# Charles University

Faculty of Social Sciences
Institute of Economic Studies


MASTER'S THESIS

# Assessing Economic Linkages between the EU and the Eastern Europe Neighbours


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# Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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**Prague, July 30, 2018** _____

Signature

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My gratitude addresses, also, to my family and friends for their unconditional love, inspiration and support, through the duration of my studies.

# Abstract

*The proposed study analyses the economic linkages between five Central and Eastern European countries (Czech Republic, Romania, Moldova, Georgia and Ukraine) and the euro area, in the period 2006-2017, applying the block-restriction vector autoregression model. It allows evaluating the amplitude and persistence of the domestic vs. euro area shocks on four macroeconomic indicators: real GDP, short-term interest rate, CPI, and FX rate. The main findings emphasize that EU members are more economically synchronized with the euro area, responding to external factors in less than 10 months. Nevertheless, the Central Banks of the East European countries react extensively to the ECB monetary policy shocks, following broadly its short-term interest rate. Eastern Neighbourhood countries and Central EU members demonstrated tight connections with the euro area, in terms of international transmission of price shocks and economic activity synchronization. Thus, Czech Republic and Romania could be relevant models for the Eastern European countries, reaching their main aspiration - EU integration. Also, the paper presents a review on Deep and Comprehensive Free Trade Areas and Association Agreements, as well as their implementation in Georgia, Moldova and Ukraine, since 2014.*



**Keywords:** VAR, EU Eastern Neighbours, euro area, external shocks, monetary policy, linkages, integration, DCFTA.

**JELClassification**: E58, F15, F41, F42.

# Abstrakt

*Uvedená studie analyzuje ekonomické vazby mezi pěti zeměmi střední a východní Evropy (Česká republika, Rumunsko, Moldavsko, Gruzie a Ukrajina) a eurozónou, v období 2006-2017, prostřednictvím modelu vektorové autoregrese s blokovou restrikcí. Model vektorové autoregrese umožňuje vyhodnotit intenzitu a přetrvávání domácích a evropských šoků na čtyřech makroekonomických ukazatelích: reálný HDP, krátkodobá úroková míra, index spotřebitelských cen a měnový kurz. Hlavní zjištění ukazují, že členské státy EU jsou s eurozónou více spojené a reagují na vnější faktory za méně než 10 měsíců. Nicméně centrální banky východoevropských zemí značně reagují na šoky měnové politiky ECB. Země východního partnerství a členské státy EU střední Evropy mají těsné vztahy s eurozónou, zejména s ohledem na mezinárodní přenos cenových šoků a synchronizaci ekonomických aktivit. Česká republika a Rumunsko mohou být pro východoevropské země relevantními modely, k dosažení své hlavní aspirace - integrace do EU. Diplomová práce, také, představuje přehled o asociačních smlouvách a zóně volného obchodu s EU pro Gruzii, Moldavsko a Ukrajinu, od roku 2014.*

**Klíčová slova:** Vektorová autoregrese, východní partnerství EU, eurozóna, domácí a vnější šoky, měnová politika, vazby, integrace.

**Klasifikace JEL:** E58, F15, F41, F42.

# CONTENTS

# Master's Thesis Proposal

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| | | | |
|---|---|---|---|
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**Proposed Topic:**

**Assessing Economic Linkages between the EU and the Eastern Europe Neighbours**

**Motivation:**

After 1990, the Central and Eastern European countries performed differently than Western European countries, from the economic point of view. After several years of social planner economic regime, these countries faced a high inflation and output losses in the first years of transition to the market economy. Through changes in governments, recessions and overcoming the global financial crisis, CEE countries improved their laws and financial systems in order to become integral part of EU and be linked to advanced economies in the European Union.

The European integration plays a crucial role in supporting a rapid catch-up in the CEECs. The benefits are not only substantial EU transfers, but also closer institutional, trade and financial integration with Western countries. The Association Agreement signed in 2014 between the European Union and Republic of Moldova, Georgia and Ukraine is seen as an important step towards economic integration of these countries, however it is challenging for the EU. On the other side, there are countries from the same region, as

Romania, which smoothly acceded to the European Union and continuously are trying to converge to Western economical level, raising their living standards. Certainly, in Eastern Europe it can be observed already the influence and support of the EU: growing trade volumes, low risk premia and rising use of foreign savings. As a result, during the last years, CEECs alignment to the EU average has been taking place, and with a high probability it will continue as a fundamental, long-term economic trend. However, such a convergence does not promise a quick catch-up in income-level terms.

My motivation is to compare the CEE countries alignment to the EU, determining to what extent the EU's Eastern Partnership countries (Republic of Moldova, Georgia and Ukraine) and CEECs which are already members (Czech Republic and Romania) are economically linked with the EU. In this context, the actuality of my research is based on the strategic goal of the EU to reinforce relationships with neighbour border states, specifically Eastern Partnership countries after AA and DCFTA agreements implementation. This topic is not studied and analysed as much as Central European countries convergence to the Euro area. The main objective is to obtain new insights into the factors that determine the synchronization of shocks in the CEECs versus Euro area.

**Hypotheses:**

**H1:** Domestic shocks are the dominant force of GDP fluctuations in the selected East European countries.

**H2:** The ECB's monetary policy shock has a larger effect on price level in Central European countries, rather than in Eastern Neighbour countries.

**H3:** Central banks of the East European countries react extensively to the ECB monetary policy and follow broadly its short-term interest rate.

**H4:** Eastern European countries economic linkages with the EU are much weaker than the linkages between Central European countries and the EU.

**Methodology:**

Methodologically, based on Sims (1990), I propose to estimate block-restriction vector autoregression model, in order to analyze the interactions between the EU and Eastern

Europe Neighbour countries, comparing it to economic links between Czech Republic, Romania and the Euro area. Shocks and fluctuations in the EU are likely to play an important role and directly affect EU Neighbours economies, possibly more accentuated that many domestic disturbances. In order to assess the effect of foreign shocks in domestic economies I propose to estimate VAR model individually for each country reported to the EU, summarizing analysis using impulse responses, and variance decompositions.

For the empirical exercise, variables are chosen based on New Keynesian models. Consequently, the estimate VAR models can be expressed as a reduced form of New-Keynesian models, determining whether the co-integrating relationship is present or not and taking into account that imposing the co-integrating restriction inappropriately could possibly lead to incorrect inference.

**Expected Contribution:**

According to proposed research the main expected aim is to demonstrate that Europe Eastern neighbour economies are linked to the EU in many important structural aspects of economic performance, explaining the Eastern Partnership countries initiative to become EU member. At the same time, I expect to observe the continuity in absolute real convergence between the EU members (Czech Republic, Romania) and Euro zone, without interruption before and during the crisis, admitting that after 2008 at a reduced speed. Czech Republic's links will be more significant, comparing to Romania. Definitely, every analyzed country will have individual growth patterns, based on the economic development and its level of macroeconomic indicators.

In fact, the empirical evidence should suggest that after signing the AA and DCFTA agreements in 2014, economic fluctuations in the EU must be more representative for the 3 domestic economies and these countries must be more affected by the ECB policies. At the same time, the CEECs have mobilised considerable external resources in their catching-up process. In relative terms, as a percentage of GDP, CEECs economies attracted more FDI and more foreign savings in general than the EU economies.

**Outline:**

1. **Motivation:** Assessing economic links between the Europe http://www.eeas.europa.eu/eastern/index_en Eastern neighbours (Republic of Moldova, Georgia and Ukraine) and CEECs which are already members (Czech Republic and Romania) with the EU.
2. **Data:** Data are collected from the National Banks reports, the World Bank and IMF Databases, as well as the *Eurostat* Dissemination Database.
3. **Methods:** Empirical analysis is based on VAR models, using impulse responses and variance decompositions.
4. **Results:** Comparing obtained results regarding economic linkages from the empirical part with the economic goal of the EU - AA and DCFTA agreements implementation in the 3 selected Eastern Partnership countries.
5. **Concluding remarks:** Summarizing my findings for future research and policy recommendations.

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# List of Figures

# List of Tables

# Acronyms

AA – Association Agreement

ATPs - Autonomous Trade Preferences

CEE – Central and East European

CEECs – Central and Eastern European Countries

CHIBOR – Chisinau Interbank Offered Rate

CNB – Czech National Bank

CPI – Consumer Price Index

CUSUM – Cumulative Sum

CZK – Czech Koruna

DCFTA – Deep and Comprehensive Free Trade Areas

DS – Domestic Shocks

EaP – Eastern Partnership

ECB – European Central Bank

ENI – European Neighbourhood Instrument

ENP - European Neighbourhood Partnership

ES – External Shocks

EU – European Union

EUR – Euro

EURIBOR - Euro Interbank Offered Rate

FDI – Foreign Direct Investment

FX rate – Foreign Exchange rate

GDP – Gross Domestic Product

GEL – Georgian Lari

H1, 2,3,4 – Hypothesis 1,2,3,4

IPI – Industrial Production Index

IR – Interest Rate

M3 – Extended monetary aggregate

MDL – Moldovan Leu

MFA – Macro- Financial Assistance

MTM – Monetary Transmission Mechanism

NBG – National Bank of Georgia

NBM – National Bank of Moldova

PRIBOR - Prague Interbank Offered Rate

RNB – Romanian National Bank

ROBOR - Romanian Interbank Offer Rate

SMEs – Small and Medium Enterprises

TIBR – Tbilisi Interbank Offered Rate

UAH – Ukrainian Hryvnia

US – United States

VAR – Vector Autoregression model

# Introduction

After a quarter-century of post-socialist transformation, institutional, political and economic restructuring processes, some of the Central and Eastern European countries (e.g. Czech Republic and Romania) achieved their goal, becoming members of the European Union. On the other side, Eastern Partnership countries: Moldova, Ukraine and Georgia managed to establish trade links and enhance their cooperation with the EU, signing in 2014 the Association Agreements (AA), including Deep and Comprehensive Free Trade Areas (DCFTA). Based on the economic progress and convergence to EU standards of their peers (Czech Republic and Romania), the AA with the EU is not the ultimate goal for the 3 Eastern Partnership countries. In this context, by sharing the same political past and first stages of economic development, Czech Republic and Romania are models of economic growth and social advancement, reaching the world's largest common market and becoming actors on European level. On the way to EU membership status, Eastern Neighbourhood countries should complete all the steps of integration process, in order to improve the socio-economic weaknesses. Nowadays, the European neighbourhood with all the socio-political challenges and pressures is a strategic region for the EU. Therefore, the EU is supporting the fledgling democracies of Georgia, Moldova and Ukraine, providing necessary recommendations and integration standards for transparent and competitive economies.

The most of the CEECs were hardly affected by the world financial crisis in 2008-2009. Different development paths, before the crisis, have led to an increase in regional differences between the EU members and the Eastern Neighbourhood non-member countries, reducing their tightness of economic links with euro area. The slow productivity growth and

poor performance in developing innovative capacities diminished the Eastern Neighbours competitive position (Forgó & Jevčák, 2015).

In this context, the paper aim is to show that the European Union and its Eastern Partners (Georgia, Moldova and Ukraine) are mutually interconnected, and strategies of one part determine the performance of the other. In this context, the estimated small open economy VAR model for 5 countries (Czech Republic, Romania, Moldova, Georgia and Ukraine) allows to assess the impact of domestic and foreign shocks, determining the different tightness of the economic linkages between these five countries and the euro area. The proposed VAR model consists of two blocks– domestic and the euro area, assuming from the beginning that euro area variables affect the CEE variables, and not vice versa.

The assessment of economic linkages between Eastern European countries and Euro area is a very actual and important topic on EU agenda since 2014, with the entry into force of the AA and DCFTA. Nevertheless, there are no researches evaluating the connection of DCFTA signatory countries with the EU. Existing VAR analysis on small economies, especially for Central European countries, does not cover this region. Are the foreign shocks an important factor for the economic development of these 3 EU Eastern Neighbours? Can the signed Association Agreements be a step towards the European integration? Answering these questions, the present research will emphasize the topic's actuality, presenting a personal point of view on it. The study does not analyse only the DCFTA implementation and achieved results in Eastern Europe, it evaluates the real economic connections existing nowadays between the euro area and its neighbours. In addition, it is still unexplored which of these 3 countries is more economically linked to the EU and has bigger chances of integration, in the near future. Presenting an innovative research, which was not done before, is the main author's objective and contribution.

The thesis is structured in 4 chapters, as follows: Chapter 1 provides a retrospective on CEEC's transition from central planned economy to Association Agreements and EU membership, familiarizing the readers with AA and DCFTA main goals and principles; Chapter 2 "Econometric methods and data", summarizes the existing empirical literature on VAR models, especially for CEECs and contains a general information regarding the data set, research hypothesis and the main steps for computing the VAR model for small open economies; Chapter 3 presents the VAR model results and evaluation of the external vs.

domestic shocks on CEECs economies, responding to the main research hypothesis; Chapter 4 reveals the advantages and the implementation costs of AA and DCFTA agreements in the Eastern EU countries, showing the barriers and opportunities for both sides EU and Eastern Partnership countries. In the end, it concludes with a series of recommendations for the future economic cooperation. The thesis starts with an introduction and at the end are presented the concluding remarks. The bibliography, as well as the appendices facilitate illustrating the model's results, detailing the empirical analysis.

# Chapter I

# Theoretical Framework

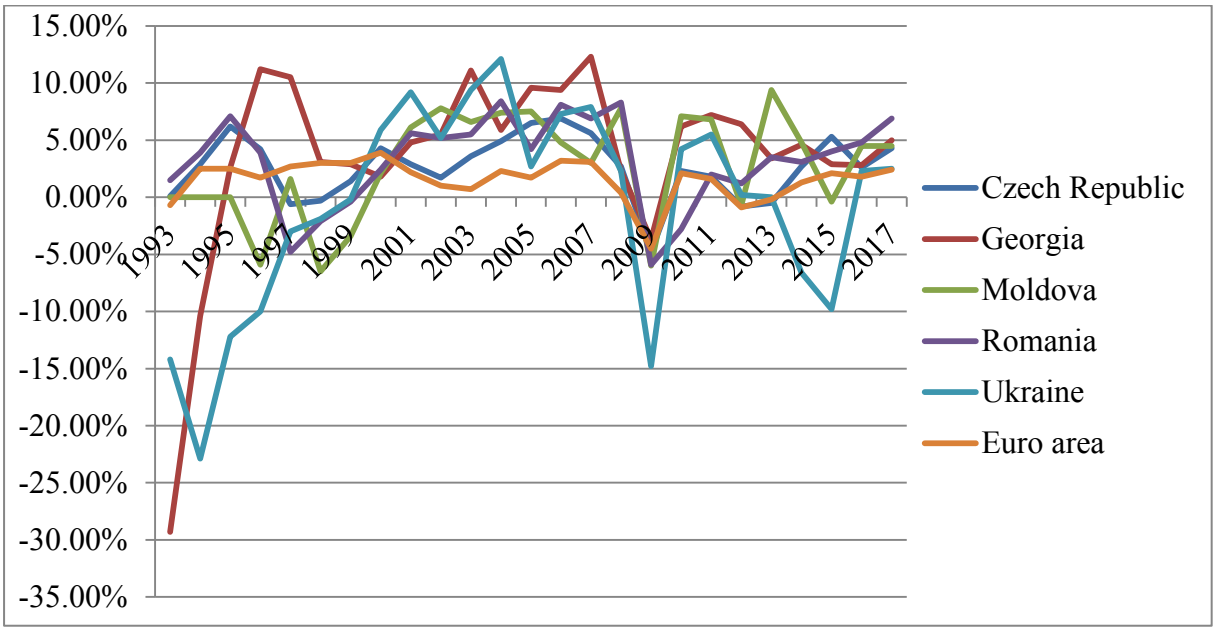
## 1.1. CEE Economies: transition from central planning to association agreements and EU membership

In the last 25 years, Central and Eastern European countries passed a dramatic transformation from communism to capitalism and democracy, resulting in their alignment to the EU economy and improvements in living standards. The main goal of building open market economies has been difficult and challenging process for most of the CEE countries. For the Czech Republic and Romania the results of transition were successful, these countries managed in 2004, and respectively in 2007 to become a part of EU, attracting more FDI and achieving strong and sustainable growth, despite the inherent vulnerabilities. Trade liberalization generated essential governmental reforms in competition policy, labour markets, privatization and enterprise restructuring. CEECs faced a high inflation level and major recessions after the prices liberalization. Implemented fiscal and monetary policies led to an excess in demand and unsustainable external debt in CEECs.

