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МОДЕЛЬНІ ОЦІНКИ ВЗАЄМОЗВ'ЯЗКІВ ЕКОНОМІКИ УКРАЇНИ ТА ЄС

Пінчук, А. К. Модельні оцінки взаємозв'язків економіки України та ЄС / Анастасія Костянтинівна Пінчук// Економічний аналіз : зб. наук. праць / Тернопільський національний економічний університет; редкол. : В. А. Дерій (голов. ред.) та ін. – Тернопіль : Видавничо-поліграфічний центр Тернопільського національного економічного університету "Економічна думка", 2015. – Том 20. – С. 60-65. – ISSN 1993-0259.

Анотація

Вступ. *В контексті глобалізаційних процесів у світі євроінтеграційний курс України є одним з найбільш пріоритетних напрямків зовнішньої політики нашої держави, оскільки передбачає створення умов для більш прогресивного економічного розвитку. Тому дослідження євроінтеграційного потенціалу України є актуальним викликом сьогодення до наукової спільноти.*

Мета. *Оцінити характер та силу взаємозв'язків між показниками розвитку економік України та Європейського союзу, дослідити динаміку їх взаємовпливу та визначити таким чином місце України на шляху євроінтеграції.*

Методологія. *Оцінка взаємовпливу України та країн Європейського союзу здійснена на основі дослідження коефіцієнтів вектор авторегресійної моделі (VAR-моделі), функцій імпульсних відгуків та декомпозицій дисперсії основних факторів, включених в дану модель.*

Результати. *На основі квартальних даних 2003-2014 рр. таких показників, як: ВВП на душу населення України, темпів зростання середнього ВВП країн Європейського союзу, обсягів прямих іноземних інвестицій з ЄС до України, імпорту та експорту ЄС-Україна у статті побудовано VAR-модель. Головною гіпотезою моделі є підтвердження позитивного взаємного впливу між темпами економічного зростання ЄС та добробутом України. Крім того, у VAR-моделі досліджено функції імпульсних відгуків, що свідчать про тяжіння системи до рівноваги у довгостроковому періоді, а також аналіз декомпозиції дисперсії ключових факторів моделі показав, що інтесивність взаємовпливу між економіками України та країн Європейського союзу суттєво зросла в останні п'ять років. Підтвердження взаємозв'язку між Україною та ЄС, а також спостереження посилення даного зв'язку після 2009 року є важливими результатами моделі, що мають практичне значення, оскільки емпірично підтверджують ефективність офіційного курсу України на євроінтеграцію.*

Ключові слова: *євроінтеграція; VAR-модель; Україна; Європейський союз; функція імпульсних відгуків; декомпозиція дисперсії.*

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MODEL EVALUATIONS OF INTERRELATION BETWEEN UKRAINIAN AND EU ECONOMIES

Abstract

Introduction. *In terms of world globalization processes Ukrainian course for European integration is one of the high priority directions of external policy of our country, as far as it proposes creation of conditions for more progressive economic development. That is why investigation of Ukrainian potentials for European integration is one of the actual challenges for scientific society nowadays.*

Purpose *of the article is to evaluate character and strength of interrelations between economies of Ukraine and EU, to explore the dynamic of their interdependence and so to identify the place of Ukraine on its way of European*

integration.
Methodology. *Assessment of interrelation between Ukraine and EU is based on the investigation of coefficients of vector autoregressive model (VAR-model), its impulse functions and variance decompositions of the main factors, which the model includes.*
Results. *On the basis of the quarterly data of GDP per capita of Ukraine, EU GDP growth, amounts of foreign direct investments from EU to Ukraine, import and export of EU- Ukraine, VAR-model is built. The main hypothesis is the confirmation of positive interrelations between economic growth of EU and welfare of Ukraine. Also impulse functions demonstrate the system tendency to balance in long-run period, and variance decompositions of main factors of the model show increase of interdependence between Ukrainian and European economies in the last five years. Confirmation of existence of actual interrelationship between economies of EU and UA, and raising dynamic of such relation are important results of the model, which have significant practical value as far as they provide empirical evidence of the effectiveness of the official course of Ukraine regarding European integration.*

Keywords: *European integration; VAR-model; Ukraine; European Union; impulse function; variance decomposition.*

JEL classification: C21, C12, F15

Introduction

Nowadays is characterized by high level of globalization on different levels, especially from economical point of view. Economies worldwide tend to integrate to form bigger areas with common markets and long-run strategic goals in order to benefit from more possibilities, and gain from more markets available. Ukrainian official international position regarding European integration since September, 2008 is in line with global world trends. However, to make integration efficient for all its participants, the candidates for such membership should be well-prepared, and be sure they have reached acceptable level of development of their markets and internal processes comparable with their potential partners. Similar task is faced to Ukraine now – we should define the kind and strength of interrelation with European Union we have now, and find out what we should develop or change to be closer to EU economical tendencies and environment, and so to minimize the gap between our levels of economic development in order to make such integration beneficial for both parties. That is why the investigation of current role of Ukraine in relationships with European Union, and kind of influence, which makes EU on Ukrainian economy is so relevant today and needs deeper empirical exploration.

