of GDP, Remittances and Foreign Direct Investment for the CEE countries.

Table 3. Descriptive statistics.

Country	Variable	Obs	Mean	Std. Dev.	Min	Max	DF unit root test (for 1st diff)
BGR	Real GDP/cap growth	22	1.03	0.037	0.94	1.08	−7.34***
	Remittances (%GDP)	22	3.39	2.27	0.31	8.19	−1.801**
	FDI (%GDP)	22	8.17	7.51	1.07	31.24	−2.95**
	Investment rate (%)	22	23.19	7.43	5.93	37.86	−2.92**
	Export (%GDP)	22	50.38	11.07	33.90	66.32	−3.67***
	Consumption (%GDP)	22	82.52	4.47	74.48	88.45	−5.07***
CZE	Real GDP/cap growth	22	1.022	0.028	0.94	1.06	−4.90***
	Remittances (%GDP)	22	0.76	0.43	0.11	1.66	−1.801**
	FDI (%GDP)	22	5.06	2.82	0.90	10.37	−6.87***
	Investment rate (%)	22	30.00	1.13	28.17	32.07	−4.93***
	Export (%GDP)	22	60.87	14.81	38.31	82.54	−3.49***
	Consumption (%GDP)	22	68.96	1.93	65.48	72.16	−4.64***
EST	Real GDP/cap growth	22	1.04	0.060	0.85	1.13	−5.00***
	Remittances (%GDP)	22	1.27	0.89	0.034	2.36	−1.801**
	FDI (%GDP)	22	7.87	5.24	−3.20	22.32	−8.46***
	Investment rate (%)	22	28.91	4.91	20.32	38.48	−3.05**
	Export (%GDP)	22	70.28	9.59	57.39	86.53	−3.80***
	Consumption (%GDP)	22	73.11	3.04	69.16	80.01	−3.76***
HRV	Real GDP/cap growth	22	1.02	0.033	0.92	1.067	−6.24***
	Remittances (%GDP)	22	3.43	0.633	2.26	4.53	−1.801**
	FDI (%GDP)	22	4.06	1.977	0.32	7.60	−6.84***
	Investment rate (%)	22	24.87	3.002	19.43	31.20	−3.44***
	Export (%GDP)	22	39.10	5.85	29.48	51.26	−3.61***
	Consumption (%GDP)	22	80.29	3.19	76.60	87.27	−4.50***
HUN	Real GDP/cap growth	22	1.02	0.026	093	1.05	−6.36***
	Remittances (%GDP)	22	1.66	1.22	0.291	3.70	−1.801**
	FDI (%GDP)	22	10.17	18.14	−15.9	55.48	−5.65***
	Investment rate (%)	22	25.36	1.63	22.15	27.06	−3.95***
	Export (%GDP)	22	71.34	15.28	41.84	90.21	−3.73***
	Consumption (%GDP)	22	71.01	2.55	69.20	79.18	−4.54***
LTU	Real GDP/cap growth	22	1.05	0.054	0.86	1.12	−5.27***
	Remittances (%GDP)	22	2.35	1.67	0.02	4.50	−1.801**
	FDI (%GDP)	22	3.21	1.95	0.04	8.23	−5.42***
	Investment rate (%)	22	21.07	2.77	15.99	27.98	−3.58***
	Export (%GDP)	22	57.70	16.53	32.41	84.06	−3.82***
	Consumption (%GDP)	22	83.72	3.22	78.89	89.30	−4.59***
LVA	Real GDP/cap growth	22	1.05	0.58	0.87	1.12	−3.85***
	Remittances (%GDP)	22	3.21	1.93	0.64	6.05	−1.801**
	FDI (%GDP)	22	4.04	2.27	−0.12	8.78	−3.77***
	Investment rate (%)	22	25.37	5.43	15.17	36.90	−3.42**
	Export (%GDP)	22	46.34	10.32	35.03	61.30	−3.01**
	Consumption (%GDP)	22	81.59	3.45	77.48	89.84	−5.67***
POL	Real GDP/cap growth	22	1.038	0.018	1	1.07	−6.62***
	Remittances (%GDP)	22	1.35	0.599	0.48	2.46	−1.801**
	FDI (%GDP)	22	3.37	1.48	.151	6.22	−5.17***
	Investment rate (%)	22	22.29	2.01	18.72	25.27	−3.12**
	Export (%GDP)	22	36.75	9.60	22.09	53.39	−5.38***
	Consumption (%GDP)	22	80.07	2.27	76.05	84.96	−3.52***
ROU	Real GDP/cap growth	22	1.03	0.044	0.94	1.10	−5.51***
	Remittances (%GDP)	22	.72	.669	.044	2.02	−1.801**
	FDI (%GDP)	22	3.57	2.252	.707	8.909	−5.76***
	Investment rate (%)	22	25.85	6.31	17.88	41.47	−4.06***
	Export (%GDP)	22	33.35	5.67	22.86	41.44	−3.66***
	Consumption (%GDP)	22	81.79	4.36	75.21	89.25	−4.00***
SVK	Real GDP/cap growth	22	1.035	0.033	0.944	1.107	−5.82***
	Remittances (%GDP)	22	1.341	0.947	0.061	2.44	−1.801**
	FDI (%GDP)	22	3.975	3.085	−0.35	12.00	−8.30***
	Investment rate (%)	22	27.87	3.741	23.25	24.64	−4.90***
	Export (%GDP)	22	73.09	16.91	46.65	96.30	−3.68***
	Consumption (%GDP)	22	75.25	1.591	72.63	80.35	−5.02***