After first years of transition, has followed a uniformly growth in central Europe. Macroeconomic stability led to large capital inflows and increased confidence in European convergence, especially for CEECs that joined the EU. Campos, et al. (2014) present the

benefits of integration for the countries that joined the EU before 2004, underlying that the effects tend to be smaller, but positive for the Czech Republic. Until the global financial crisis in 2008, the average growth of CEE region was 6%, with a minimum growing rate of 3% annually (Forgó & Jevčák, 2015). The credibility and financial provision of Central and Eastern Europe have grown with the presence of foreign banks in this region. According to Schadler, et al. (2006), the boom in the CEE economic transition is associated with the accession of 10 CEECs to the EU. For the new EU member states the effects of the accession were substantial. The main changes were noticed by the liberalization of trade (capital and labour); institutional and legal development; and access to EU funds. The effects of integration were felt not only at the moment of accession to EU, but more afterwards, as a progressive development aid, based on Van Der Loo (2017). Corresponding to EU standards from the legislative, economic and social aspects had a huge impact on sustainable strong growth of new member countries, because accession to EU imposes a list of improvements on institutional and administration levels, applying EU norms and regulations in practice. Comparing the Czech Republic and Romania, it is obvious that the second has a slower integration path, not only because of attending the EU few years later, but also taking into consideration the socio-economic premises from which the integration started. Financial flows from the EU increased sharply for both analysed countries after accession, from less than 1% of GDP before the integration to approximately 2.5% in the next years after attending the EU (Gorzelak, 2015). The financial aids were addressed as structural funds, agricultural support or subsidies for specific sectors. The key element in applying the EU grants in new member states was not the amount of money received, but the effectiveness of using it, distributing it not only for consumption or covering the external or internal debts, but for productive sectors. This is one of criteria which vary across countries until nowadays and is an important factor of economic growth, differentiating the development of the EU members (Campos & Coricelli, 2002). In order to confirm this, below is presented figure 1.1, showing the GDP annual growth, in the period 1993 – 2017.

**Figure 1.1: Annual GDP growth (%), 1997 - 2017**




*Source*: author's computation based on https://data.worldbank.org.

There are multiple approaches on transition analysis before the economic crisis, based on cross-country approach:

• Havrylyshyn (1998) analysed the determinants of growth in transition economies over 1990–1997. The key idea is that macroeconomic stabilization, including fiscal restraints and structural reforms helped achieve sustainable growth. While reforms might have depressed output initially, long-term growth was associated with sustained reform performance. An important founding is the negative and small adverse initial conditions for a country that initiates its transition process.

• From Fischer and Ratna (1998) perspective, successful stabilization measures (lower inflation and more stable exchange rates), higher assistance, faster and more comprehensive structural reforms were associated with better growth outcomes during the transition.

• De Melo et al. (2001, p. 1) pointed out that: "economic liberalization is the most important factor determining differences in growth." Campos and Coricelli (2002, p. 825) continued this idea, summarizing that price liberalization and tight macroeconomic policies are not sufficient to foster growth, emphasizing that "institutions enabling the functioning of

a market economy are a fundamental precondition, particularly relating to financial markets and social safety nets."

The financial crisis in 2008-2009 resulted in economic vulnerabilities, hitting the Central and Eastern Europe harder than any other. Large drops in output, large volumes of lending redirected into consumption and non-tradable sectors contributed to significant macroeconomic imbalances and reduced the initial transition speed. The crisis eruption triggered high risks of banking instability, represented by disruptions of exchange rates and real estate booms.[1] Portfolio losses during the banking crises were absorbed, especially in CEE member states, by the reserve buffers, widespread problems affecting Eastern Partnership countries such as Ukraine and Moldova. At the EU level, the new banking union and regulatory harmonization enhanced financial stability and reduced fragmentation among countries during the crisis, making the difference between CEE member states and non - members of the EU more significant.

The external shocks, as well as imbalances in the "Great Moderation" period, Lehman Brothers' collapse in 2008 and the Euro-zone crisis in 2010–2012 had a huge impact on the CEE transition economies, increasing their vulnerability. The impact on the crisis is maintaining until today, reflected by a reduced potential growth, high unemployment, and fragile financial markets in the CEECs. Moreover, it significantly diminished the economic convergence of the Eastern Neighbours with the Western Europe.

The global financial crisis for the CEE countries meant lower capital inflows, reduced trade, making the Central and Eastern Europe more unstable and vulnerable. The slow growth in the Euro area and deleveraging Western European banks negative impacted the Eastern part of Europe, and these shocks continue to influence the macroeconomic and financial developments.[2] Definitely, the crisis in CEE region did not have the same macroeconomic repercussions, EU members being impacted less than Eastern neighbours. In large context, lack of new funding triggered declines in credit and domestic demand in Eastern Partnership countries. In states with fixed exchange rate regimes were attested greater capital inflows during the pre-crisis years, lowering after the crisis.

[1]United Nations Paper: *World Economic Situation and Prospects 2013 Global outlook*, 2013.

[2] IMF: *Central, Eastern and South-eastern Europe How to Get Back on the Fast Track, Regional Economic Issues*, 2016.

In this context, taking into account the theoretical background, the goal of the thesis is to analyse if economic links of the Eastern European Neighbourhood countries with EU are tight enough after the crisis for a future economic integration. Moreover, the aim is to establish if Association and DCFTA Agreements, signed in 2014, are a precondition for economic integration and enhanced the cooperation between Georgia, Moldova and Ukraine and the EU. The further accessions are expected to be relatively protracted, membership prospects after the economic crisis reducing considerably. Nevertheless, the EU remains closely engaged with candidate and potential candidate countries, helping them to implement necessary reforms, in order to meet accession requirements.

Econometric analysis proposed by Llaudes, et al. (2010) specifies the link between pre-crisis fundamentals and the severity of output contractions after the crisis, stressing the key determinants for the CEE region:

- External vulnerabilities represented by high current account deficits, high level of external debt, and low reserve coverage are leading to output declines. In 2007, the average current account deficit in the CEE region was estimated at 12 percent of GDP.
- Trade linkages specify that a higher share of aggregate demand imply greater output losses.

The collapse in economic activity imposed a rapid and prompt governmental response, adjusting the fiscal and monetary policies of CEE countries, adopting emergency measures in order to stabilize financial sectors. CEECs that entered the crisis with stronger fundamentals, better external and fiscal balances, more buffers, lower public debt, and lower inflation, were able to adjust faster their economy after the crisis and return to the initial set-up. During the crisis, in Ukraine for example, the reserve requirements were relaxed in order to increase liquidity in the financial, introducing new fixed-term domestic and foreign currency supply operations (Litra & Chkhivadze, 2016). As a response to crisis, Eastern European countries tried to reach the balance between supporting their economies relaxing their monetary regulations and preserving stability in the financial sector by avoiding excessive exchange rate depreciation (Kharlamova, 2015). Other attested reactions to the crisis, in the Eastern European region, reflected differences in exchange rate regimes and increase of the external funding costs. As an example, Ukraine faced a temporarily increase in policy rates, affecting the balance sheet, because of exchange rate overshooting. On the

contrary, according to Gorzelak (2015), Romania did not change them. Generally, the riskier markets or countries with fixed exchange rates confronted an increase in bond spreads, being limited in monetary regulations. On the other hand, the Czech Republic, being more credible from the monetary perspective, had a low level of inflation during the financial crisis. In comparison with EU members (Romania and Czech Republic) that were involved in the joint EU economic programs during the crisis, Eastern European countries applied for the financial and policy support from IMF programs, in order to overcome the global crisis.[3]

In conclusion, the growth model and economic convergence of the CEECs prior to crisis cannot be compared with the speed, strength and competitiveness after 2008. The strong trading partnership between the EU and CEECs, ample foreign bank financial aids, structural reforms of the banking system to supply credit to the economy were keys for economic integration of the Czech Republic and Romania in 2004 and 2007, respectively. Roaf, Atoyan and Joshi (2014) specified that current Europe is supported by a different approach of simple ranking, based on macroeconomic performance relative to advanced European country norms.[4]

Comparing the present results with those obtained in 2000, it is observable that nowadays there is an overlap between "advanced" and "emerging" European countries. This classification illustrates the growing disparities among emerging economies, more "developed" CEE countries being closer to the best performers in Western Europe, and far ahead of their Eastern Neighbours. In the proposed research, such a good practice is demonstrated by the Czech Republic and its economic progress (Roaf, et al., 2014).

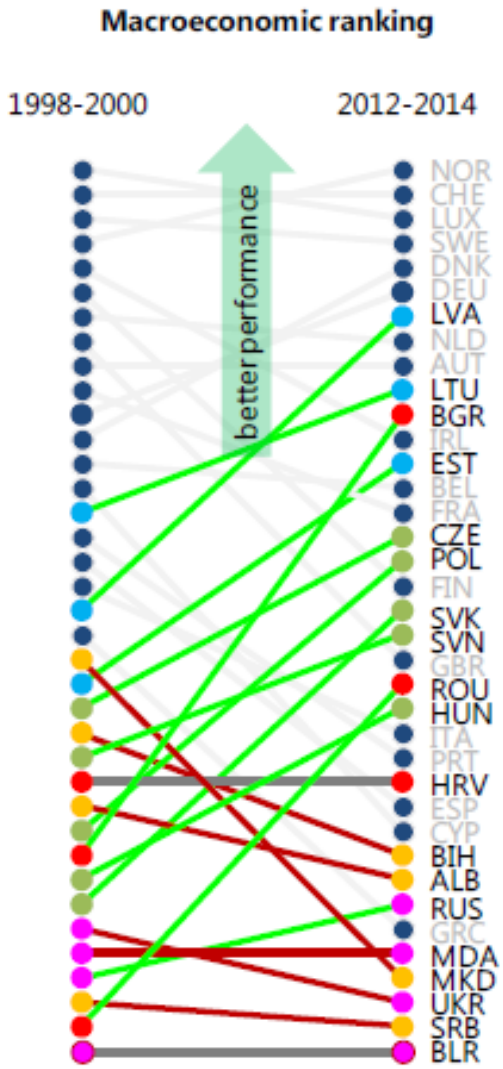
Below, on the left side of the chart, is represented the ranking in 2000, and on the right side the progress of the European countries after a decade. It is noticeable that Romania had the biggest jump in the rank, fact explained by the integration into the European Union, economic and legislative adjustment to the EU regulations, norms and standards. Czech Republic is constantly increasing performance, Moldova is keeping its constant development and maintaining the same position, after 10 years. Regarding Ukraine, the economic

[3] IMF: *Central, Eastern and South-eastern Europe How to Get Back on the Fast Track, Regional Economic Issues*, 2016.

[4] The macroeconomic ranking - weighted average of 7 macroeconomic indicators (inflation, current account balance, unemployment, government balance and debt, GDP/capita at PPP and real GDP growth). Weights were generated by principal components analysis of EU14 countries using averages from 2000–2014. The variables were normalized against 2000-2014 EU14 benchmarks.

outcomes after a decade are not encouraging, with a 3-positions drop in the ranking. Because of the political influence of Russian Federation on Eastern Neighbourhood countries (Moldova, Georgia and Ukraine), as well as initiated conflict at the eastern border of Ukraine, global financial crisis and slow economic growth these countries did not register any substantial development and progress between 1998-2014.

**Figure 1.2: Macroeconomic ranking of progress performance in 1998 vs. 2014**




*Source*: Roaf J., Atoyan R. and Joshi B. (2014): "*Regional Economic Issues -Special Report 25 Years* of *Transition: Post*-Communist Europe and the IMF"

## 1.2. Association agreements with EU - a step towards economic integration

Initiated in 2004, the European Neighbourhood Partnership (ENP) was a first step towards the Association and Deep and Comprehensive Free Trade Agreements signed 10 later with Georgia, Moldova and Ukraine. The significant intensification of the economic relations with the EU, the democratic and prosperous transformation was the main goal of ENP. In some perspective, ENP was seen as a geopolitical paradigm and a technocratic process, founded on EU's economic power. The EU reforms and regulations proposed to Eastern European partners overcome the Russian aggressive influence in this region. Russia's intentions to manipulate and control these 3 countries are demonstrated by the "frozen conflicts": in Moldova (Transnistria region), Georgia (South Ossetia and Abkhazia) and new military dimension of the war in Ukraine (Donetsk and Luhansk).[5]

It is expectable that all the three EaP countries: Georgia, Moldova, and Ukraine will support the idea of EU integration. A closer association with western countries will lead to successfully reforms and challenges, implementing the best practices of their neighbours. For EaP countries, the EU integration would lead to many economic and political benefits: consolidating and strengthening the commitment of political elites and societies to proceed with necessary reforms in economic, judiciary and fiscal sectors, as well as obtaining protection against Russia's manipulation with trade and resource dependence (natural gas).

In this context, EU should provide its technical and financial support and follow a set of actions in order to facilitate Eastern European countries convergence to the proposed reforms:[6]

• Providing support for structural reforms for specific economy sectors, including state budget support mechanisms;

• Assisting the democracy and human rights-related reforms, as well as respecting the rule of law in combating corruption;

[5] IMF: *Central, Eastern and South-eastern Europe How to Get Back on the Fast Track, Regional Economic Issues*, 2016.

[6] Galgóczi, B., Drahokoupil, J., Bernaciak, M., 2015. Foreign investment in eastern and southern Europe after 2008 Still a lever of growth?. ETUI

• Controlling successful implementation of AAs, and especially DCFTAs, involving the civil society and policymakers in the supervision processes;
• Creating platforms for the development of the small and medium business environment, as well as access to EU funds and grants, especially in the agricultural and service sectors.
• Developing effective communication networks, raising visibility of the benefits of EU support and promoting EU values in the societies.

Generally, analysing the three Eastern European countries: Moldova, Georgia and Ukraine, it is worthy to emphasize that Moldova is, nowadays, the most active among the other states. Cooperating with the EU under the ENP and EaP, it gradually tries to achieve the economic and political integration. This country was one of the first Eastern Partners which negotiated and signed the AA on June 27, 2014, including a DCFTA with the EU. These agreements led to visa liberalization regime, enabling an increasing EU bilateral financial assistance under the European Neighbourhood Instrument (ENI) and implementation of the EU Common Aviation Area Agreement. Galgóczi, et al. (2015) expressed that financial assistance increased by almost €100 million, in the period 2007-2014. Moreover, Moldova improved its energy security position, building with the EU support the gas interconnector Iasi (Romania) – Ungheni (Moldova). Contrary to all expectations, the last presidential elections in 2016 won by a pro-Russian candidate, settled in Moldova the political uncertainty regarding European future. These results explained the slow implementation of the Justice Sector Reform Strategy, maintaining the same level of corruption. Nowadays, the population is less optimistic about Moldova's European integration prospects than at any time before. During the six-year rule of pro-European governments (2009-2015), Moldovans support for European integration decreased by 30%.

Ukrainian perspective has almost the same characteristics, implying that the EU support means reducing dependency and vulnerability from Russia, obtaining access to European markets, liberalizing trade, improving energy systems, and obtaining a visa-free regime. By comparison, Georgia has the same facilities and less manipulation from Russia.