Integration processes in European Union were widely explored by different economists, and the most significant empirical researches are represented in the works of Bayoumi T. and Eichengreen B. [1], Stanoeva G. [2], Von Hagen J. and Neuman M. [3], Alesina A., Barro R. and Tenreyro S. [4], L. Jonung and F. Sjoholm [5], S. Dibooglu and J. Horvath [6]. Evaluation of potential of Ukrainian integration in different directions was point of interest of such researchers as: Savchenko T. G., Rebryk M. A. and Kazarinov D. I. [7], Shumska S. S. [8], Drobyshevsky S. and Polevoy D. [9], Klimenko I. V., Kharazishvili Y. M., Sharov O. M., Us I. V. [10].

Purpose and methodology

The purpose of this paper is to explore current place of Ukraine in relationship with European Union, and define level type of influence, which make interactions with EU on Ukrainian welfare. The stated goal will be reached through investigation of interrelations between Ukrainian welfare, EU economic growth, volumes of trade between these regions and investments from European Union to Ukrainian economy. Mentioned tasks will be done using the econometrical instruments of analysis for multifactor relationships, in particular with vector autoregression (VAR) modeling.

Main results

In terms of European integration strategy of Ukraine we should care about the most benefits we could gain from potential integration with EU. For this purpose, first of all, it is important to understand the impact that currently makes EU economy on Ukrainian welfare and identify its most significant elements. Then, we should try to maximize the positive input of those factors that make most influence to develop powerful platform for successful cooperation between Ukraine and European Union. So, in order to evaluate the impact of EU economy to Ukrainian one the vector autoregression model is built, which includes such elements of UA-EU interactions as: volume of Ukrainian export to EU and EU import to Ukraine, volume of FDI from EU to Ukrainian economy, and also average GDP growth of EU economy and GDP per capita of Ukraine to indicate whether economic growth of EU influence the Ukrainian welfare. VAR model is chosen to reflect interrelationship between mentioned variables, and the main hypothesis is the following: *confirmation of positive interrelations between economic growth of EU and Ukrainian welfare.* The statistical data is taken quarterly for the period 2003: 2 – 2014: 3, so 46 observations are included to the model using statistical package Eviews, which has generated the following system of equations after a number of adjustments were executed to find the best model specification:

D(GDPPCAP_UA) = – 0,546*D(GDPPCAP_UA(-1)) – 0,655*D(GDPPCAP_UA(-2)) – - 0,455*D(GDPPCAP_UA(-3)) + 0,00026*D(GDPGROWTH_EU(-1)) + 0,00014*D(GDPGROWTH_EU(-2)) + 0,00022*D(GDPGROWTH_EU(-3)) + 0,141*D(EX_EU(-1)) + 0,116*D(EX_EU(-2)) + 0,105*D(EX_EU(-3)) + 0,0024*D(FDI_EU(-1)) – 0.00014*D(FDI_EU(-2)) + 0.00135*D(FDI_EU(-3)) – 0,001 + 0,376*D(IM_EU)

Positive coefficients of EU GDP growth variable prove the main hypothesis that economical increase of European countries lead to rise in Ukrainian welfare, this input is currently very little, which means that impact is very slight as for now, however, this empirical evidence shows that the positive relationship between our economies exists, and we should work on its further development. There are also positive coefficients of Ukrainian export to European Union, which proves the main idea that the more we sell to EU the more we add to our GDP. The relation with volume of import from EU is much lower and furthermore this variable was indicated as exogenous one for the model, which means that we couldn't influence it much internally as it is mostly depends on the volume EU is ready to supply for Ukraine, so it depends mostly from the factors that are not represented in the model. Regarding FDI there are two positive and one negative coefficients, which reflects the current situation in Ukrainian economy – mostly external FDI increase local GDP according to economic theory, but in our case negative FDI in 2nd lag indicates that we don't use incoming investments from EU properly for our economic growth forwarding them, for instance, on covering current liabilities, in this case UA GDP may decrease in spite of EU FDI inflow. Concluding the system of VAR equations, the coefficients of the variables confirm the main logic of the model and go in line with the theoretical assumptions the model is base on. Estimation output of the VAR-model, represented in the Table 1, shows appropriate Akaike and Schwarz criteria, and satisfying R^2=0,87, which means that included variables represent enough the main dependent variable – GDP per capita of Ukraine.

Table 1. Estimation output of VAR-model.