(*continued*)

Table 3. Continued.

Country	Variable	Obs	Mean	Std. Dev.	Min	Max	DF unit root test (for 1st diff)
SVN	Real GDP/cap growth	22	1.023	0.333	0.913	1.063	−5.06***
	Remittances (%GDP)	22	0.838	0.182	0.545	1.282	−1.801**
	FDI (%GDP)	22	1.930	1.785	−0.68	7.85	−5.62***
	Investment rate (%)	22	27.037	4.374	19.73	33.966	−2.92**
	Export (%GDP)	22	61.611	11.97	44.14	82.210	−4.09***
	Consumption (%GDP)	22	73.627	2.429	68.42	77.075	−2.82*

Note: ***and ** represent 1% and 5% significance level.
Source: Own computation using Stata 13 software.

Table 4. The correlations between GDP cycle and Remittances cycle in Central and Eastern European (CEE) Countries (1996–2017).

	Remit (t-1)	FDI (t-1)	Remit (t)	FDI (t)	Remit (t + 1)	FDI (t + 1)	Nature of the Remit flow co-movement	Nature of the FDI flow co-movement
Whole sample	**−0.0293**	0.016	−0.0132	**0.1579**	0.0118	0.1268	Acyclical	Acyclical
BGR	0.0693	−0.024	**0.1046**	0.360*	0.0106	**0.573***	Acyclical	Procyclical
CZE	−0.44**	−0.121	−0.051	0.011	**0.686***	0.306	Procyclical	Acyclical
EST	−0.181	−0.235	0.2107	0.072	**0.788***	0.282	Procyclical	Acyclical
HRV	**−0.49**	0.317	−0.206	0.2637	0.063	0.028	Countercyclical	Acyclical
HUN	0.0515	**0.410***	0.3498	0.3411	**0.457**	0.019	Procyclical	Procyclical
LTU	−0.38*	−0.123	0.0240	**0.525**	**0.3844***	0.356	Procyclical	Procyclical
LVA	0.1953	−0.164	−0.312	0.665***	**−0.57***	**0.761***	Countercyclical	Procyclical
POL	−0.171	−0.255	0.1360	**0.417***	0.2172	0.350	Acyclical	Acyclical
ROU	−0.036	−0.026	0.2607	0.192	**0.3488**	0.1007	Acyclical	Acyclical
SVK	0.0820	**−0.215**	0.1527	0.085	**0.2120**	0.1520	Acyclical	Acyclical
SVN	−0.167	**−0.196**	**0.1854**	0.141	0.0608	0.1522	Acyclical	Acyclical

Note: ***, ** and * represent 1%, 5% and 10% significance level.
Source: Own computation using Stata 13 software.

Table 4 reports the coefficients for each country and for all of them and the highest correlation coefficient, at the absolute value, is shown in bold. The results obtained highlight three types of remittances co-movement: acyclical (in five countries, BGR, POL, ROU, SVK and SVN), procyclical (in four countries, CZE, EST, HUN and LTU) and countercyclical (in two countries, HRV and LVA) and two types of foreign direct investment co-movement: procyclical (for BGR, HUN, LTU, LVA and POL) and acyclical (for CZE, EST, HRV, ROU, SVK and SVN).