# Chapter II

# Econometric methods and data

## 2.1. Empirical theoretical background

Sims (1980) introduced the vector autoregression models (VARs), proving for a long time their effectiveness for modelling the dynamics of macroeconomic variables as well as their forecasting. These econometric models capture the linear interdependencies among multiple time series. The thesis applies VAR model for small open economies, which aim to show and help to analyse the economic linkages between CEECs and the euro area. It is expectable that the EU members, Romania and Czech Republic, will be more connected to the EU economy that the Eastern Neighbours. A point of interest, applying the VAR model is to determine at what extent the 3 Eastern European countries are connected with the Euro - zone and which one has more economically common fluctuations with the EU. VAR model is analysed based on impulse responses and variance decomposition. Impulse responses show the effects of shocks on the adjustment path of the variables. Variance decompositions measure the impact of every type of shock, both computations being extremely useful in assessing how shocks to economic variables react through a system. Another important reason to study the economic linkages, applying the VAR model, is due to transmission mechanism, which facilitate the analysis for Central and Eastern Europe and permit to

compute a conclusion precising how fast, and to what extent, a change into the EU policy (e.g. the Central Bank's interest rate) will impact the CEECs.

Given that some of CEECs (Romania, Czech Republic) entered the EU in 2004/2007 and it exists a large gap in financial sector development between CEE and the euro area, it is a strategic issue to evaluate whether transmission mechanism operates differently in the CEECs member and non-member countries. The main idea is to estimate 5 individual country block and the euro area block. Therefore, in the following is analysed a short literature overview, emphasizing the main VAR principles.

The empirical model of the thesis is based on Cushman and Zha (1997) approach, presenting how foreign monetary policy shock can influence the domestic economy. The authors analysed the interactions between the US and Canadian economies, in order to identify the Canadian monetary policy. The block exogeneity stresses the idea that small economy cannot influence significantly the developments of a large economy. Identifying the monetary policy shock, they focus on the assessment of Canadian monetary shock, not taking into account the US monetary shocks.

Speaking about the US economy, another perspective is proposed by Kim (2001), studying the effects of US monetary policy shocks and their influence on non-US G7 countries. The paper conclusion emphasizes that after the control for inflationary or supply shocks, the reaction of non-US monetary authorities to US monetary reforms does not seem to be particularly strong with an exemption of Canada.

Giordani (2004), in contrast to Kim (2001), presents a small open economy VAR model, based on New-Keynesian and Bayesian approaches and is not specified on domestic shocks, but on foreign. The founding of the empirical estimation shows that US shocks are a key element for variables variation of Canada. In this model, foreign variables are set as a priority for optimal and actual monetary policy regulations.

As all these models were focused on monetary policy analysis, another interesting research on the same subject is proposed by Jacobson, Jansson, Vredin and Warne (1999). The economists investigated the deregulation of financial markets and the policy rules specifying more transparent monetary policy. Their paper demonstrates that VAR model with long run restrictions can be usefully applied in analyses of different monetary policy issues: the effects of innovations in interest rates and other shocks; the short and long run

relationships between prices and nominal and real exchange rates; the properties of an index of monetary conditions; dynamic forecasts of inflation; and the relation between inflation and the output gap.

All the previous models form a general empirical vision. Nevertheless, it is important to have a look on papers which are focused on VAR models for Central and Eastern European area. In this context, Maćkowiak (2006) proposes the variance decomposition by origin the sources on real aggregate output and aggregate price level in the Czech Republic, Hungary and Poland, for the first 15 years of transition. The research concludes that external shocks are the drivers for these economies on long run. About 60–85% of the long-run variance in aggregate price level in the Czech Republic, Hungary and Poland are assigned to external factors. The same estimate for real aggregate output, which vary between 25–50%.

Additionally, Coricelli, Égert and MacDonald (2006) studied the MTM, also applying the VAR model. The authors focused on CEECs, in particular, evaluating the functioning of the separate channels in the MTM, and exploring possible interrelations between different channels through which they may amplify or attenuate each other's impact on prices and the real economy. The empirical findings for CEE were compared with results for industrialized countries from the euro area, pointing out the relevant asymmetries between CEECs and the euro area.

Arčabić, Globan, Nadoveza, Rogić and Tica (2016) inspected the macroeconomic effects of productivity shocks, using a VAR model of a small open economy. The paper compares theoretical impulse response functions from a DSGE model with an empirical five variable VAR model, estimated for the Croatian economy. The research reflects the productivity shock on the selected macroeconomic variables: domestic output gap, nominal interest rate, CPI inflation and terms of trade. The obtained results stress that the productivity shocks do not play a significant role in determining the variation of selected macroeconomic variables in the case of the Croatian economy.

Popescu's research is a combination between Maćkowiak's concept (2006) and Coricelli's analysis (2006), assessing the magnitude and persistence of monetary policy shock on GDP, price level, extended monetary aggregate (M3) and exchange rate in Romania. "The VAR results reflect that a monetary policy shock causes a response with the same sign for the nominal exchange rate, GDP, and M3. There is a limited impact of the

short-term interest rate shock in explaining the consumer prices, production and exchange rate fluctuations."

Vonnák (2010), taking the same country group as Maćkowiak (2006), investigated the role of monetary policy in a small open economy, stressing the importance of exchange rate shocks in the Czech Republic, Hungary and Poland. The VAR model points out that: "The transmission of monetary policy is fairly similar in CEE countries. After a monetary contraction, output, consumer prices and industrial production fall in line with intuition."

The Bayesian VAR approach with structural restrictions and zero restrictions on lags, addressed to CEECs, is proposed by Junicke and Merellay (2016). The research evaluates the transmission channels of external shocks to an extended set of Eastern European Countries. In particular, the study paper aims to analyse at what extent monetary policy shocks, originating from the US and from Germany, can explain fluctuations on Eastern European markets. The conclusions figure out that the US and German monetary policies influence in the same way the CEECs.

One of the last researches in this field was done by Lessuisse (2017). The study aims to identify the amplitude of the direct ECB monetary policy shock on Central and Eastern European countries. The panel-VAR method permits to conclude that GDP has a negative and robust reaction against monetary shock, during the post-economic crisis period. The exchange rate regime plays a small but significant role in terms of magnitude.

All the papers and researches mentioned above were a starting point for this thesis, motivating to adapt the VAR model and econometric methodology for the selected set of countries.

## 2.2. Data description and research hypothesis

The VAR model, based on Horváth and Rusnák (2008) research, consists from the estimation of 5 individual country blocks (Czech Republic, Romania, Moldova, Georgia and Ukraine) and the Euro area block. The data set for the country blocks, as well as for Euro area are constructed from the following variables: measure of economic activity (Output gap and Industrial Production Index for sensitivity analysis), the aggregate price level represented

by the Consumer Price Index, the exchange rate and the short-term interest rate (3 month money market interest rate).

The data are structured with a monthly frequency for the analysed period January 2006 – September 2017, and counts in total 141 observations. There were used multiple databases for setting the data sample: Eurostat and IMF International Financial Statistics Database, National Bureaus of Statistics and National Banks databases of Moldova, Georgia and Ukraine. The data set was restricted to 12 years, because of insufficient evidence for economic activity in the Eastern European Countries.

The ordering of the model variables followed the Kim and Roubini (2000) paper. As proposed by Horváth and Rusnák (2008), VAR model uses two different economic activity indicators, for sensitivity analysis: GDP gap and industrial production index. The output gap was obtained deducting the potential output from seasonally adjusted GDP. It is worthy to mention that the quarterly GDP data were interpolated using the quadratic match procedure, and the potential output was obtained applying the Hodrick-Prescott filter, with a smoothing parameter of 1600, for obtaining monthly variables. All the analysed variables, except 3 month money market interest rate, took the logarithmical values.

Based on the proposed VAR model and the suggested 7 endogenous variables, the main hypothesis of the research are stated as 4 pillars of the thesis:

*H1: Domestic shocks are the dominant force of GDP fluctuations in the selected East European countries.*

*H2: The ECB's monetary policy shock has a larger effect on price level in Central European countries, rather than in Eastern Neighbour countries.*

*H3: Central banks of the East European countries react extensively to the ECB monetary policy and follow broadly its short-term interest rate.*

*H4: Eastern European countries economic linkages with the EU are much weaker than the linkages between Central European countries and the EU.*

The formulated hypotheses for the seven variable VAR model permit to reflect the interactions between the euro area and CEECs economies and the impact of foreign shocks versus the domestic ones, measuring their intensity using impulse responses and variance decomposition.

Additionally, there will be taken into account and interpreted the impact of structural breaks, represented by: financial crisis (2008-2009), political factors (e.g.: the war in Ukraine), economic frauds (e.g.: the Moldovan bank robbery), and other external factors.

## 2.3. Small Open Economy VAR Model specification

The proposed model, based on Horváth and Rusnák (2008) consists from the estimation of 5 individual country blocks (Czech Republic, Romania, Moldova, Georgia and Ukraine) and the Euro area block.

Generally, the VAR model for small open economies is based on linear equation, with a stochastic dynamic form:

$$A(L)y(t) = \varepsilon(t),$$

where:

- $A(L)$ is an $n \times n$ polynomial matrix in the lag operator (only with positive powers),
- $y(t)$ represents an $n \times 1$ observations vector,
- $\varepsilon(t)$ reflects an $n \times 1$ structural disturbances or shocks vector and is serially uncorrelated $var(\varepsilon(t)) = \Lambda$
- $\Lambda$- diagonal matrix, elements of the matrix are the variances of structural disturbances.

The previous equation could be expressed more formally:

$$E[\varepsilon(t)\varepsilon(t)' \mid y(t-s), s > 0] = I, E[\varepsilon(t) \mid y(t-s), s > 0] = 0.$$

The small open economy vector is formed by: $n_1$ domestic variables and $n_2$ exogenous variables. Dividing the model into the euro area and CEECs' block, the dimension of $A_{ij}(L)$ is $n_i \times n_j$, $y_i(t)$ and $\varepsilon_i(t)$ take the form $n_i \times 1$.

$$A(L) = \begin{bmatrix} A_{11}(L) & A_{12}(L) \\ A_{21}(L) & A_{22}(L) \end{bmatrix}; y(t) = \begin{bmatrix} y_1(t) \\ y_2(t) \end{bmatrix}; \varepsilon(t) = \begin{bmatrix} \varepsilon_1(t) \\ \varepsilon_2(t) \end{bmatrix}.$$

As the present study analysis the effect of the euro area shocks on CEE national economies, the $A_{21}(L)=0$, as is no need in interpreting the effects of domestic shocks on euro area, the same principle being applied by Cushman and Zha (1997). This represents the block exogeneity restriction. The model's challenge is that number of estimated parameters in the structural model is higher than the number of parameters in the reduced form. Following

Mackowiak (2006), in order avoid identification problem, it is imposed Choleski recursive scheme: n(n-1)/2 restriction. This permits obtaining a just identified model.

$$\begin{pmatrix} u_t^1 \\ u_t^2 \\ u_t^3 \\ u_t^4 \\ u_t^5 \\ u_t^6 \\ u_t^7 \end{pmatrix} = \begin{pmatrix} 1 & d_{12} & d_{13} & d_{14} & d_{15} & d_{16} & d_{17} \\ 0 & 1 & d_{23} & d_{24} & d_{25} & d_{26} & d_{27} \\ 0 & 0 & 1 & d_{34} & d_{35} & d_{36} & d_{37} \\ 0 & 0 & 0 & 1 & d_{45} & d_{46} & d_{47} \\ 0 & 0 & 0 & 0 & 1 & d_{56} & d_{57} \\ 0 & 0 & 0 & 0 & 0 & 1 & d_{67} \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \varepsilon_t^{g(CEE)} \\ \varepsilon_t^{p(CEE)} \\ \varepsilon_t^{r(CEE)} \\ \varepsilon_t^{e(CEEC/EUR)} \\ \varepsilon_t^{g(eu)} \\ \varepsilon_t^{p(eu)} \\ \varepsilon_t^{r(eu)} \end{pmatrix}$$

Mojon and Peersman (2001) specified the order of variables in each computed block. It starts with measure of economic activity (output gap or industrial production), followed by the price level, interest rate and the FX rate.

The vector of the five Central and Eastern European countries variables specifies: economic activity measure, the aggregate price level, the exchange rate and the short term interest rate, as applied also by Horváth and Rusnák (2008).

The vector of Euro area variables includes a measure of the EU economic activity, aggregate price level represented by the CPI and 3M EURIBOR.

Another essential aspect of econometric modelling is the impulse responses and variance decomposition analysis with regard to structural breaks. The sequential analysis techniques: CUSUM and CUSUM of squares tests, as well as recursive residuals have facilitated the observation of small shifts in the process mean and variance change in the non-stationary time series models. Additionally, for detecting the presence of structural changes, was computed the Chow test, checking the VAR regressors for significance. In order to obtain higher stability, the initial models were restricted at the breaking points.

# Chapter III

# Results and Interpretation

## 3.1. Evaluating economic impact of the euro-area shocks on CEECs economies

A priori it is expected a strength correlation in business cycles between the CEECs and the euro area, because of accentuated trade links in the last years and the international monetary spillovers. While qualitatively similar, the responses observed in the Czech Republic should be much stronger in comparison with Romania, which attended the EU 3 years later. On the same note, the responses of the EU Eastern Neighbours, AA and DCFTA signatory countries, are expected to be much weaker, on average. A key question is whether these three states Georgia, Ukraine or Moldova have the same degree of connection with the EU or some of them are more linked to euro area, based on undertaken reforms since 2014.

As mentioned in the second chapter, for sensitivity analysis the model was estimated with 2 distinct economic activity indicators: Output gap and Industrial Production Index. As Czech Republic, Romania and Ukraine have a stronger industrial potential, the VAR model based on IPI variable could be more representative in terms of evaluating the economic connection with the EU. On contrary, Georgia and Moldova's economies are driven by the agriculture, which is one of the most productive economic sectors; therefore, the output gap would reflect a wider picture of the inter-linkages with the euro area.

The GDP is one of the most inclusive measures of economic activity, for this reason the VAR results using the GDP gap will be commented as follows, in the main part of the thesis. The synchronization based on industrial production is presented in the appendices, with an important remark that the Czech Republic and Romania made some progress with regard to EU industrial alignment, in contrast to the results observed for output gap (Appendices A and B). The strong industrial production links between the euro area and several CEECs are not surprising, since industry generates a large proportion of foreign trade, representing one of the main channels of economic cooperation.

As the data set includes the period of economic crisis, interest rate volatility in the Czech Republic and Romania was more pronounced in 2008 - beginning of 2009. Nevertheless, the restricted models do not differ significantly from the full sample models. For the Eastern European countries, the major breaks were in 2014-2015, thus the restricted models are more stable, implying wider confidence bands.

An important preliminary step in model computing is the selection of the VAR lag order. Because of the small data set, constituted from 141 monthly observations, the Schwarz information criterion is preferred, setting the lag to 1. Meanwhile, the impulse responses in 95% confidence bands were bootstrapped to 250 replications, based on Hall's (1988) asymptotic theory and bootstrap procedure.

### *3.1.1. Czech Republic*

On 1 May 2004, the Czech Republic became the EU member. With the same communist past and central planned economy as other 4 researched CEECs, Czech Republic was the first country which integrated in the European Union, knowing a steady progress. Its cooperation with the EU started after 1993, the European Union becoming the largest trading partner with more than 80% of its exports value and great investment support ( Galgóczi, et al., 2015). Moreover, the Czech Republic was the first post-communist country that obtained an investment credit rating by international credit institutions. Hence, its development and alignment to euro area is incontestable and stronger compared to other analysed countries.