R-squared	0.871657	0.457094	0.721561	0.512882
Adj. R-squared	0.812069	0.205030	0.592285	0.286720
Sum sq. resids	0.317589	35314.40	0.708329	728.1210
S.E. equation	0.106501	35.51378	0.159052	5.099443
F-statistic	14.62812	1.813407	5.581579	2.267766
Log likelihood	42.98259	-201.0173	26.13742	-119.5042
Akaike AIC	-1.380123	10.23892	-0.577972	6.357341
Schwarz SC	-0.800900	10.81814	0.001251	6.936565
Mean dependent	0.004356	0.020782	-0.005386	-0.013635
S.D. dependent	0.245672	39.83103	0.249092	6.037996
Determinant resid covariance (dof adj.)		6.852208		
Determinant resid covariance		1.353523		
Log likelihood		-244.7386		
Akaike information criterion		14.32089		
Schwarz criterion		16.63778		

Source: Developed by author using data from Ukrstat and Worldbank [11, 12].

To investigate the impact that make interactions with European economy on Ukrainian welfare the functions of impulse were built, which all indicate positive tendency for UA GDP per capita of returning to the balance state after shocks' impact from EU variables via the time, that is no longer than 20 periods (or 5 years). The functions of impulse create more empirical evidences for the main assumption of our VAR-model that there is exact reaction of UA welfare on relationship with European Union – whether it is change in volume of export to EU, or FDI from EU, or European economy growth – all these factors reflects in changes of UA GDP per capita. And what is even more significant for our investigation that these reactions tend to stability in long-run perspective, so Ukrainian interactions with European countries make positive impact on UA growth and do not provide long-run shocks for Ukrainian economy. Some functions of impulse are shown on the Table 2.

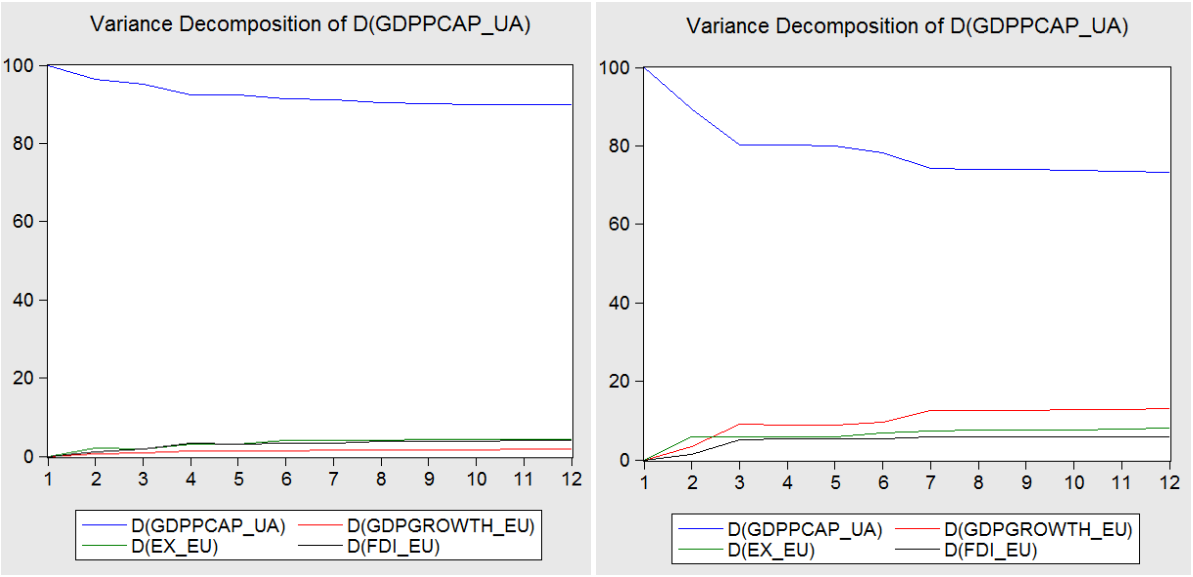
Table 2. Functions of impulse for D(GDPPCAP_UA) in VAR-model

Period	D(GDPGROWTH_EU)	D(EX_EU)	D(FDI_EU)
1	0. 000000	0. 000000	0. 000000
2	0. 009419	0. 017209	0. 011925
3	-0. 007358	0. 000755	-0. 012844
4	0. 007699	-0. 013649	0. 014988
5	-0. 005029	-0. 008465	-0. 001618
6	0. 001911	0. 012722	-0. 008026
7	-0. 006911	0. 005204	-0. 005475
8	0. 005988	-0. 005026	0. 009681
9	0. 001841	-0. 006173	0. 003421
10	-0. 000935	0. 004353	-0. 004946
11	-0. 004236	0. 002693	-0. 003951
12	0. 002042	-0. 001675	0. 003332
Cholesky Ordering: D(GDPPCAP_UA) D(GDPGROWTH_EU) D(EX_EU) D(FDI_EU)			
Standard Errors: Analytic			

Source: Developed by author using data from Ukrstat and Worldbank [11, 12].

