

Roksolana Lastovetska
Ukrainian Catholic University

Mechanisms of Remittances Influence on the Economy of Ukraine

Summary

The purpose of the article is to highlight the impact of remittances on the economy of Ukraine. Based on statistical data for the period 2001-2014 there has been developed a small structural model that describes in details the interconnections between the amount of transfers and main macroeconomic indicators. In particular, it demonstrates the impact of remittances on GDP, inflation, interest rate and exchange rate. That small structural model confirms a direct link between the remittances inflows and economic growth of the country, emphasising transfers' procyclicality. As well it reveals that remittances lead to the increase in interest rates, stimulating investments in Ukraine. Nevertheless, it demonstrates a neutral effect of remittances on the inflation rate in Ukraine. As for the negative consequences of remittances inflows the model confirms the effect of "Dutch disease", since migrant remittances cause the appreciation of the national currency, reducing the competitiveness of Ukraine in the international markets.

Key words: remittances, migrant sending country, gross domestic product, inflation, interest rate, real effective exchange rate.

JEL codes: F37, E22, E24

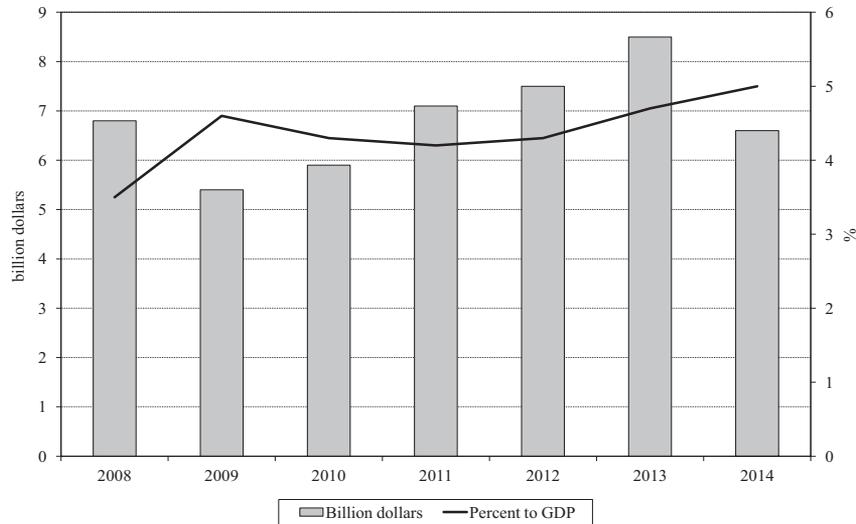
Introduction

Ukraine belongs to the top ten list of the largest migrant sending countries in the world (World Bank 2013). In 2014, our country received \$6.6 billion of remittances, which represented 5% of the GDP (National Bank of Ukraine 2014) (Figure1).

In 2014, the largest amounts of remittances to Ukraine flew from five countries – Russia (36%), the US (9%), Germany (6%), the UK (5%) and Cyprus (5%), representing 60 percent of the overall flows (National Bank of Ukraine 2014). Interestingly, there are no neighboring countries, except of Russia, in this list. Perhaps, the reason is that most of remittances from the bordering countries are carried by migrants illegally during their visits to Ukraine.

Remittances tend to stimulate consumer demand that in case of consuming imported goods create an additional pressure on the exchange rate. However, the cumulative effects of remittances on the economy of recipient country are not completely investigated and require further research.

Figure 1
Remittances inflows to Ukraine



Source: authors' calculations based on National Bank of Ukraine data (2014).

Methods

Comprehensive studying of migration processes requires fundamental understanding of the mechanisms of the remittances impact on the economy of recipient country. Remittances impacts on the economy of recipient country were investigated by A. Barajas, J. Durand, L. Katseli, R. Lucas, D. Massey, E. Parado, R. Faini, R. Chami and many others. Among Ukrainian scientists this problem was covered by A. Haidutskiy, E. Libanova, O. Kupets, O. Malinovska, O. Pyatkovska and others.