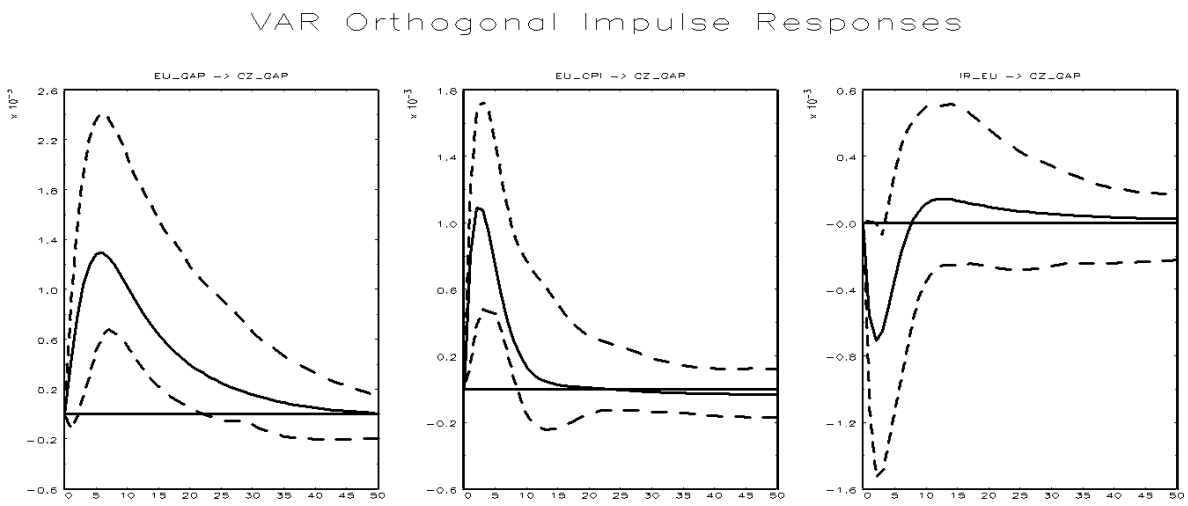
Due to the stable banking sector, the global financial crisis caused just a temporary interruption of the Czech financial markets integration with the euro area. Another detected

structural break is the FX sharp fluctuation in November 2013 and it corresponds to CNB intervention with **200 billion CZK** on the foreign exchange market to weaken the koruna against the euro, and keep FX rate close to CZK 27. This was the Central Bank measure **to avoid the deflation and to maintain price stability.**[7]

Figure 3.1 presents the direct and fast responses of the Czech economy to the euro area shocks. An increase of the EU economic activity will transpose to Czech Republic in approximately 7 months, with a maximum magnitude of 0.13%. The same direct proportional impact has the CPI, as a measurement of price level, on the domestic economic activity. An increase in EU prices generates higher interest for exports; consequently, the economic activity of the Czech Republic will benefit. As reflected in the figure below, Czech economy reacts very fast to changes in the EU price level, reaching its maximum of 0.11% after only 3-4 months. In terms of short-term interest rate, an increase of 3M EURIBOR rate will discourage consumers and firms from borrowing money. Correspondingly, reduced aggregate demand in the Czech Republic will decrease overall economic activity, causing less earnings and less investments. After an external monetary policy shock, the Czech economy gradually declines and reaches a bottom immediately, after 2 months, fact accentuated also by Vonnák (2010).

[7] Czech National Bank: *The CNB buys foreign exchange worth about CZK 200 billion*, 2013. Available online: https://www.cnb.cz/en/public/media_service/press_releases_cnb/2013/20131125_cnb_balance_sheet.html

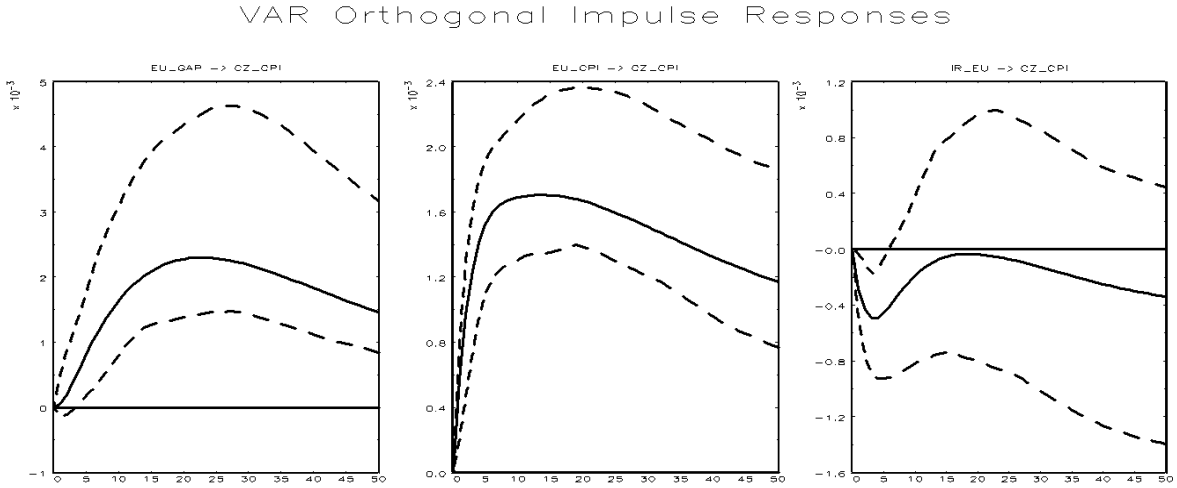
***Figure 3.1: The effect of the Euro area shocks on the Czech economy, impulse responses***




*Source*: author's computations using JMulti software

Next figure reflects the impulse responses of the Czech prices with respect to euro area shocks. The most significant shocks driving higher and extended responses are: the increase in EU prices and euro area's economic activity shock. An improvement in the EU economy will generate an augmentation of domestic prices in the following 2 years, with a peak of Czech price level of 0.22 per cent. Similarly effects are obtained for EU - Czech price convergence. Higher EU prices will transpose into rise of the Czech price level after, approximately 1 year, with a maximum value of 0.17 per cent. Referring to ECB monetary policy, it has less impact on the prices in the Czech Republic. If 3M EURIBOR rate rises, Czech prices will decrease by maximum 0.04 per cent, in 4 months. The negative effect is specified, as well, by Vonnák (2010).

***Figure 3.2: The effect of the Euro area shocks on the Czech price level, impulse responses***



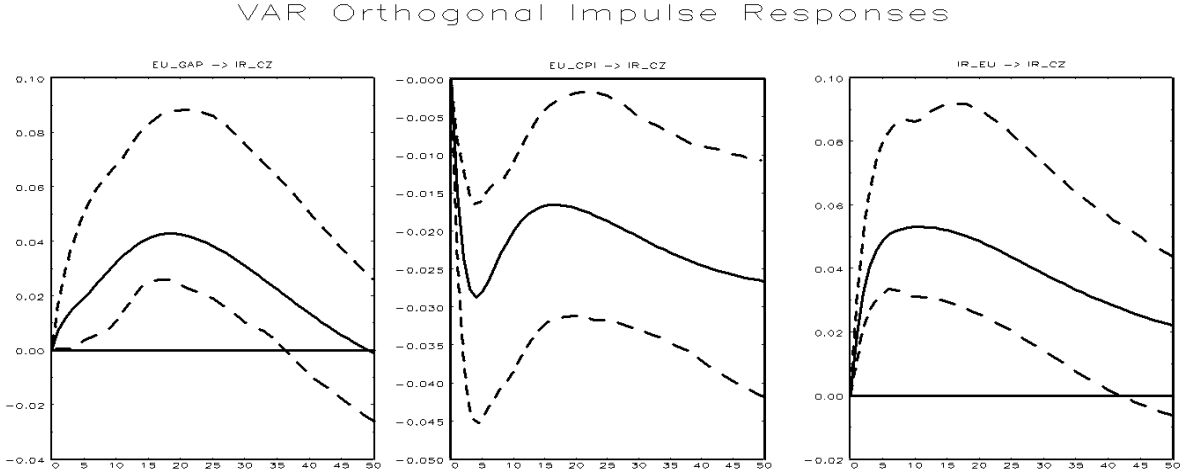

*Source*: author's computations using JMulti software

In the following, are presented the impulse responses of the euro area shocks on the Czech monetary policy, specifically on short-term 3M PRIBOR rate. A rise of EU economic activity will lead to a rise in interest rates in Czech Republic, as demand for funds in the EU member country increase. CNB responses extensively to the European shocks. In 20 months, short-term interest rate will increase with 4 basis points, if EU economic develops.

The monetary policies of the ECB and CNB are strongly connected. CNB follows the European monetary policy; higher ECB short-term interest rates determine higher CNB rates. 3M PRIBOR will reach its peak level after 10 months after an increase of the 3M EURIBOR, with a magnitude of maximum 5 basis points.

Since the real GDP remain fixed, higher prices in the euro area cause a decrease in the real money supply in the Czech Republic. This means that Czech money demand exceeds domestic money supply, and the short-term interest rate is lower. The effect of the EU price increase can be seen immediately, transposing into a reduction of 3M PRIBOR with maximum 2.8 basis points in the following 5 months.

***Figure 3.3: The effect of the Euro area shocks on the Czech 3M PRIBOR, impulse responses***

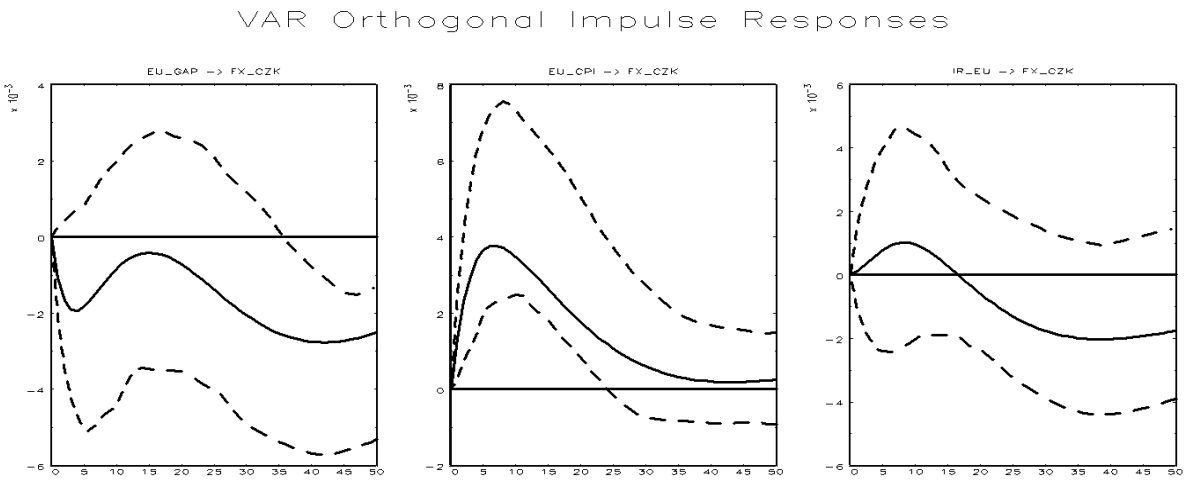



*Source*: author's computations using JMulti software

The figure 3.4 presents the responses of Czech foreign exchange rate, caused by euro area shocks. Higher growth rates in EU would encourage Czech producers to export more, their prices being more competitive on the European markets. Given Czech Republic's strategic geographical position in Central Europe, the most valuable export products are cars, followed by: automobile parts and accessories, computers and electrical machinery. Consequently, Czech Koruna tends to appreciate. This pattern is supported by the obtained results. An increase in EU's GDP will lead to lower exchange rate, which in the direct quotation (CZK/EUR) implies that the domestic currency is becoming stronger. Although the FX rate will react instantaneously to economic changes in the EU, the highest level of the national currency appreciation is attested after 3 years.

Regarding the CPI, it is, at the same time, an indicator of inflation. When inflation increases in the EU, the ECB may increase interest rates in order to ensure the price stability. As a result, EURO would appreciate, being more desirable, comparing to Czech Koruna. In half a year, a price increase in euro area will devaluate Czech Koruna with 0.4%. As it can be observed in the figure below, there is no significant relationship between the EU short-term interest rate and the FX rate.

***Figure 3.4: The effect of the Euro area shocks on the Czech FX rate, impulse responses***




. *Source*: author's computations using JMulti software

Impulse responses gave a broaden picture on the external shock persistence. In order to have a better understanding of the relative importance of the external shocks vs. domestic shocks, further, are presented the variance decomposition results.

**Table 3.1: Variance decomposition of domestic vs. Euro area shocks in the Czech Republic**

| Forecast horizon (months) | GDP gap | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S[8]. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.85 | 0.15 | 0.8 | 0.2 | 0.78 | 0.22 | 0.92 | 0.08 |
| 12 | 0.78 | 0.22 | 0.62 | 0.38 | 0.69 | 0.31 | 0.88 | 0.12 |
| 24 | 0.75 | 0.25 | 0.46 | 0.54 | 0.62 | 0.38 | 0.86 | 0.14 |
| 36 | 0.75 | 0.25 | 0.41 | 0.59 | 0.59 | 0.41 | 0.85 | 0.15 |
| 48 | 0.75 | 0.25 | 0.38 | 0.62 | 0.57 | 0.43 | 0.81 | 0.19 |

*Source*: author's computations using JMulti software

As reflected in the table above, Czech economy is driven mostly by the domestic shocks. On short term, euro area monetary policy has the highest impact on Czech economy (22% after 6 months). In the same time period, price changes in the EU will influence Czech

[8] D.S – Domestic Shocks

E.S. – External Shocks

prices in proportion of 20 per cent. Personal computing is in line with Maćkowiak's result (2006) who obtained 28% impact on Czech prices.

Variance decomposition of the GDP gap fluctuations will weight 22% of the changes in the Czech economic activity, after 1 year. Foreign shocks have lower importance on the CZK/EUR reference exchange rate. After 4 years, CNB will react in proportion of 19% on the European currency changes, which denotes Czech Koruna's stability and power parity.

In the long run, the situation essentially changes. Euro area shocks tend to be more significant for the domestic economy. Czech Republic's economic activity is stimulated in the proportion of 25% by the external shocks and 75% by the national ones. Personal findings emphasize Maćkowiak's research (2006), which points out that the impact of external shocks on domestic economic activity is about 30% on long run. In 48 months, ECB monetary policy explains 43% of the Czech monetary policy. A reversal of the situation occurs in terms of prices. Due to very close trade relations with the EU, a long term price change in Euro area will impact the Czech prices in proportion of 62 per cent, comparing to 32% driven by domestic factors. Almost the same result applies for Maćkowiak (2006), 59% of aggregate prices are attributable to external factors. Strategic dialogue and very close cooperation with Germany, permits to the Czech Republic to be competitive on the EU markets, exporting especially their industrial products.

The obtained results permit to conclude that Czech Republic is one of the most integrated Central-European EU members. Still keeping its own currency and being influenced in the major part by the domestic factors, this country is respecting the monetary policy of the ECB and, on long run, aligns to euro area price changes.