For most of the countries the strongest correlation coefficient was registered at $t + 1$; the flows of remittances and FDI reacted with a time lag of one year. According to the literature mentioned above, to validate the hypothesis, the FDI co-movement should be procyclical while the remittances co-movement should be countercyclical or acyclical. This is the case for only two countries: Bulgaria (BGR) and Latvia (LVA).

The highest correlation coefficients were recorded for Estonia (EST) and The Czech Republic (CZE), where remittances received were not synchronous with the business cycle. The same type of procyclical movement was found in Hungary (HUN) and Lithuania (LTU). The results signify that the emigrants from these countries increased the money they sent home in expansion periods but with a time lag of one year. Graphically, the GDP and Remittances cycles can be observed in Figure 4.

Another type of co-movement, a countercyclical one, was identified in Croatia (HRV) and Latvia (LVA). Here, the emigrants increase the value of remittances in
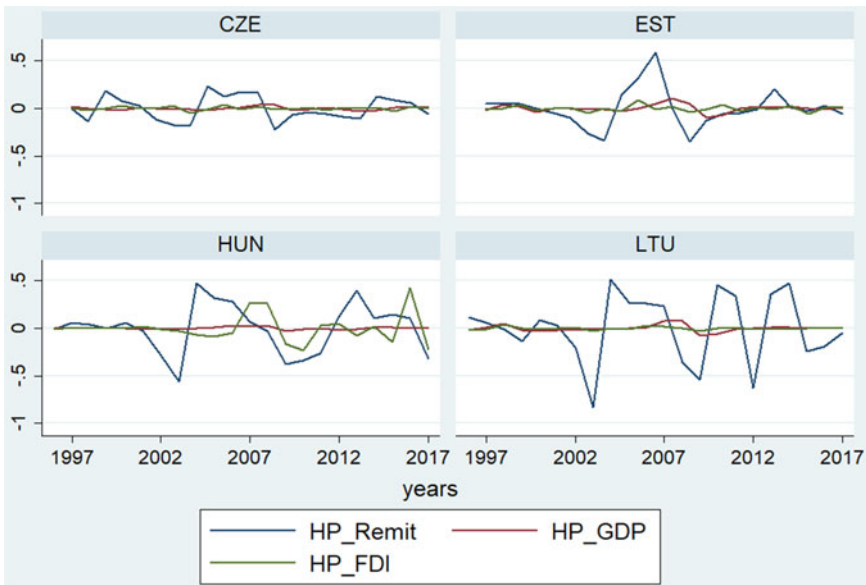
Figure 4. The procyclical movement of the GDP and Remittances cycles in CEE countries (1996–2017).
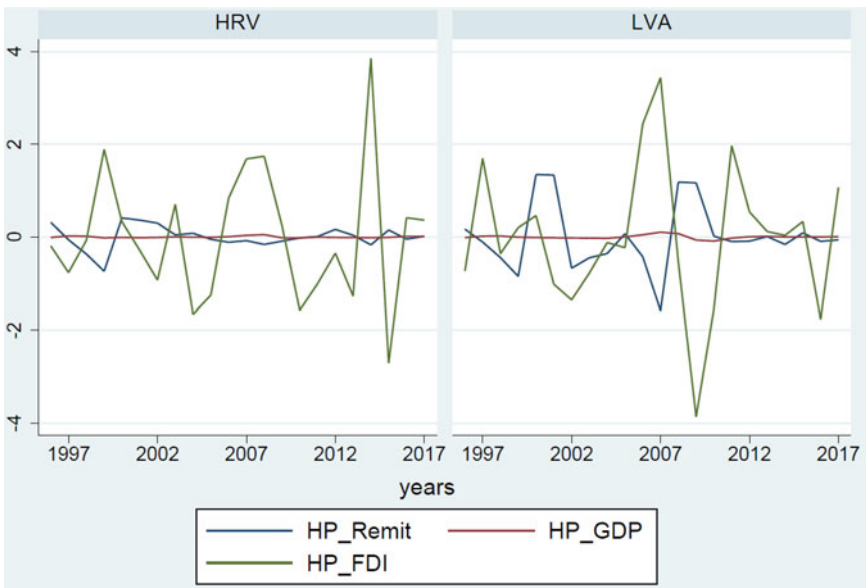
Figure 5. The countercyclical movement of the GDP Remittances and Foreign Direct Investment cycles in CEE countries (1996–2017).

recession or economic crises periods, to help their families in difficult times. Both movements are asynchronous: in LVA they respond with a time lag of one year after the event and in HRV one year before (Figure 5).