We try to build a model that would allow us to analyze these effects in the case of Ukraine. At the beginning we are examining the structure of macroeconomic processes and then basing on a series of simulation experiments we are trying to demonstrate how dynamically the economy of Ukraine is able to respond to exogenous shocks in the volume of remittances. The goal of our model is to cover all the possible macroeconomic effects of the remittances inflows. In particular, we will try to show the interdependence between the remittances volumes and such economic indicators as GDP, investment flows, exchange rate, inflation and interest rates.

Results

Plenty of models exist in the economic literature. Our econometric model is based on the paper of Corbo and Tessaga (2005) who developed the equilibrium simulation model to study the monetary policy of the government of Chile. Another fundamental work for

our study is the paper of Charemza et al. (2008). In 2008, they developed a model that basing on real effective exchange rate dependency explores the possibility of extending the effect of «Dutch disease» from the Russian resource economy to economies of Belarus and Ukraine.

The model includes quarterly data from 2000 to 2014. The empirical database for the study includes data from the IMF International Financial Statistics (2015), Eurostat (2015) and National Bank of Ukraine (2014). In the table below the main indicators for the model are presented (table 1).

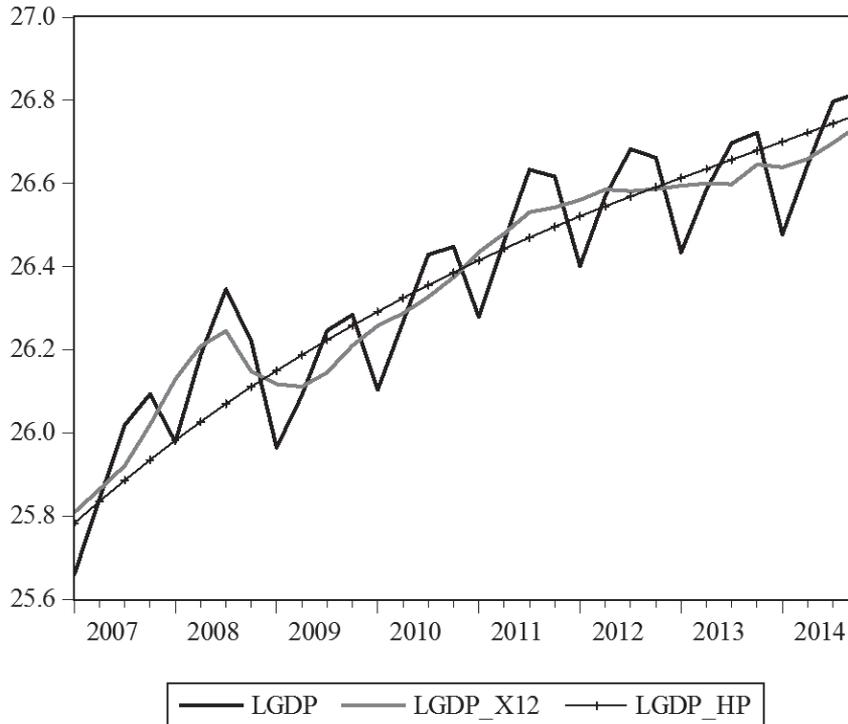
Table 1
Description of indicators used in the model

Variable	Description	Source
Gross Domestic Product (<i>GDP</i>)	Nominal Gross Domestic Product in national currency (UAH ^a)	IMF International Financial Statistics
World Gross Domestic Product (<i>GDPW</i>)	Calculated on the basis of the European Union GDP (million euro)	Eurostat
Investments (<i>INV</i>)	Calculated as the sum of foreign direct and portfolio investments (million dollar)	National Bank of Ukraine
Remittances (<i>REM</i>)	Calculated according to the BPM5 as sum of the following items: «compensation of employees» and «workers' remittances», (million dollar)	National Bank of Ukraine
Interest rate (<i>R</i>)	Money Market Rate, (%).	IMF International Financial Statistics
Real effective exchange rate (<i>REER</i>)	Index 2010 = 100%	IMF International Financial Statistics
Inflation	Calculated as Consumer Price Index, CPI 2010 = 100%	IMF International Financial Statistics

¹ Since 2014 information has been presented excluding the temporarily occupied territory of the Crimea and the zone of the antiterrorist operation in the eastern Ukraine.
Source: Eurostat (2015); International Monetary Fund (2015); National Bank of Ukraine (2014).