### *3.1.2. Romania*

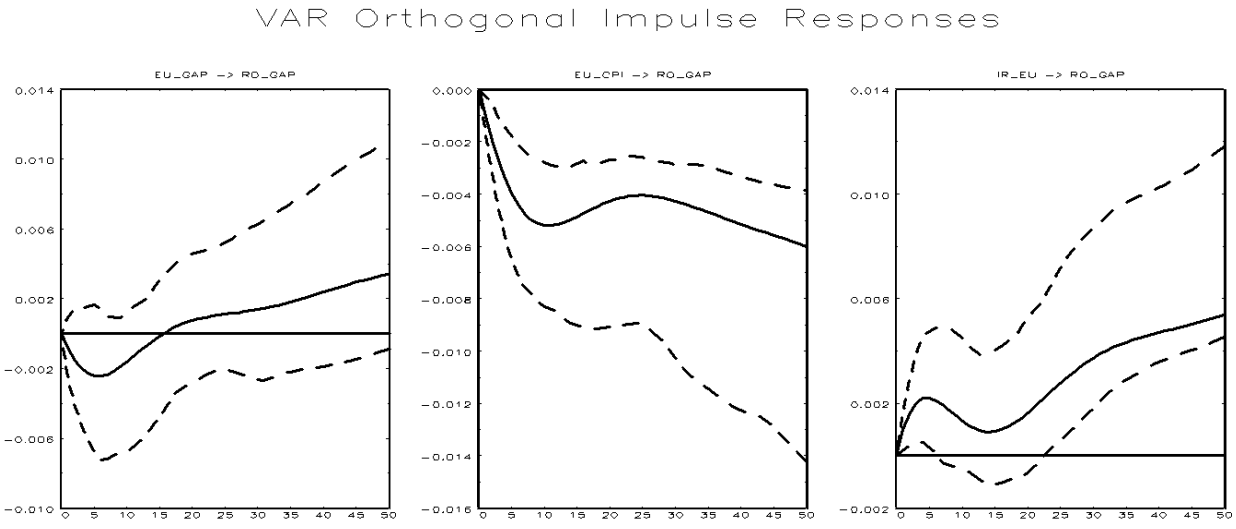
Romania was the first CEE country that had official relations with the European Community. In January 1974, an agreement included Romania in the Generalized System of Preferences of the Community. Subsequently, the both parties signed a series of agreements to facilitate trade and culminated with Romania's accession to the European Union that took place on 1st of January 2007.

According to Rusu (2013), Romania reoriented its trade focus after the EU integration. Nowadays, Romania's foreign trade is formed in proportion of 71% by exports and 72.7% by imports. EU had beneficial effects on the activity of Romanian enterprises, and led to technology modernization, reducing costs, diversifying and improving quality of products and services, being more efficient on the European Single Market.

Computing the Chow test for Romania's VAR model, there were observed 2 deviations: after global financial crisis and after the EU integration. In 2008, interest rates sharply increased and RNB reported a loss of 16% of Romanian Leu value, compared to the 12% of Czech currency. From 2010 to 2012, real GDP constantly increased, recording additionally 3.1%. The increase in value added volume came from the following activity areas: 8.7 % from trade, 5.2% from information and communications, and 1.9 % from construction (Popescu, 2012). However, these stages of economic ascension cannot be interpreted as significant structural breaks, therefore in the main part of research is presented the full sample model results.

Enhanced connections with the EU in terms of trade policy translated to high responsiveness of Romanian industrial production to Euro area shocks (see Appendix B).

***Figure 3.5: The effect of the Euro area shocks on the Romania's economy, impulse responses***



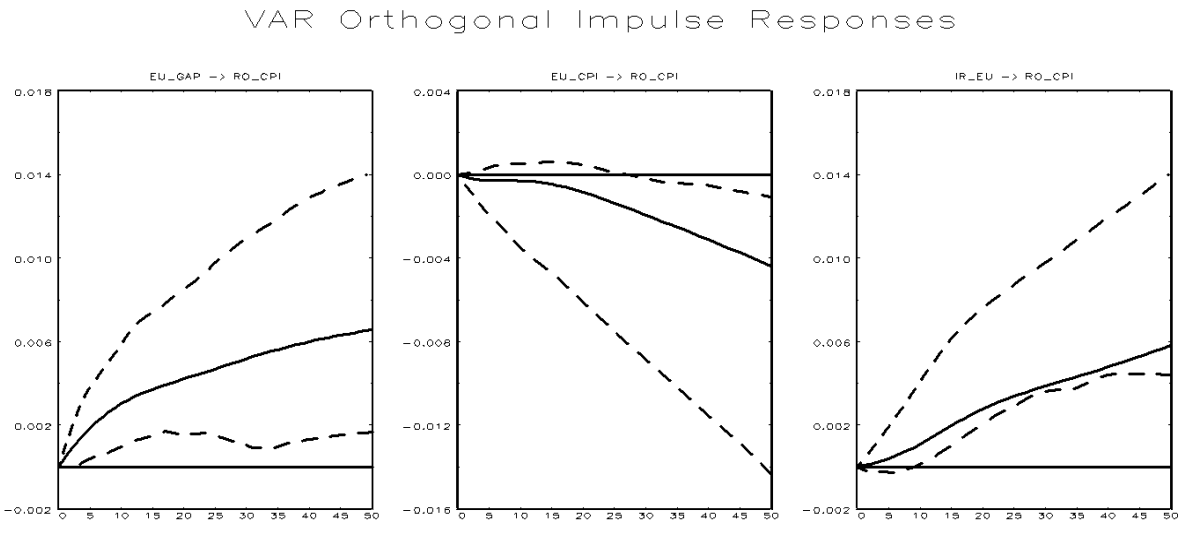

*Source*: author's computations using JMulti software

An expansion of EU industrial activity leads to an immediate response of Romanian industrial productivity, achieving its maximum increase by 1 b.p., in 6 months. Not the same tendencies can be followed in terms of overall economic activity. The euro area shock does not trigger any significant responses in the economic activity of Romania (figure 3.5). Contrarily to impulse responses of the Czech Republic, Romanian economy answers negatively to a price increase in euro area. Higher CPI in the EU will increase, eventually, the wages in the member countries. However, the Romanian government reacts slower than the European markets, and cannot make the necessary income adjustments in order to keep a good quality of life, because the European living costs increased fast. As consequence, after 1 year, the economic activity in Romania will decrease by 0.4 basis points, due to euro area CPI shock.

A bit different responses, comparing to Czech Republic, are attested in regard to EU short-term interest rate. If interest rate in EU increases, the cost of money in EU is higher than in Romania. So, the EU investments will be reoriented to Romania, increasing its economic potential, and accordingly its real GDP.

In the figure below are represented the euro area shocks with respect to CPI index in Romania.

***Figure 3.6: The effect of the foreign shocks on the Romanian price level, impulse responses***



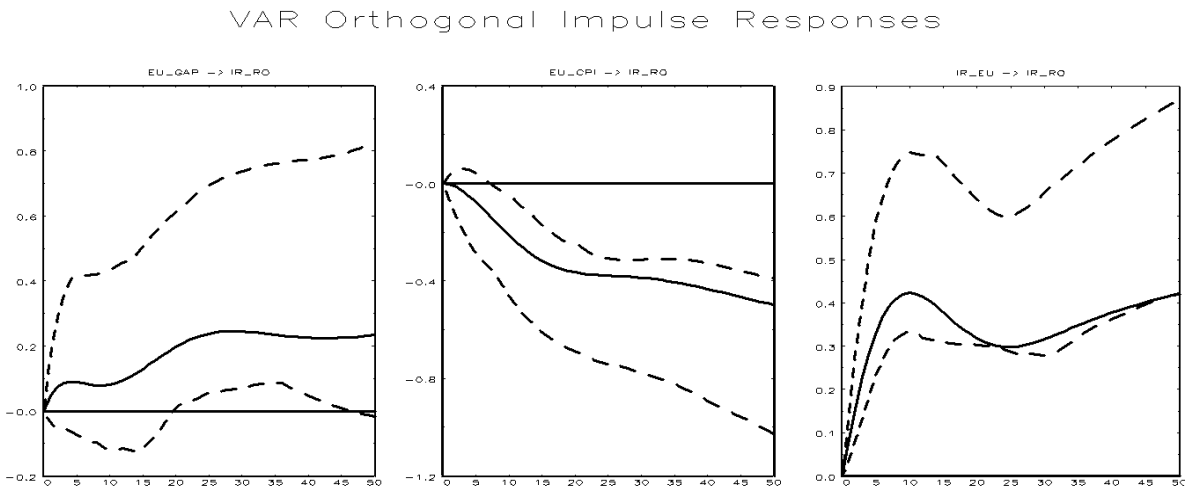

*Source*: author's computations using JMulti software

If EU economy develops, this transposes to a continuous price increase in Romania. The euro area shock magnitude in Romania will be with 0.2 b.p. higher than in Czech Republic, for the period of 24 months.

Similar inverse effect is observed between the euro CPI and domestic prices. This impulse response being very close to zero, is interpreted as non-significant. The same sign and effect were obtained by Popescu (2012). Referring to the foreign monetary shock; if 3M Euribor rate rises, Romanian prices will tend to increase, as well.

Figure 3.7 presents the Romanian monetary policy responses on euro area shocks. Comparing with Czech Republic, it is worthy to mention that linkages are more strength and Romanian National Bank is extensively following the EU monetary regulations, especially on long run. If EU knows an augmentation of its economic activity, short-term interest rate in Romania will increase by maximum 25 basis points, after 2 years. RNB responses fast and persistent to the euro area monetary shocks. In 10 months, 3M ROBOR will reach its peak and increase by 42 basis points, comparing to 5 b.p. reached in the same time interval by the Czech Republic. The impulse response of the Romanian short-term interest rate with respect to EU price shocks follows the same tendencies as in the Czech Republic. Continuously decreasing, 3M ROBOR keeps its bottom of 35-40 basis points between 20 and 30 months after the external shock.

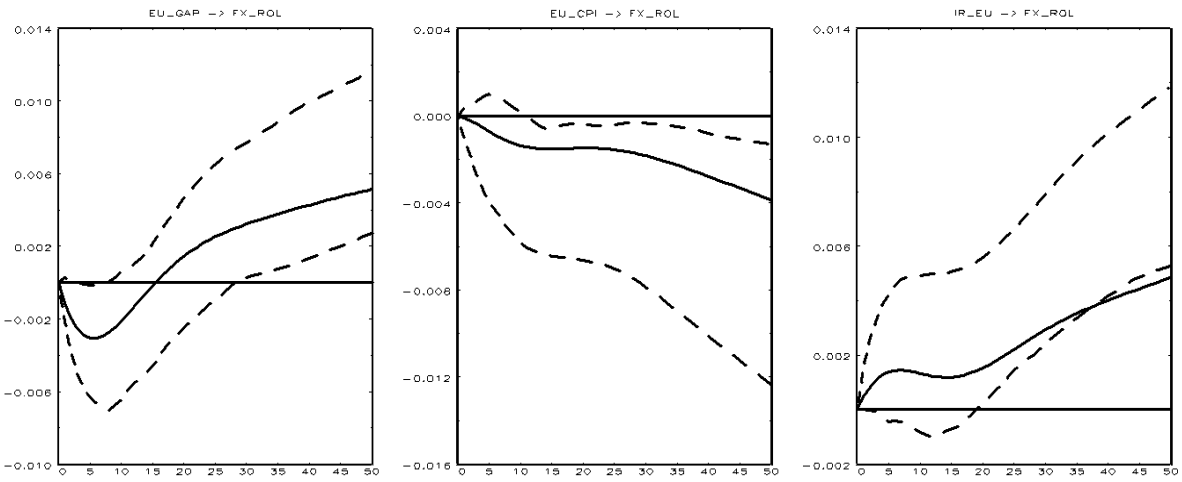
***Figure 3.7: The effect of the foreign shocks on the Romanian 3M ROBOR, impulse responses***




*Source*: author's computations using JMulti software

Last but not least, are presented the euro area shocks impacting Romanian exchange rate.

***Figure 3.8: The effect of the Euro area shocks on the Romanian FX rate, impulse responses***




*Source*: author's computations using JMulti software

As can be observed in the figure 3.8, the impulse responses are not very representative, their value being very close to zero, confirmed also by Popescu (2012). This fact permits to affirm that euro area shocks do not impact at the large extent the reference exchange rate of the Romanian Leu with respect to EURO. Comparing the FX rates linkages between the EU and the 2 members (Czech Republic and Romania), Czech Republic is more linked to the euro area. Czech Koruna's stability and power parity allows the country to take steps towards the monetary integration.

Further, can be analysed the variance decomposition for Romania, based on external and domestic shocks. At first sight, it can be observed that on short run Romanian economy is driven more than 90% by domestic factors. As underlined by Popescu (2012), considering a time horizon of two quarters, the CPI variation is explained approximately 97% by domestic factors (80% of GDP shocks, 17% by M3 innovations, short-term interest rate, and nominal exchange rate).

At the 6 months horizon, Czech Republic is more linked to EU, comparing to Romania. The prices in Romania are influenced by the Euro area shocks with 14% less than

in the Czech Republic. Same for interest rate, foreign shocks have an impact of 13% higher on the Czech Republic, in contrast to Romania.

Assessing the impact of the euro area shocks vs. domestic, on longer term, the results are opposite. After a 4 years horizon, the Romanian economy will be influenced in proportion of 40 % by the foreign shocks and just 60 % by the national reforms. Reporting the obtained results to Czech Republic, Romania is more linked to EU, in terms of prices.

As for interest rate, external factors overcome domestic ones, after a period of 4 years. RNB is closely cooperating with ECB and is respecting all its monetary regulations, norms and policies. In comparison with Czech Republic, Romanian monetary policy is more connected to EU policy (impact of external shocks +11%). Referring to FX rate, Romanian Leu is influenced by foreign factors in proportion of 28% and by domestic in proportion of 72%, being more connected to euro area changes than the Czech Koruna.

**Table 3.2: Variance decomposition of domestic vs. Euro area shocks in Romania**

| Forecast horizon (months) | GDP gap | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S[9]. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.91 | 0.1 | 0.94 | 0.06 | 0.91 | 0.09 | 0.95 | 0.05 |
| 12 | 0.79 | 0.21 | 0.85 | 0.15 | 0.73 | 0.27 | 0.9 | 0.1 |
| 24 | 0.71 | 0.29 | 0.74 | 0.26 | 0.55 | 0.45 | 0.89 | 0.11 |
| 36 | 0.65 | 0.35 | 0.67 | 0.33 | 0.5 | 0.5 | 0.82 | 0.18 |
| 48 | 0.6 | 0.4 | 0.62 | 0.38 | 0.46 | 0.54 | 0.72 | 0.28 |

*Source*: author's computations using JMulti software

### *3.1.3. Moldova*

Economic relations between the European Union and the Republic of Moldova have intensified after 2009, when Moldova joined the EU's Eastern Partnership. In 2014, together with Georgia and Ukraine, Moldova signed the Association Agreements, enclosing DCFTA with the EU. The provisional application of this agreement started in November 2014 for

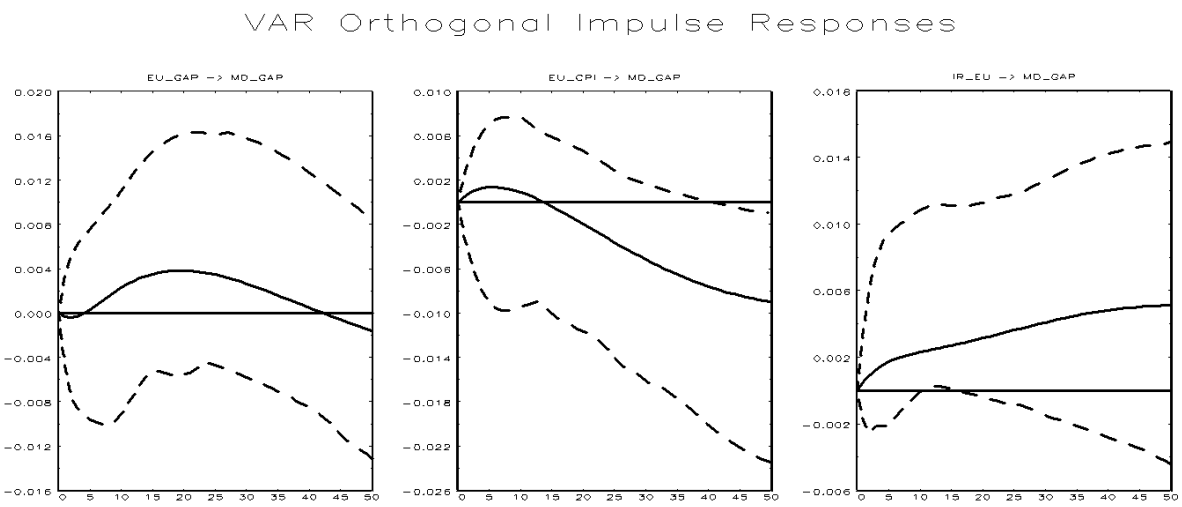
[9] D.S – Domestic Shocks
E.S. – External Shocks

Moldova and entered into force on 1 July 2016, strengthening political and economic linkages between the 2 parties. Mainly, AA and DCFTA imply a reform plan in economic and law systems, Moldova obtaining for that substantial support from the EU. Nowadays, the EU is Moldova's first trading partner and investor (Forgó & Jevčák, 2015). In 2017, total bilateral trade between the EU and Moldova increased by 18%, constituting€4 billion. The EU's imports from Moldova increased by 23% and value €1.6 billion (Gumene, 2017).