For the rest of the countries, the correlation coefficients revealed an acyclical co-movement (both of remittances and of FDI). A factor that contributed to this situation could be the availability of data series regarding the remittances, which can be

Figure 6. The acyclical movement of the GDP and Remittances cycles in CEE countries (1996–2017).

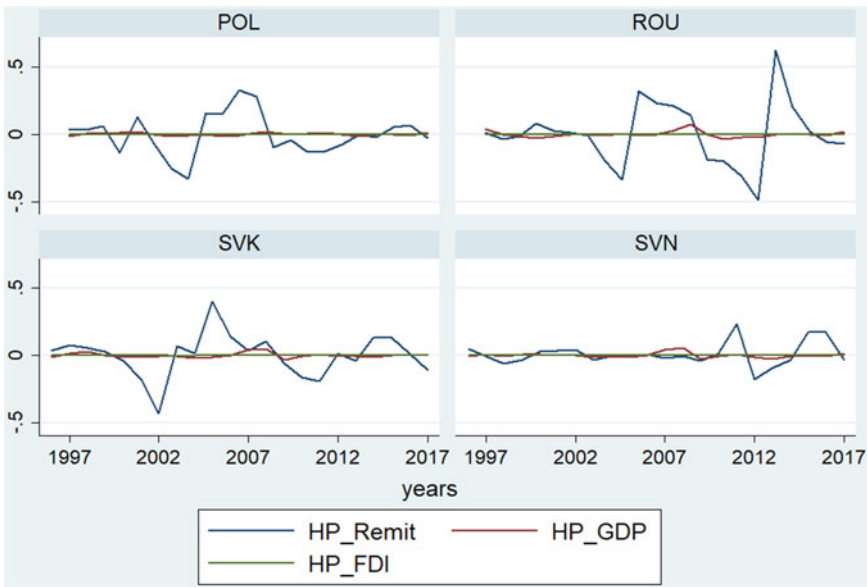found only annually. Considering that the analysed period is not very long, comprising only 21 years, an improved result could be obtained by analysing quarterly or monthly data (Figure 6).

Among the countries that register an acyclical movement (BGR, POL, SVK, SVN) is also Romania. Studying its GDP cycle, we identified two periods of recession in our timespan (2001–2003 and 2009–2012). In the first one, 2001–2003, when only the Romanian economy experienced an economic crisis, the volume of Remittances followed an upward trend, the movement was countercyclical, but in the second period, 2009–2012, during the global economic crises, it decreased, a procyclical movement. According to a study, in the first year of crises, 100,000 Romanians working abroad have lost their jobs […] However, only 14% of them had the intention to come back to Romania, 33% will remain for 2–5 more years abroad, 15% will come back only after 5 years, while 29% have no intention of coming back (Sirghi & Hategan, 2011).

The results obtained are in accordance with other studies in the literature; Jackman (2014) studied the correlation with the business cycle in Barbados, Jamaica and U.S. and obtained a procyclical movement and Cooray and Mallick (2013) developed a large study on 116 countries worldwide and found a strong positive correlation between the variables. The countercyclical movement was also obtained by Bettin, Presbitero, Spatafora, and Nikola (2017) on 79 developing countries, by Frankel (2011) who studied 64 countries worldwide and by De et al. (2016) with an extensive study on 109 countries divided as developed, developing and emerging.

In conclusion, the first hypothesis was validated especially for two countries (HRV and LVA) but also for other countries where the movement was acyclical and for the whole group, the correlation coefficient was negative, indicating a countercyclical co-movement but very low to be taken into consideration.

Table 5. The correlation matrix at panel level for CEE countries.

		(1)	(2)	(3)	(4)	(5)	(6)
(1)	Real GDP/cap growth	1					
(2)	Remittances (%GDP)	0.0569	1				
		(0.3779)					
(3)	FDI (%GDP)	0.1431	0.0773	1			
		(0.0260)	(0.2312)				
(4)	Investment rate (%)	0.1527	−0.0148	0.1741	1		
		(0.0174)	(0.8187)	(0.0066)			
(5)	Export (%GDP)	−0.0297	0.0924	0.0807	0.1266	1	
		(0.6455)	(.1520)	(0.2112)	(0.0492)		
(6)	Consumption (%GDP)	0.0659	0.2220	−0.0319	−0.5436	−0.6070	1
		(0.3071)	(0.0005)	(0.6218)	(0.0000)	(0.0000)	

Note: *p*-values are reported in parenthesis.
Source: Own computation using Stata 13 software.