Real values of our variables are given in different units that may cause some problems with interpreting the results of our research. That's why we take logarithms of the variables. It is important to note that most macroeconomic indicators tend to display specific periodic fluctuations caused by the change of seasons. In order to avoid the impact of seasonal factors on the results of our model, we conduct a seasonal adjustment of the data using Census X12 method. In our model, we do not take ordinary data logarithms but the deviation of variables from their equilibrium state. The equilibrium state is calculated by smoothing the time series using Hodrick-Prescott filter ($\lambda=1600$). Final variables gaps are obtained as the difference between seasonally adjusted and smoothed time series.

For example, Figure 2 shows the dynamic of GDP growth (LGDP), seasonally adjusted time series (LGDP_X12) and the equilibrium state (LGDP_HP) (Figure 2).

Figure 2**Deviation of the GDP variable from its equilibrium state (% , 2007-2014)**

Source: authors' calculations.

In case of investment and interest rate data we not just adjust them seasonally but also smooth the values using Hodrick-Prescott filter ($\lambda=15$). This allows us not to include in the model excessive fluctuations in the values of investments and interest rates that are associated with the cyclical and seasonal factors, not with real macroeconomic processes.

For model specification we have to create a system of equations that describe the structure and interdependence of macroeconomic processes in Ukraine. It is noted above that as basis of our model we use regression equations of Corbo and Tessaga (2005), which describe dynamics of GDP, interest rates, inflation and real effective exchange rate in Chile.

$$\left\{ \begin{array}{l} y_t = f_y(y_{(t-L)}^*; c_{f(t-L)}; r_{(t-L)}; q_{(t-L)}; y_{(t-L)}); \\ r_t = f_r(y_{(t-L)}; E_t(\pi_t - \pi_{(t-L)}^T); r_{(t-L)}); \\ \pi_t = f_\pi(y_{(t-L)}; \pi_{(t+L)}; \pi_{(t-L)}; q_{(t-L)}); \\ q_t = F_q(y_t; q_{(t-L)}), \end{array} \right.$$

where y_t – domestic output gap; y_t^* – world output gap; cf_t – capital flows gap; r_t – real monetary policy rate gap; q_t – real effective exchange rate growth; π_t – inflation gap; π_t^T – inflation target.

We change slightly the equations structure in order to take into account the impact of remittances on the economy of Ukraine. To estimate the equations we choose a least square method. The structure of the GDP we describe through a number of endogenous and exogenous variables. The dependent variable is $LGDP_GAP$ – Ukrainian GDP gap. The independent variables are the following:

- $LGDPW_GAP$ – world output gap;
- $LINV_GAP$ – investment rate gap;
- $LREM_GAP$ – remittances gap;
- LR_GAP – interest rate gap;
- $LREER_GAP$ – real effective exchange rate gap;
- $LCPI_GAP$ – inflation gap.

Estimation results are presented below with t-statistic coefficients in brackets.

$$\begin{aligned}
 LGDP_GAP_t = & 0,25 * LGDPW_GAP_{t-1} + 0,11 * LINV_GAP_t + 0,027 * LREM_GAP_t - \\
 & (0,85) \qquad \qquad \qquad (2,91) \qquad \qquad \qquad (2,2) \\
 & - 0,043 * LR_GAP_{t-2} - 0,315 * LREER_GAP_{t-1} + 0,778 * LGDP_GAP_{t-1} \\
 & (-2,75) \qquad \qquad \qquad (-4,96) \qquad \qquad \qquad (8,63)
 \end{aligned}$$

Adjusted $R^2 = 0,83$, DW stat = 1,9

The regression results reveal direct relationships between remittances and GDP gaps, an increase in remittances deviation from the equilibrium in 1% leads to a positive GDP deviation in 0,027%. We also confirm a positive relationship between GDP and investment gaps (0,11%), while increase in interest rate and exchange rate deviations in 1% cause negative impacts on the GDP gap (0,043% and 0,315% respectively). Coefficient of the world GDP gap turns out to be statistically insignificant.