Computing VAR tests for stability, it was observed a structural break of interest rate, at the end of 2014. This corresponds to Moldova's systemic bank collapse and the well known banking fraud from 2014. $1 billion disappeared from three Moldovan commercial banks, leaving the government with little option to issue 25-year bonds to reimburse the central bank. In effect, Moldova was robbed of approximately € 880 million, which represent an eight of Moldova's GDP (Gumene, 2017). In consequence, the inflation quickly increased to 8%. Protecting the banking sector and stabilizing the monetary collapse, NBM increased its benchmark interest from 8.5% to 15.5%. This economic instability affected the investment climate and reduced EU confidence to Moldova's economy and reforms towards integration.

For this reason, the VAR model was restricted until December 2014, in order to avoid the structural break. Nevertheless, impulse responses for the restricted model did not differ very much from the full sample, and are represented as follows.

***Figure 3.9: The effect of the Euro area shocks on the Moldova's economy, impulse responses***

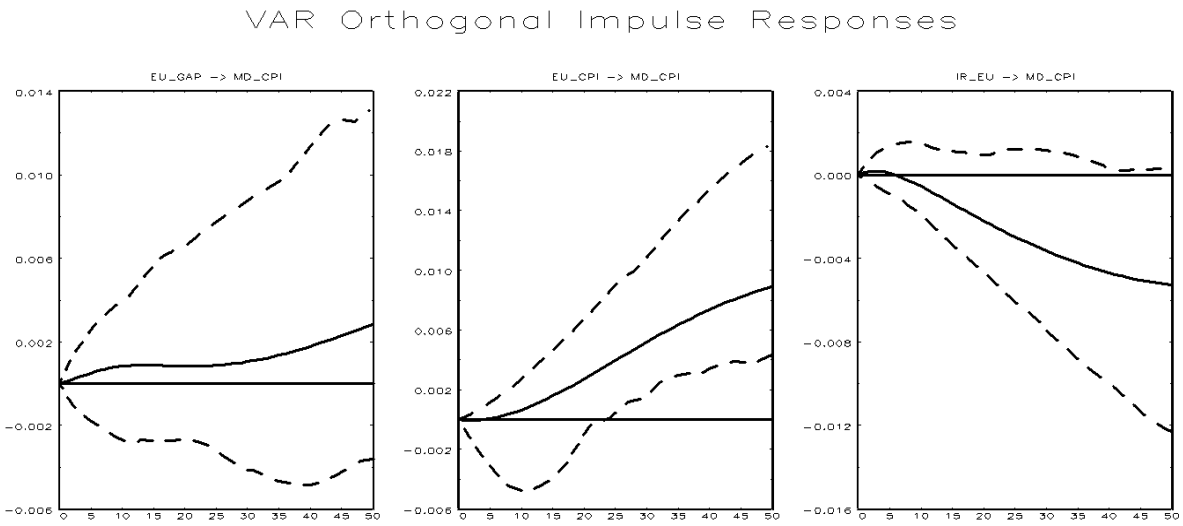



*Source*: author's computations using JMulti software

According to obtained impulse responses, euro area shocks do not have a substantial impact on the overall economic activity in the Republic of Moldova. An important moment to emphasize is that Moldova's impulse responses trends are very similar to Romania's, just with a smaller magnitude and with a few months difference in triggering. This fact talks about a synchronization of business cycles between these two neighbouring countries and could represent a potential growth perspective for the Republic of Moldova, if the initiated reforms are respected.

Figure 3.10 highlights the same trending of Moldova's price impulse responses as in the Czech Republic. Nonetheless, the actual responses are less persistent and significant. Improving its economic activity, the EU will impact Moldova's prices after 4 years, with only 0.3 basis points. Prices are positively correlated, the domestic ones reaching the peak just after 4 years, as maximum with 0.8 basis points. Euro area monetary shock will have an inverse impact on Moldova's prices, decreasing them continuously.

***Figure 3.10: The effect of the foreign shocks on the price level in Moldova, impulse responses***

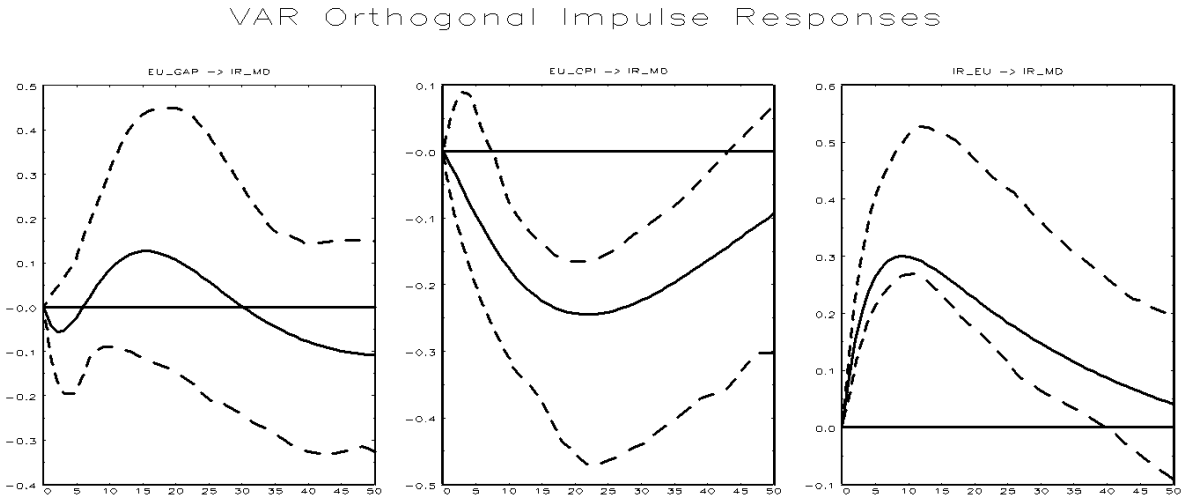



*Source*: author's computations using JMulti software

More significant aspect is Moldova's monetary linkages with the EU. Respecting the EU member states trend, the EU economic development will impact short-term interest rate in Moldova after 15 months, increasing it with maximum of 15 basis points, exactly as in Romania. Euro area price shock has a valuable magnitude on interest rate level in Moldova.

In 20 months, 3M CHIBOR will reach its bottom and decrease by 24 b.p., less than in Romania for the same time horizon. In terms of monetary policy alignment, National Bank of Moldova will adjust, very fast, its interest rate to the benchmark established by the ECB. In 9 months, 3M CHIBOR reaches its response peak with 30 b.p, which is 10 b.p. less than in Romania, for the same period.

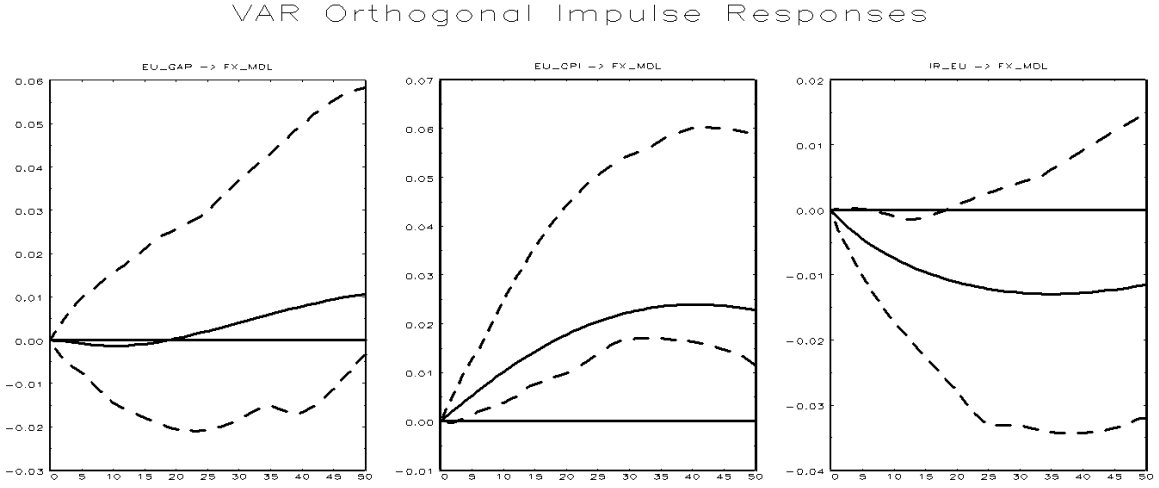
***Figure 3.11: The effect of the Euro area shocks on the 3M CHIBOR, impulse responses***




*Source*: author's computations using JMulti software

Figure 3.12 shows the magnitude and the evolution of FX responses on the foreign shocks. Output shock does not lead to representative changes in the exchange relations. The CPI increase in the EU depreciates MDL with almost 2.5 basis points after 40 months. Contrarily, the national currency will appreciate by 1 b.p. after 3 years, as a consequence of the EU short-term interest rate increase.

***Figure 3.12: The effect of the Euro area shocks on Moldova's FX rate*, *impulse responses***




*Source*: author's computations using JMulti software

As researched for the previous 2 countries, variance decomposition for Moldova is represented in the table 3.3. According to initial expectations, on short run all the macroeconomic indicators are driven by the national factors. For 6 months horizon, Moldova's monetary policy is very close to Czech Republic's alignment to the ECB. Moldova's short-term interest rate is determined by domestic shocks in proportion of 75%, and respectively 25% by foreign factors. After 4 years, situation is opposite; the euro area shock has a major impact (52%), similarly as in Romania. All other variables are controlled by the national aspects: GDP (87%), CPI (61%) and FX rate (71%). These results stress that Moldova is still dominated by the domestic economic and political circumstances and its links with the EU are weaker, comparing to EU members.

**Table 3.3: Variance decomposition of domestic vs. Euro area shocks in Moldova**

| Forecast horizon (months) | GDP gap | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S[10]. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 1 | 0 | 1 | 0 | 0.75 | 0.25 | 0.96 | 0.04 |
| 12 | 0.98 | 0.02 | 0.99 | 0.01 | 0.57 | 0.43 | 0.9 | 0.1 |

[10] D.S – Domestic Shocks

E.S. – External Shocks

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 24 | 0.95 | 0.05 | 0.85 | 0.15 | 0.54 | 0.46 | 0.82 | 0.18 |
| 36 | 0.91 | 0.09 | 0.68 | 0.32 | 0.5 | 0.5 | 0.76 | 0.24 |
| 48 | 0.87 | 0.13 | 0.61 | 0.39 | 0.48 | 0.52 | 0.71 | 0.29 |

*Source*: author's computations using JMulti software

### *3.1.4. Georgia*

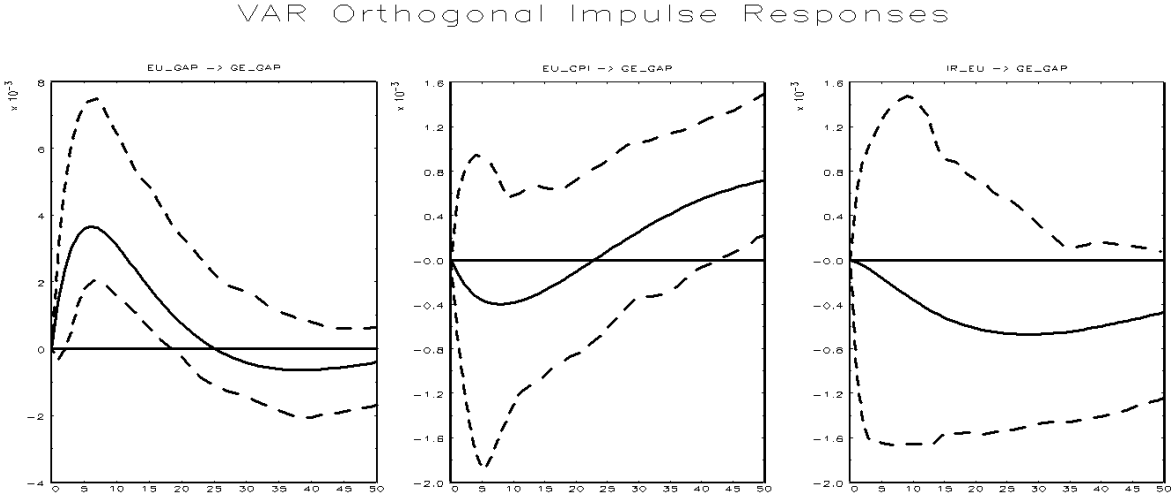
The European Union and Georgia enjoy a mutual advantageous relationship. Being one of the 3 signatory countries of the AA and DCFTA agreements with the EU in 2014, Georgia tends for political association and economic integration with the EU, being annually supported by €100 million for technical and financial reforms. On the other side, Georgia is a strategic partner for the EU, within the ENP and its eastern dimension under the EaP.[11]

The VAR model for Georgia was estimated in the similar way as for previous CEE states, taking into account the structural deviations. For Georgian economy was observed a structural break in the 4th quarter of 2015. In the period 2010-2015, the inflation in Georgia has been volatile. Moreover, weak economic activity put pressure on the CPI growth rate and on the exchange rate. As of end-June 2015, Georgian Lari has depreciated. In order to avoid the structural breaks, the research of inter-linkages between Georgia and EU was restricted to September, 2015. The full sample results are available upon request and they do not significantly differ from the restricted VAR model results, commented as follows.

Figure 3.13 compares the 3 impulse responses of Georgian economy, determined by the output, price levels and interest rate changes in the euro area. Between the 2 economies are established positive relationships, confirmed by the increase of Georgian economic activity, as response to euro area shock. In less than 7 months, Georgian economy grows by 0.4%. The 2 other foreign shocks do not display valuable responses, but the dynamic is identical to previous countries. Georgia's output response to EU CPI shock is similar to Moldova's and Romania's and response to the EU interest rate shock is the same as in the Czech Republic.