Table 6. The estimates of OLS regression.

Country	R-squared	F	Remittances	Investment rate	Remit*Inv
Whole sample	0.58	338.21***	0.32***		
	0.98	3984.78***	0.35***	0.039***	−0.013***
BGR	0.71	53.72***	0.21***		
	0.96	163.30***	0.31***	0.051***	−0.014***
CZE	0.77	71.60***	1.03***		
	0.99	9800.68***	0.52**	0.032***	−0.015**
EST	0.66	42.08***	0.55***		
	0.99	716.36***	0.37***	0.041***	−0.016***
HRV	0.97	702.91***	0.28***		
	0.99	5380.84***	0.32***	0.040***	−0.012***
HUN	0.65	40.21***	0.40***		
	0.99	3727.8***	0.37***	0.040***	−0.014***
LTU	0.67	42.66***	0.30***		
	0.99	1856.82***	0.23***	0.054***	−0.012***
LVA	0.71	52.27***	0.23***		
	0.98	432.92***	0.30***	0.045***	−0.012***
POL	0.84	115.55***	0.64***		
	0.99	5457.42***	0.64***	0.046***	−0.028***
ROU	0.56	27.72***	0.79***		
	0.98	467.53***	1.54***	0.042***	−0.058***
SVK	0.68	44.64***	0.52***		
	0.99	1949.32***	0.32***	0.032***	−0.008**
SVN	0.95	495.59***	1.16***		
	0.99	4786.30***	1.18***	0.036***	−0.042***

Note: ***and ** represent 1% and 5% significance level.
Source: Own computation using Stata 13 software.

4.3. The VECM analysis

After the descriptive analysis of the indicators presented in the section above, we used the Dickey Fuller test, to check for unit root, and this showed that the variables were not stationary, so we calculated the first difference, redid the test and obtained all variables, for all countries, integrated of first order and stationary at 10% level of significance (Table 3). From the correlation matrix (Table 5), we observed that between the real GDP/cap expressed as rate of change and the percent of Remittances there was a positive but non-significant correlation.

The growth regression was estimated first, taking into consideration only remittances and after that included in the model a channel of propagation of their effects, investment rate, as well as the interaction between the two. A negative interaction coefficient (as can be seen in Table 6) showed that the remittances have a bigger impact on

Table 7. The estimates of VECM.

Country	R-sq	Chi2	Short-run parameters					Cointegration equations
			Remit	FDI	Inv	Exp	Cons	
BGR	0.90	94.36***	–	0.1	0.01	–	–	$\Delta GDP = 0.22 - 0.012\Delta Remit - 0.002 Trend$
CZE	0.92	131.96***	0.1	–	0.05	0.01	0.05	$\Delta GDP = -0.051 - 0.089\Delta Remit + 0.003 Trend$
EST	0.90.	92.43***	–	–	–	–	0.5	$\Delta GDP = -0.077\Delta Remit$
HRV	0.93	153.64***	–	–	0.05	0.01	–	–
HUN	0.61	15.93*	–	–	–	–	–	$\Delta GDP = -0.061\Delta Remit$
LTU	0.95	234.01**	0.1	–	–	–	0.01	$\Delta GDP = -0.021 + 0.03\Delta Remit + 0.002$
LVA	0.80	40.51***	–	0.01	0.05	0.05	–	$\Delta GDP = 0.017 + 0.032\Delta Remit - 0.022 Trend$
POL	0.90	100.83***	–	0.05	0.05	–	–	–
ROU	0.89	87.77***	–	0.05	0.01	0.01	–	–
SVK	0.94	173.10***	–	–	0.05	–	0.1	–
SVN	0.95	232.60***	–	–	0.01	0.05	–	–

Note: 0.01, 0.05 and 0.1 show the level of significance.
Source: Own computation using Stata 13 software.

economic growth when the investment rate is low. Also, comparing the two regressions, if the marginal impact of remittances is bigger in the first one it means that the investment is the main channel through which remittances influence economic growth. This situation was recorded in four countries: CZE, EST, HUN and LTU.