The following equation in the model corresponds to the monetary policy reaction function, which Corbo and Tessaga (2005) describe on the basis of the Taylor rule. In economics, a Taylor rule is a monetary-policy rule that stipulates how much the central bank should change the nominal interest rate in response to changes in inflation and output (Taylor 1993).

In our model the dependent variable demonstrates interest rate deviation from its equilibrium. The regression results show that positive deviation in GDP growth in 1% leads to an increase in interest rate deviation in 1,27%. As well, we confirm a significant positive effect on the interest rate gaps of their lagged values (0,91%). Coefficient of the inflation gap turns out to be statistically insignificant.

$$\begin{aligned}
 LR_GAP_t = & 1,27 * LGDP_GAP_t - 0,32 * LCPI_GAP_t + 0,91 * LR_GAP_{t-1} \\
 & (6,12) \qquad \qquad \qquad (1,02) \qquad \qquad \qquad (18,9)
 \end{aligned}$$

Adjusted $R^2 = 0,89$ DW stat = 0,34

istic approach (Agarwal, Horowitz 2002; Chami et al. 2005; Osili 2007) supports the idea that primary function of remittances is to compensate their recipients for bad economic outcomes, such as low income in recipient country. While representatives of the portfolio approach (Adams 2010; Cooray, Mallick 2013; Yang 2008), by contrast, tend to believe that remittances are procyclical in nature, falling in times of recession.

In our previous investigation based on data over 140 countries during the period from 2002 to 2009 we revealed that remittances tend to rise when the recipient economy suffers a downturn, as migrants may send more funds during hard times to help their families and friends. This confirmed the altruistic approach (Lastovetska 2014). However, we consider that altruism can be observed only in the medium and long term periods. Our model is based on short-term data (quarterly values) that's why we expect a procyclicality of remittances.

Hypothesis 2: Significant inflows of remittances intensify household demand for consumer goods. In case the population demand is met by imports the inflation can be developed (Pyatkovs'ka 2011; Kupets 2012). Thus, we assume that the increase in remittances leads to a higher inflation.

Hypothesis 3: According to the monetary-policy Taylor rule a relative increase in GDP and inflation in the country leads to an increase in interest rates (Taylor 1993). Based on the two previous hypotheses, regarding the positive impact of remittances on GDP and inflation growth in the recipient country, we expect to confirm a direct relationship between the remittances and interest rate level.