[11]European Union External Action Service: *EU - Georgia relations, factsheet*, 2017. Available online: https://eeas.europa.eu/headquarters/headquarters-homepage_en/23634/EU-Georgia%20relations,%20factsheet

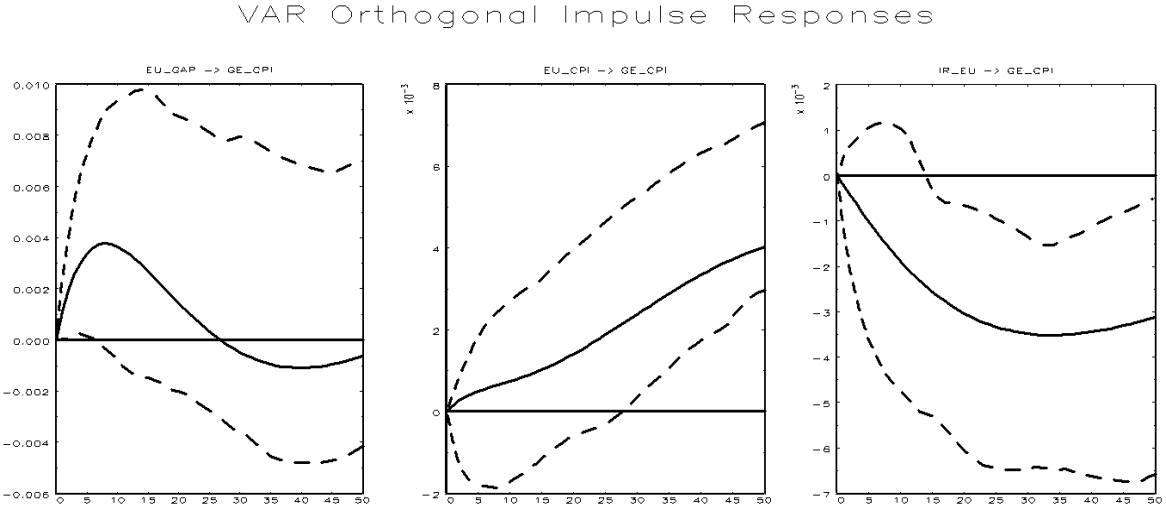
***Figure 3.13: The effect of the Euro area shocks on the Georgia's economy, impulse responses***




*Source*: author's computations using JMulti software

Next figure displays the Georgian price effects on the 3 researched foreign shocks.

***Figure 3.14: The effect of the foreign shocks on the price level in Georgia, impulse responses***



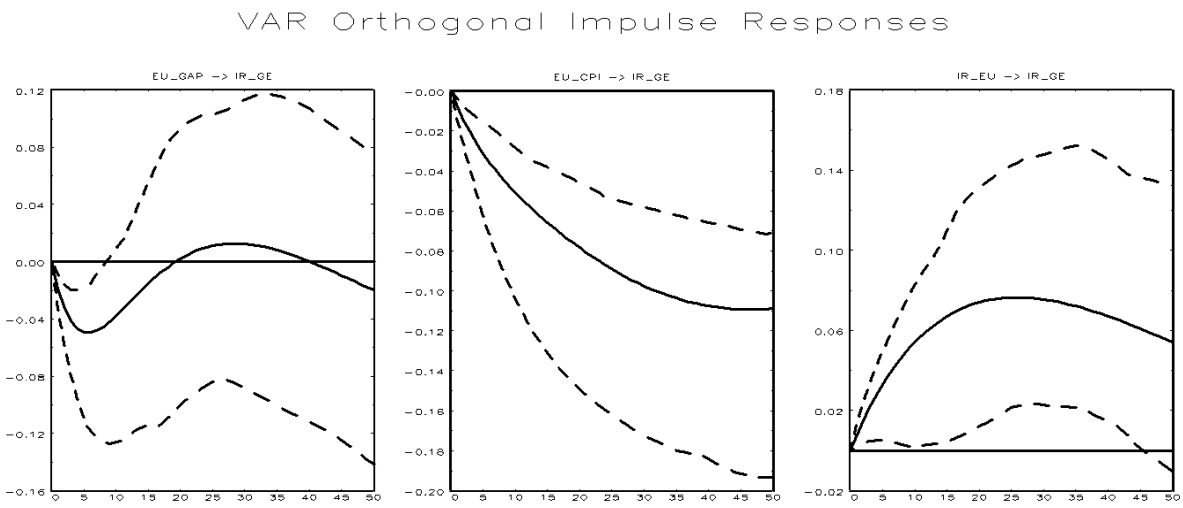

*Source*: author's computations using JMulti software

An increase in EU output leads to the GDP growth in Georgia, reaching its peak in 9 months; twice faster than in Moldova, but with the same intensity - 0.4 per cent. The other

responses respect the same trend as for previously analysed countries. The euro area CPI and interest rate shocks have more significant impact on Moldova (0.8 b.p., and respectively 0.45 b.p.), than on Georgia (0.4 b.p. and 0.35 b.p.).

In the figure 3.15 are presented the responses of the Georgian monetary policy on the euro area shocks. The first graph, corresponding to euro output shock, does not reflect a stable response on 3 month TIBR rate. More significant is the response of the National Bank of Georgia to ECB reforms. After a period of 2 years, NBG will increase its short-term interest rate by 8 b.p. Euro area price shock has a valuable magnitude on Georgian short-term interest rate. In 45 months, 3M TIBR will reach its bottom at 11 basis points, less than in Moldova (24 b.p.). In terms of monetary policy alignment towards European integration, National Bank of Georgia adjusts slower its national monetary policy than Moldova.

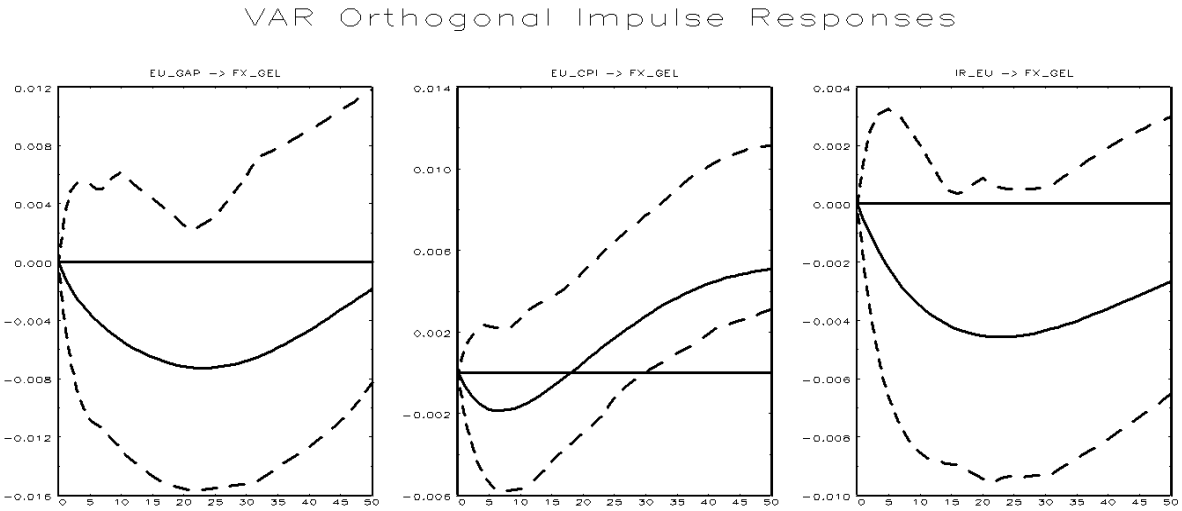
***Figure 3.15: The effect of the Euro area shocks on the 3M TIBR, impulse responses***




*Source*: author's computations using JMulti software

As can be observed from the figure 3.16, external shocks have a lower impact on Georgian FX rate, responses being very close to zero. This fact permits to emphasize that Moldova's exchange rate linkages with EU are stronger than Georgia's.

***Figure 3.16: The effect of the Euro area shocks on the Georgian FX rate, impulse responses***




*Source*: author's computations using JMulti software

Table 3.4 summarizes variance decomposition for Georgia. Comparing to Moldova, on short run Georgian economy is more linked to EU. For 6 months horizon, national economy is driven 88% by domestic shocks and 12% by euro area's changes. Same proportion is respected for monetary policy and short-term interest rate in Georgia. From previously analysed states, Georgia's alignment to the EU is very close to Czech Republic's indicators, its economy being more connected than Romania's or Moldova's. On long run, the external shocks are more pronounced in Georgia, comparing to Moldova. After 4 years, economic activity is controlled 26% by euro area shocks and 74% by domestic ones; Georgian prices are influenced in proportion of 68% by foreign factors and 32% by internal; almost the same percentage report keeps for FX rate. On long run, the monetary sector is the most dominated by the euro area policies, external shocks weighting 45%.

**Table 3.4: Variance decomposition of domestic vs. Euro area shocks in Georgia**

| Forecast horizon (months) | GDP gap | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.88 | 0.12 | 0.93 | 0.07 | 0.88 | 0.12 | 0.97 | 0.03 |
| 12 | 0.78 | 0.22 | 0.86 | 0.14 | 0.8 | 0.2 | 0.92 | 0.08 |
| 24 | 0.76 | 0.24 | 0.82 | 0.18 | 0.7 | 0.3 | 0.81 | 0.19 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 36 | 0.75 | 0.25 | 0.76 | 0.24 | 0.63 | 0.37 | 0.73 | 0.27 |
| 48 | 0.74 | 0.26 | 0.68 | 0.32 | 0.55 | 0.45 | 0.7 | 0.3 |

*Source*: author's computations using JMulti software

### *3.1.5. Ukraine*

2014 was the symbolic year for Ukraine, too. European Union and Ukraine signed the AA, putting contractual bases for future economic relations and further integration. The DCFTA, as a part of the Association Agreement, was provisionally applied as of 1 January 2016, creating the necessary conditions to aligning the key sectors of the Ukrainian economy to EU standards.

Nowadays, the EU is Ukraine's biggest trading partner, weighting in 2016, more than 40% of its trade. Ukraine exports to the EU raw materials (iron, steel, mining products, agricultural products), chemical products and machinery, amounted to €13.1 billion in 2016.[12] From January to August 2017, total trade between the two parties increased by 27.1 %, comparing with the same period from previous year. Meanwhile, exports from EU to Ukraine increased by 26.6%, in 2017.Since 1991, EU continues to be the Ukraine's largest donor, providing financial support, amounted to over €3 billion.

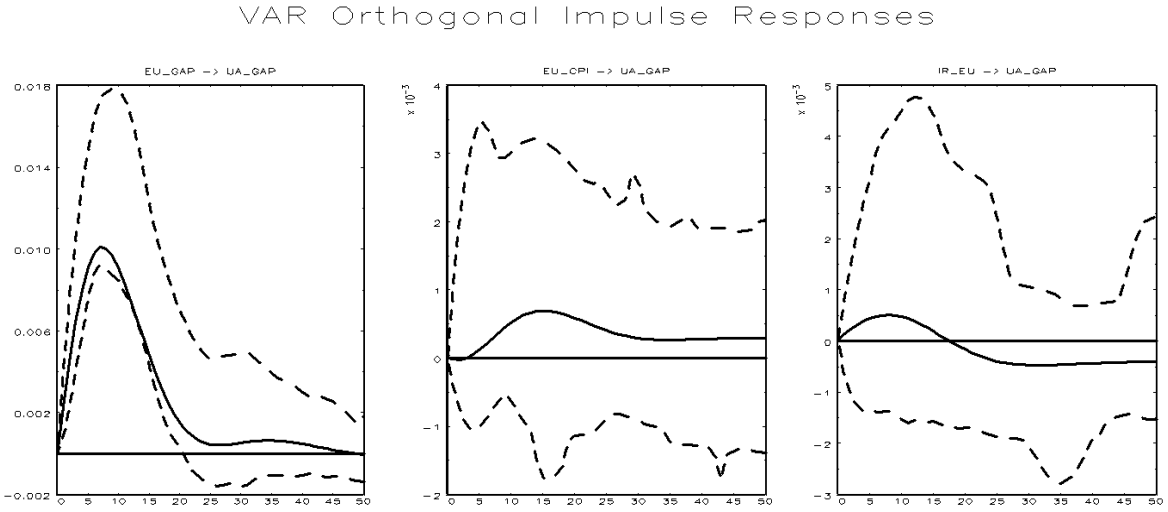
Since April 2014, economic cooperation and *trade integration with EU* were temporarily set aside, due to armed conflict in Donetsk and Luhansk regions, after Crimea's annexation by pro-Russian separatists. The overall economy suffered, the currency has lost 80% of its value, the interest rates sharply increased, as a consequence of monetary policy promoted by the National Bank of Ukraine. It tried to curb inflation and prop up the national currency, after political instability in the country (Lessuisse, 2017). These aspects were reflected, as well, by the Chow test. In order to exclude structural breaks, the model was restricted to the second quarter of 2014.

The following responses for euro area shocks correspond to restricted model, the full model results being available upon request. Ukraine is the only country that has a higher discrepancy between the full sample and the restricted data series. It highlights the fact that war and political conflicts have a major importance on economic development.

[12] European Commission report: *EU-Ukraine Deep and Comprehensive Free Trade Area. Economic benefits and opportunities*, page 3, 2015.

Figure 3.17 reflects a significant response of Ukrainian economy on the EU economic growth, reaching its maximum (+1b.p.) in 7 months. From the all AA and DCFTA signatories, the restricted model of Ukraine shows the tightest economic linkages with EU, overcoming Moldova and Georgia. Nevertheless, Georgia is responding 1 month faster than Ukraine to EU output shock. The 2 other shocks are not very representative, but are respecting the same dynamic and magnitude as for Moldova. Georgia responds slower to CPI and monetary external shocks than Ukraine.

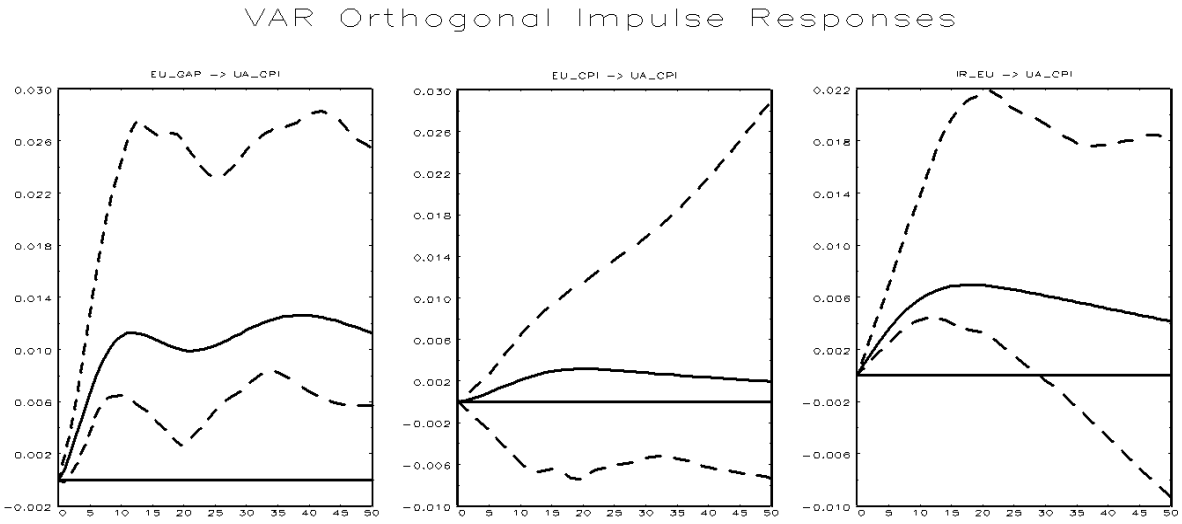
***Figure 3.17: The effect of the Euro area shocks on the Ukraine's economy, impulse responses***




*Source*: author's computations using JMulti software

As expected, with an EU economic straightening, the prices in Ukraine will correspondingly increase. The peak of response in Ukraine is registered after 1 year and is weighted to 1.2 b.p., comparing with 0.4b.p. in Georgia, and 0.2 in Moldova. This confirms one more time that Ukraine had closer ties with EU before the army conflict, that other to Eastern Partnership states. The Ukrainian CPI is influenced, as well, by the interest rate external shock, reaching the highest increasing point (+0.8 b.p.) after 15 months. Nonetheless, the domestic prices are not responding extensively to a price increase in the euro area.