After we performed an OLS regression, we carried out some pre-estimation tests to decide what method to use subsequently. Obtaining a mean VIF of 6.26 meant that we did not have a multicollinearity problem; the Breusch-Pagan/Cook-Weisberg test showed a chi2(1) of 4.16 with a p-value of 0.0415, lower than 0.05, so we reject the null hypothesis of homoscedasticity or constant variance at 5% level of significance. The Breusch-Godfrey LM test shown a p-value of 0.946 leading us to accept the null hypothesis of no-serial autocorrelation and for ARCH test we obtained a chi2 of 0.001 with a p-value of 0.9815, thus accepting the hull hypothesis of no ARCH effects. The Johansen cointegration test suggested a long-run relationship among variables and therefore a VEC model could be estimated.

For the estimations of the VECM we considered as dependent variable GDP/cap and as independent variables Remittances, FDI, investment rate, export and consumption, the last four of them being control variables. The results are presented in Table 7 for each country separately. For the cointegration equations we took into consideration only GDP/cap and Remittances, together with the constant term and trend, where this was the case.

The short-run influence of remittances on GDP/cap was validated, at 10% level of significance, only in two countries: CZE and LTU. In the case of Romania, the GDP/cap is influenced in the short run by the foreign direct investments (at 5% level of significance), by the rate of investment and by the export of goods and services (both at 1% level of significance).

Regarding the long-run influence of remittances on GDP/cap it was found only in six CEE countries (BGR, CZE, EST, HUN, LTU and LVA) and for the rest of them, the p-value of the independent variables was above the 5% threshold and validated the null hypothesis. In two countries the long-run influence is positive: in LTU and LVA if the remittances received increase at 1% they will lead to an increase of GDP/cap with 0.03%. For the case of Romania, we did not find a long-run influence on economic growth.

To study the economic growth response to shocks through time, we employed an impulse response function and observed (Figure 7) that for some countries the impact
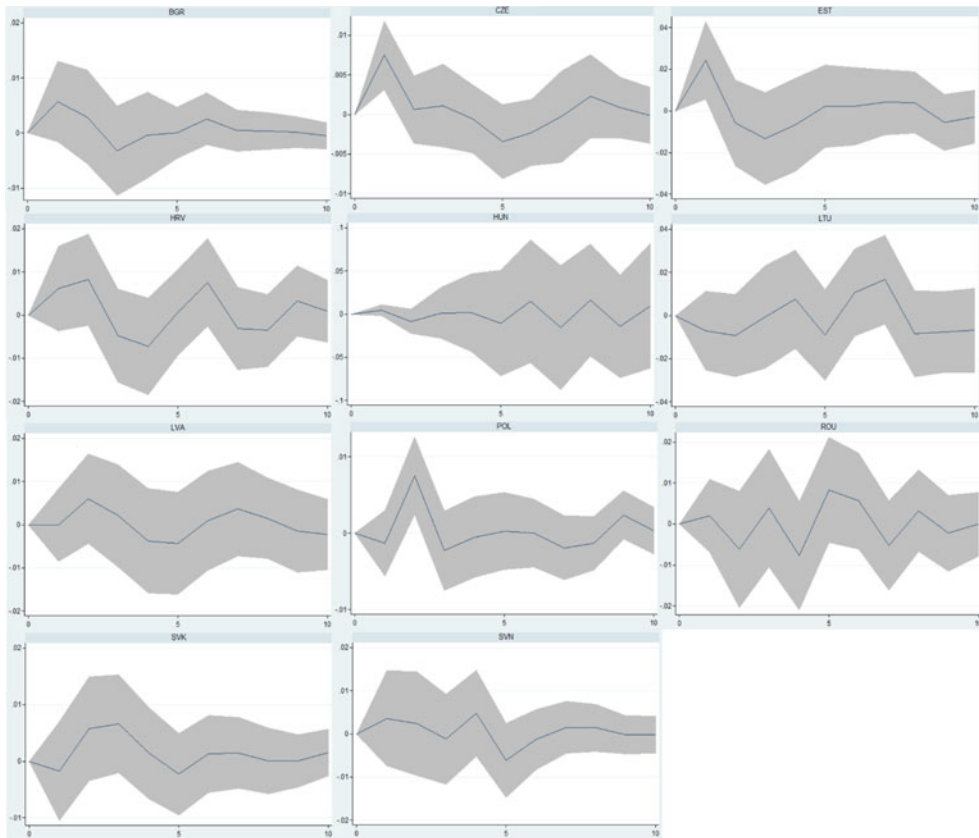
Figure 7. The impulse response function for CEE countries.

diminishes over time (BGR, CZE, EST, LVA, POL, SVK and SVN) and for others, it oscillates (HRV, HUN, LTU, ROU), which means the inflow of remittances could produce effects in the following years but the impact was not very large.