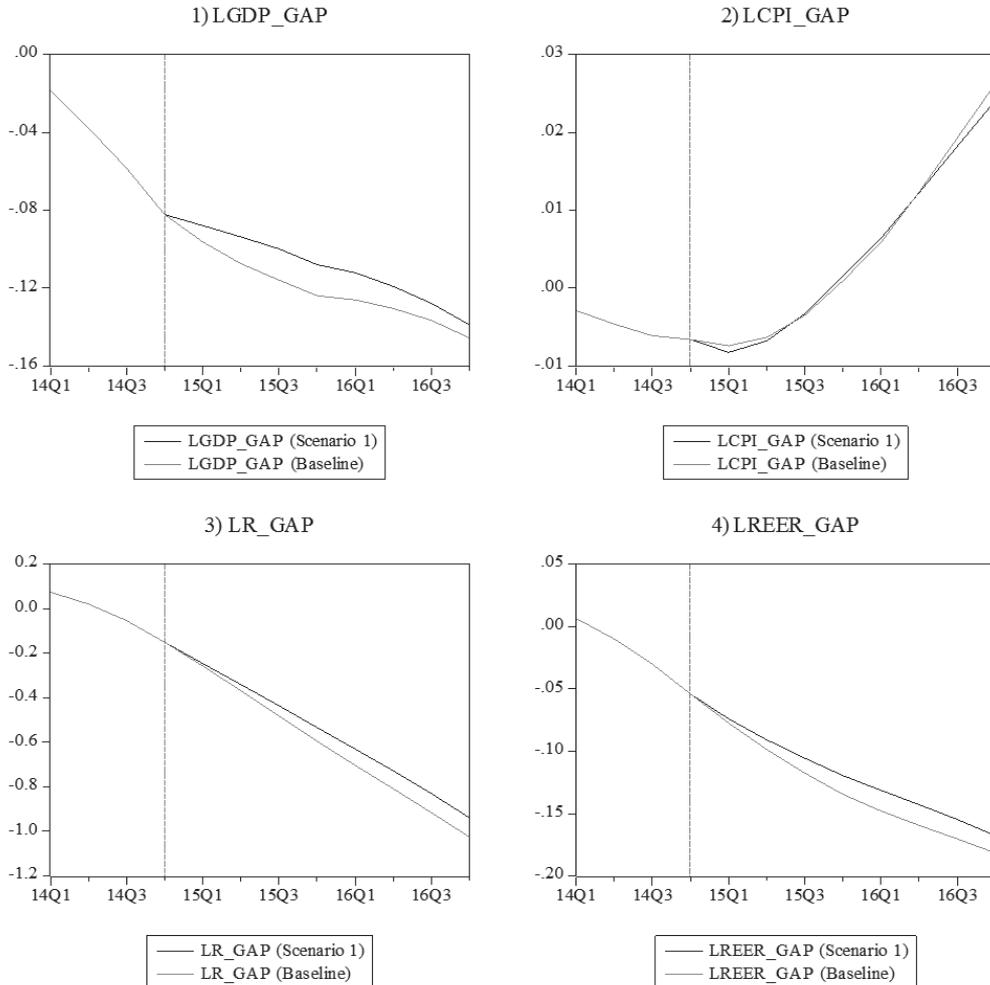
Hypothesis 4: Significant inflows of foreign currency create a deficit on the market of national currency, leading to its appreciation (Amuendo-Dorantes, Pozo 2004; Barajas et al. 2010; Roberts, Banaian 2004). In economics, this process is called «Dutch disease». Thus we expect that growth in remittances positively affects the real effective exchange rate.

On the figure below the results of the model are presented. Particularly, we could compare two scenarios: Baseline scenario, which shows variables' dynamic under constant conditions and experimental scenario (Scenario 1) demonstrating the dynamic of variables in response to the shock in remittances (Figure 3).

We now turn to the description of our results. Our model demonstrates a direct relationship between the growth in remittances and the GDP growth in Ukraine. Comparing two scenarios we discover that in case of experimental scenario GDP gap is on average 0,014% higher than in baseline scenario (Figure 3.1). In our opinion, this result reveals that in short-term period the growth in remittances has a positive effect on the GDP growth in Ukraine.

Regarding the prevalent opinion that migrant remittances stimulate inflation in Ukraine, the results of the model demonstrates a neutral impact of remittances on inflation gap (Figure 3.2). As an explanation, we can assume that in case of Ukraine an unbalanced monetary policy of the government has much bigger impact on the inflation rate than remittances inflows.

The next finding emerging from the results confirms the hypothesis that remittances intensify an aggregate demand of the population leading to the increase in interest rates and

Figure 3**Response to the shock in the growth of remittances, 2014-2016 (%)**

Source: authors' calculations in EViews.

growth in investments. The model shows that increase in remittances deviation from the equilibrium in 0,31% leads to the interest rate deviation in 0,06% (Figure 3.3).

Analyzing the results of the model we managed to detect symptoms of «Dutch disease». We confirmed the hypothesis that significant inflows of foreign currency create a deficit of national currency, leading to its appreciation. Increase in remittances growth deviation in 0,31% causes an increase in real effective exchange rate deviation in 0,01% from the baseline scenario (Figure 3.4). As a result, the model demonstrates that via currency appreciation mechanism remittances has a negative impact on the competitiveness of the economy of Ukraine.