In order to explore to which extend the changes of one variable could be explained with the change of other variables, included in the VAR-model, the Variance Decompositions were built. Considering the purpose of current research the main interest is focused on the Variance Decompositions of UA GDP per capita and EU GDP growth. Analyzing the output for the whole period of investigation, results are not encouraging – about 90% of changes in Ukrainian welfare are explained by itself in the previous periods, so there is no significant influence from operations with European Union, and similar results are obtained for European GDP growth – that is represented on the Graphs 1 and 2.

Graph 1. Variance Decompositions of UA GDP per capita for the periods 2003-2014 and 2009-2014.

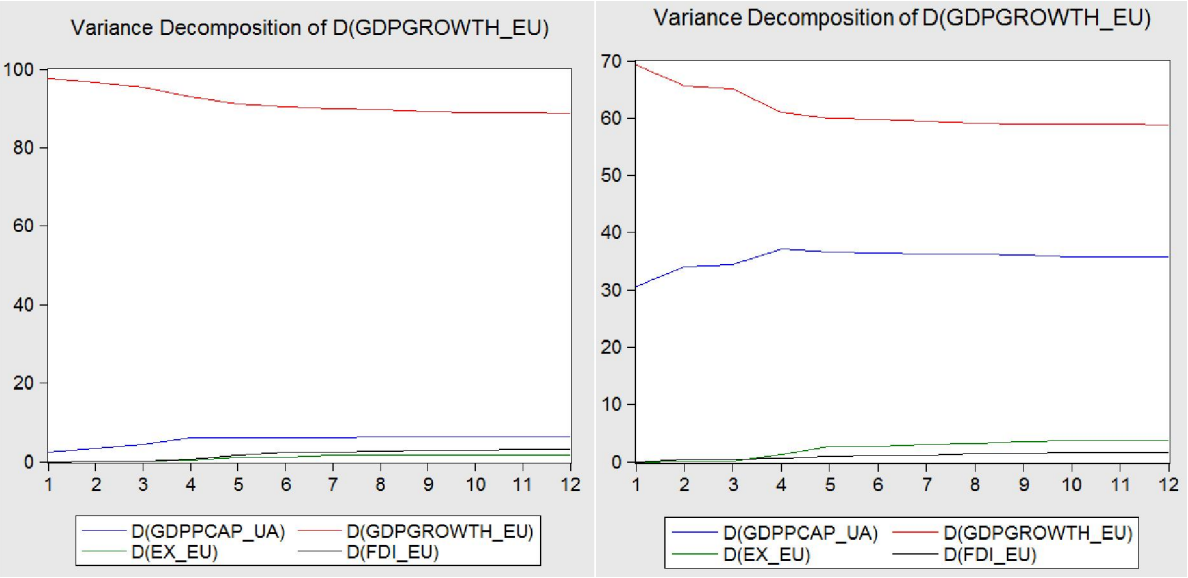


Source: Developed by author using data from Ukrstat and Worldbank [11, 12].

But the great difference is illustrated by Variance Decompositions, if they are taken for the 2009-2014 period, when course for European integration strategy was officially announced and 5 years of implementation stage were passed. So, for the last 5 years a significant change in the structure of the factors that influence UA welfare is considered, particularly, the input of EU economy growth to UA GDP per capita change increased from 2-3% to almost 15%, and also the impact of UA export to European Union raised on several percent. The even more improvements are considered regarding Variance Decomposition of EU economy growth: during the last 5 years about 40% of changes of volume of EU GDP growth is explained by economic prosperity of UA and under 60% –

by the growth of EU economies, which shows UA impact in several times more than it was indicated for the previous investigation period of 2003-2014.

Graph 2. Variance Decompositions of EU GDP growth for the periods 2003-2014 and 2009-2014.



Source: Developed by author using data from Ukrstat and Worldbank [11, 12].

This structural change in factors which explain Ukrainian welfare and EU GDP growth proves that our preparation for European integration has successful empirical evidences, and shows that interactions between European Union and Ukraine make more influence on UA welfare and EU economic growth.

Conclusions

Provided investigation proves positive impact of EU economic growth and Ukrainian cooperation with European countries on welfare of Ukraine. The results also confirm the increase of these impacts during the last 5 years, when strategy on European integration was officially approved and its implementation was started. Further research should be focused on exploration of factors that encourage closer cooperation between Ukraine and EU, which would lead to synchronization of their long-run strategic goals and so will create appropriate platform for smooth and effective financial integration of Ukraine to European Union.

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