For the first category of countries, remittances had an impact on the economy in the first two years and after that the effect faded away, but for the second category, a significant impact was recorded five or six years after the shock.

4.4. Robustness analysis

To verify the robustness of our model, we employed three post-estimation tests. Lagrange-multiplier test showed (for each country) an autocorrelation at lag 2 at 10% level of significance (the p-value was 0.08) but at 5% level of confidence, we can reject the null hypothesis. The stability condition of estimates is met (for all countries) because the modulus of each eigenvalue is less than 1 and inside the companion matrix.

Next, was performed the Wald test for Granger causality, which measures if statistically the "Remittances" variable happens before the "y" variable, not necessarily a causal effect (Table 8) and "y" was represented by: GDP/cap, FDI, Investment rate, Export and Consume.

Table 8. Granger causality Wald tests results.

Country	Null Hypothesis	Chi2	Decision
BGR	Remittances does not Granger cause GDP/cap growth	7.236**	Reject
	Remittances does not Granger cause FDI	2.223	Accept
	Remittances does not Granger cause Investment rate	5.130*	Reject
	Remittances does not Granger cause Export	3.113	Accept
	Remittances does not Granger cause Consumption	3.857	Accept
CZE	Remittances does not Granger cause GDP/cap growth	41.42***	Reject
	Remittances does not Granger cause FDI	5.12*	Reject
	Remittances does not Granger cause Investment rate	34.73***	Reject
	Remittances does not Granger cause Export	7.46**	Reject
	Remittances does not Granger cause Consumption	30.19***	Reject
EST	Remittances does not Granger cause GDP/cap growth	8.923**	Reject
	Remittances does not Granger cause FDI	71.334***	Reject
	Remittances does not Granger cause Investment rate	6.19**	Reject
	Remittances does not Granger cause Export	12.83***	Reject
	Remittances does not Granger cause Consumption	7.03**	Reject
HRV	Remittances does not Granger cause GDP/cap growth	3.688	Accept
	Remittances does not Granger cause FDI	3.484	Accept
	Remittances does not Granger cause Investment rate	4.151	Accept
	Remittances does not Granger cause Export	0.239	Accept
	Remittances does not Granger cause Consumption	0.125	Accept
HUN	Remittances does not Granger cause GDP/cap growth	14.242***	Reject
	Remittances does not Granger cause FDI	0.591	Accept
	Remittances does not Granger cause Investment rate	2.959	Accept
	Remittances does not Granger cause Export	27.808***	Reject
	Remittances does not Granger cause Consumption	15.996***	Reject
LTU	Remittances does not Granger cause GDP/cap growth	0.669	Accept
	Remittances does not Granger cause FDI	6.455**	Reject
	Remittances does not Granger cause Investment rate	0.147	Accept
	Remittances does not Granger cause Export	4.484	Accept
	Remittances does not Granger cause Consumption	2.204	Accept
LVA	Remittances does not Granger cause GDP/cap growth	4.993*	Reject
	Remittances does not Granger cause FDI	1.694	Accept
	Remittances does not Granger cause Investment rate	4.076	Accept
	Remittances does not Granger cause Export	7.306**	Reject
	Remittances does not Granger cause Consumption	11.735***	Reject
POL	Remittances does not Granger cause GDP/cap growth	16.659***	Reject
	Remittances does not Granger cause FDI	1.939	Accept
	Remittances does not Granger cause Investment rate	22.493***	Reject
	Remittances does not Granger cause Export	1.597	Accept
	Remittances does not Granger cause Consumption	0.516	Accept
ROU	Remittances does not Granger cause GDP/cap growth	0.812	Accept
	Remittances does not Granger cause FDI	4.352	Accept
	Remittances does not Granger cause Investment rate	8.365**	Reject
	Remittances does not Granger cause Export	5.152*	Reject
	Remittances does not Granger cause Consumption	0.440	Accept
SVK	Remittances does not Granger cause GDP/cap growth	4.623*	Reject
	Remittances does not Granger cause FDI	8.322**	Reject
	Remittances does not Granger cause Investment rate	2.944	Accept
	Remittances does not Granger cause Export	10.145***	Reject
	Remittances does not Granger cause Consumption	0.401	Accept
SVN	Remittances does not Granger cause GDP/cap growth	3.679	Accept
	Remittances does not Granger cause FDI	4.215	Accept
	Remittances does not Granger cause Investment rate	29.367***	Reject
	Remittances does not Granger cause Export	0.104	Accept
	Remittances does not Granger cause Consumption	3.579	Accept