Conclusions

In the economic literature there is no definite approach to the remittances impact on the economy of the recipient country. Based on statistical data for the period 2001-2014 we developed a small structural model for Ukraine. Through this model we tried to investigate the interconnections between remittances inflows and main macroeconomic indicators. In particular, we demonstrated the impact of remittances on the dynamic of GDP, inflation, interest rate and exchange rate.

Summarizing the results of the model we can distinguish the following effects of remittances inflows on the economy of Ukraine. First of all, the model confirmed a direct link between the remittances inflows and economic growth of the country, emphasizing their procyclicality. Also our model confirmed that remittances lead to the increase in interest rates, stimulating investments in Ukraine. The model did not confirm the assumption that migrant transfers cause the growth of inflation in Ukraine, demonstrating their neutral effect on inflation rate.

As for negative consequences of remittances inflows, it is worth noting that our model confirmed the existence of the «Dutch disease» effect. Thus, migrant remittances can cause the appreciation of the national currency, thereby reducing the competitiveness of Ukrainian exports abroad.

Nevertheless, it is important to remember that the economy of Ukraine is a complex mechanism, where all the factors and influences are closely interconnected. Therefore, it is important for the government to implement economic reforms that would enhance the positive impacts of remittances on the economy while minimizing the negative effects.

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Mechanizmy wpływu przekazów pieniężnych na gospodarkę Ukrainy

Streszczenie

Celem artykułu jest zwrócenie uwagi na wpływ przekazów pieniężnych na gospodarkę Ukrainy. Na podstawie danych statystycznych za okres 2001-2014 opracowany został mały model strukturalny, który szczegółowo opisuje wzajemne powiązania między liczbą transferów i głównymi wskaźnikami makroekonomicznymi. W szczególności wskazuje on na wpływ przekazów pieniężnych na PKB, inflację, stopy procentowe i kursy walutowe. Mały model strukturalny potwierdza bezpośredni związek między wpływami przekazów pieniężnych i wzrostem gospodarczym kraju, podkreślając procykliczność transferów. Ujawnia, że przekazy pieniężne prowadzą do wzrostu stóp procentowych, stymulując inwestycje na Ukrainie. Niemniej jednak pokazuje to neutralny wpływ przekazów pieniężnych na stopę inflacji na Ukrainie. Jeśli chodzi o negatywne skutki przekazu wpływów, model potwierdza efekt „choroby holenderskiej”, ponieważ przekazy pieniężne migrantów powodują aprecjację waluty krajowej, zmniejszając konkurencyjność Ukrainy na rynkach międzynarodowych.

Słowa kluczowe: przelewy, kraj pochodzenia, produkt krajowy brutto, inflacja, stopa procentowa, realny efektywny kurs walutowy.

Kody JEL: F37, E22, E24

Механизмы влияния денежных переводов на экономику Украины

Резюме

В статье освещается вопрос влияния денежных переводов мигрантов на экономику Украины. На основе статистических данных за 2001-2014 гг. разработали малую структурную модель, которая подробно описывает взаимосвязи между объемами переводов и главными макроэкономическими показателями. В частности, она демонстрирует влияние переводов на динамику ВВП, инфляции, процентной ставки и обменного курса. Малая структурная модель подтверждает прямую связь между притоком денежных переводов и экономического роста страны, подчеркнув процикличность переводов. Денежные переводы ведут к увеличению процентных ставок и стимулируют инвестиции в Украине. Тем не менее, модель демонстрирует нейтральное влияние денежных переводов на уровень инфляции в Украине. Что касается негативных последствий притока денежных переводов, модель подтверждает эффект «голландской болезни», так как денежные переводы мигрантов вызывают укрепление национальной валюты, снижая конкурентоспособность Украины на международных рынках.

Ключевые слова: денежные переводы мигрантов, страны выезда, валовой внутренний продукт, инфляция, процентная ставка, реальный эффективный обменный курс.

Коды JEL: F37, E22, E24

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Afiliacja;
Roksolana Lastovetska, PhD
Ukrainian Catholic University
Faculty of Applied Sciences
Department of Applied Economy and Business
16, Sheptytskoho St.
79-495 Lviv-Vynnyky
e-mail: lastovetska_roksolana@ukr.net