Note: ***, ** and * represent 1%, 5% and 10% significance level.
Source: Own computation using Stata 13 software.

For the case of Romania, we rejected two hypotheses and obtained that Remittances Granger-cause Investment rate and Export. As for GDP/cap, the H0 was accepted, the Remittances does not Granger-cause economic growth. Comparing the

results for the CEE, there were seven countries where the first hypothesis was rejected and obtained that Remittances Granger-cause GDP/cap growth: BGR, CZE, EST, HUN, LVA, POL and SVK. An interesting case also is POL and SVK because the causality effect was identified but from the VECM estimations resulted that there is no long-run or short-run influence of Remit on GDP/cap.

The results for the seven countries are similar with the one obtained by Golitsis et al. (2018) for Albania, regarding the Granger-causality between Remittances and GDP. Giuliano and Ruiz-Arranz (2009) studying 100 countries, obtained a positive influence of remittances on the economic growth; Siddique, Selvanathan, and Selvanathan (2012), Matuzeviciute and Butkus (2016) and Meyer and Shera (2016) also concluded that the volume of remittances stimulates economic growth for some receiving countries.

In the literature, there are some studies that obtained empirical results similar to the case of Romania, regarding the lack of influence of remittances on economic growth: Chami et al. (2003) considers that "remittances reduce long-term growth" and Jongwanich (2007) believes that remittance flows "increase the level of income for the poor rather than the growth of the economy as a whole".

The results for CEE countries conclude that the volume of remittances has an impact on economic growth in the short run and in the long run, depending on the conditions and the specificity of each country.

5. Conclusions

The objective of this paper was to study the nature of the remittances and their impact upon the economy of receiving countries in Central and Eastern Europe. In order to achieve our purpose, we have performed a quantitative analysis by using contemporaneous correlations and econometric models to validate our hypotheses.

We validated the first hypothesis, that remittances are more stable than private capital flows over the business cycle in some of the CEE countries. Using contemporaneous and synchronous correlations we identified four countries where the co-movement of the cyclical component of GDP and remittances was procyclical (CZE, EST, HUN and LTU), two countries where it was countercyclical (HRV and LVA) and for five countries and for the whole group the results showed an acyclical movement. But the hypothesis was validated only for two countries, Bulgaria and Latvia, in which FDI flow was procyclical while the remittances co-movement was countercyclical or acyclical.

The second hypothesis was not validated for the Romanian economy, the results showed neither a long-run or a short-run influence or a Granger causality, but for other CEE countries the hypothesis was validated. We identified six countries for which we could estimate long-run parameters (Bulgaria, Czech Republic, Estonia, Hungary, Lithuania and Latvia) and two of them, Czech Republic and Lithuania, also showed a short-run influence of remittances on economic growth.

Our empirical results regarding Romania reveal that the inflow of remittances that entered the country through official channel did not influence significantly economic growth, but the volume of remittances that enter the country through informal

channels was much higher. Thus, an appropriate policy should be made to address this situation and also to lower the level of the underground economy.

Some limitations of this article were identified: the biggest one is related to the fact that the data regarding the remittances is incomplete, as Chirila and Chirila (2017) also noted in their paper. Data collected quarterly could help obtaining more reliable results than the annual data, and secondly, in the literature there are other methods that could be used to study the influence of remittances on economic activity, like a dynamic panel data analysis, similar with Catrinescu, Leon-Ledesma, Piracha, and Quillin (2009), instead of a time series analysis.

As a future research direction we propose a study that identifies which economic indicator is most influenced by the remittances, what people are doing with the money they receive – they consume, save or invest the money – and how it influences their households and their wellbeing in Romania. Also, this study could be extended for other countries in the European Union.

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