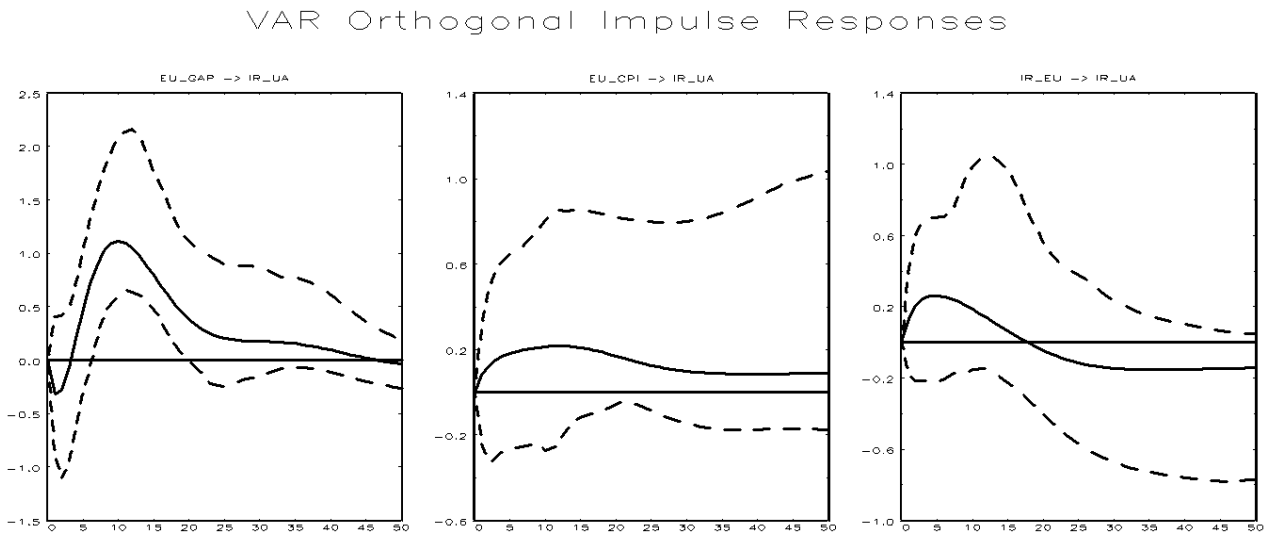
***Figure 3.18: The effect of the foreign shocks on the price level in Ukraine, impulse responses***




*Source*: author's computations using JMulti software

Due to imposed monetary and fiscal regulations, as well as financial assistance for macro-financial stabilisation, Ukraine is demonstrating closer monetary connections with the euro area. The National Bank of Ukraine reacts to ECB monetary policy modifications less than in 5 months, with a magnitude of 20 b.p, +12 b.p. comparing to Georgia and 10 b.p. less than in Moldova. An important remark, before the war Ukraine was the fastest country, between the 3 DCFTA signatories, in achieving monetary connection with EU. In terms of euro output shock, it has a maximum magnitude (10 b.p.) on Ukraine short-term interest rate in 12 months. In this regard, Moldova is more linked to EU (with 15 basis points). Last but not least, an increase in EU prices will determine the highest potential increase of the 3M interest rate after 1 year, in proportion of 22 basis points.

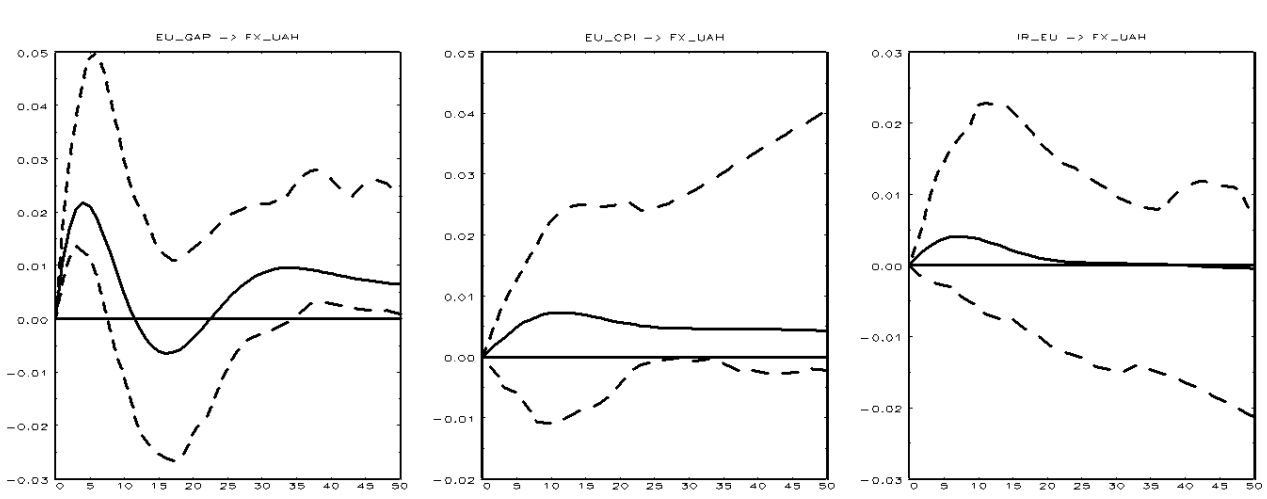
***Figure 3.19: The effect of the Euro area shocks on the 3M interbank rate in Ukraine, impulse responses***




*Source*: author's computations using JMulti software

Regarding the euro area shocks on FX, in Ukraine the situation is similar to Georgia; all the external shocks have a magnitude less than 1 basis point (figure 3.20).

***Figure 3.20: The effect of the foreign shocks on the Ukrainian FX rate, impulse responses***




*Source*: author's computations using JMulti software

To better understand these phenomenons, table 3.5 presents the variance decomposition for domestic and external shocks, determining Ukrainian economy. The tendency of national factors' influence on domestic economy is kept by Ukraine, too. Per contra, this is the only country, where the external shocks, on short run, have an impact on country's real GDP more than 30%. This is supported by the significantly importance on domestic prices (19%) and on FX rate (15%). Variance decomposition emphasizes one more time Ukrainian potential, before the political conflicts, towards EU alignment and standard convergence.

On long run, the Ukrainian economy and prices are driven by euro area shocks in proportion of 60% and 55%, respectively. However, this economic connection decreased dramatically after the war. Euro area policies influence domestic GDP by only 29% and 37% for CPI index. Indeed, Ukraine has had a major potential for convergence to the EU economy, but political instability has stopped this process, reducing its chances of progress. At the moment, the differences between DCFTA signatory states are very small.

**Table 3.5: Variance decomposition of domestic vs. Euro area shocks in Ukraine**

| Forecast horizon (months) | GDP gap | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.66 | 0.34 | 0.81 | 0.19 | 0.97 | 0.03 | 0.85 | 0.15 |
| 12 | 0.41 | 0.59 | 0.68 | 0.32 | 0.81 | 0.19 | 0.84 | 0.16 |
| 24 | 0.39 | 0.61 | 0.6 | 0.4 | 0.72 | 0.28 | 0.82 | 0.18 |
| 36 | 0.4 | 0.6 | 0.51 | 0.49 | 0.71 | 0.29 | 0.79 | 0.21 |
| 48 | 0.4 | 0.6 | 0.45 | 0.55 | 0.71 | 0.29 | 0.75 | 0.25 |

*Source*: author's computations using JMulti software

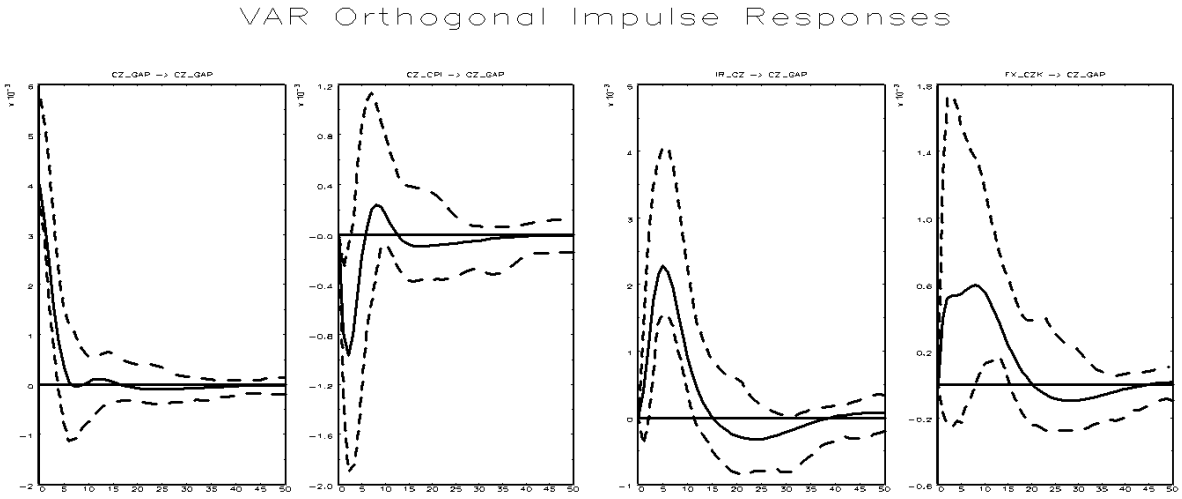
## 3.2. Assessing economic inter-linkages within CEECs

One of the most important conclusions, after interpreting the variance decomposition results, is that domestic shocks are the drivers of the CEE economies, with a major impact on short run, and gradually reducing their influence on long run.

For answering the first hypothesis: *Domestic shocks are the dominant force of GDP fluctuations in the selected East European countries*, are presented output responses for the

5 researched economies, determined only the domestic shocks: GDP, CPI, short-term interest rate and FX rate.

***Figure 3.21: The effect of domestic shocks on the Czech's real GDP, impulse responses***




*Source*: author's computations using JMulti software

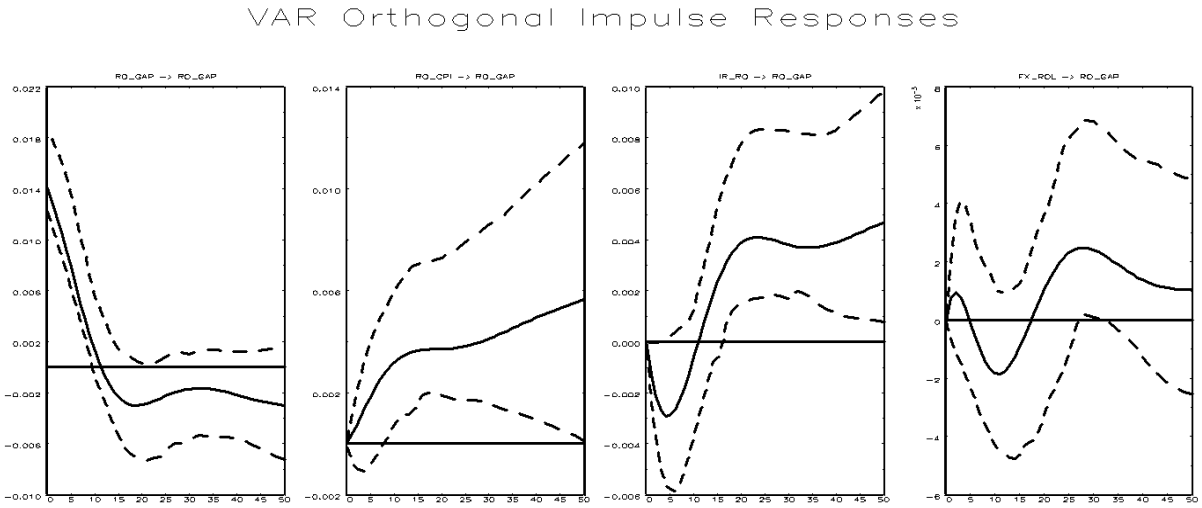
The case of the Czech Republic confirms the H1, and on short run it can be observed that domestic factors generate very high magnitude responses on national economy. As expected, the output drives itself. With an increase of Czech prices, economy will react simultaneously and after 1 month will reach the bottom, reducing by 0.08%. Although the reaction of national prices is faster, the magnitude of the euro area CPI shock is a bit higher, representing 0.11%.

An increase of interest rate will stimulate the Czech economy and maximum in 5 months the output response reaches the peak (+0.2%), significantly more important than euro area response (-0.06%). This positive inter-relation between interest rate and GDP, is specific for steady growing economies. And last but not least, if Czech Koruna weakens, then Czech Republic tends to export more, and it means that the country produces more, and increases its GDP (maximum +0.06%, after 10 months).

Figure 3.22 shows the Romania's GDP effect to domestic shocks. Romanian prices increase determines economic growth (+0.35 b.p.) after 15 months. In terms of monetary policy, Romanian output reacts extensively to national policies and changes. On short run, an increase in short-term interest rate determines more savings in the banks, thus less money

will be invested. In consequence, economy will decrease by 0.3 b.p. On long run, the economy will recover in 2 years, increasing by 0.4 b.p., twice compared to euro area shock (+0.2 b.p.). Thus, the H1 for Romania is not rejected. Fluctuations for the FX rate shocks are not representative for interpreting.

***Figure 3.22: The effect of domestic shocks on Romania's real GDP, impulse responses***



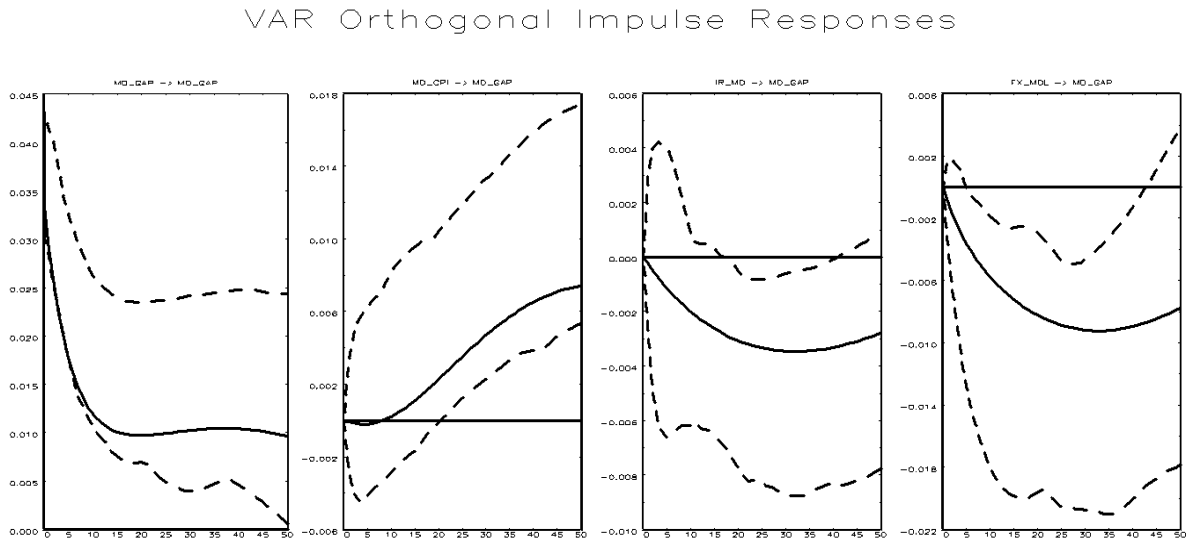

*Source*: author's computations using JMulti software

If for EU members the connections with EU are very close and the domestic shocks are as significant as the euro area shocks, the situation is different for Eastern European countries.

Moldova's output is constantly rising, as response to an increase in national prices. The peak (+0.7 b.p.) is observed on long run, and is three times higher than the response to euro area shock (+0.2 b.p.).

Higher short-term interest rate will determine, in Moldova, the same effect as for neighbour country Romania. The domestic output will decrease as maximum after 3 years, reaching its bottom of 0.35 b.p. The magnitude of interest rate response to euro shock was only 0.2 b.p. As trading relations of Moldova are not comparable with Czech Republic's potential, the effect of the FX rate shock is not very significant for national economy.

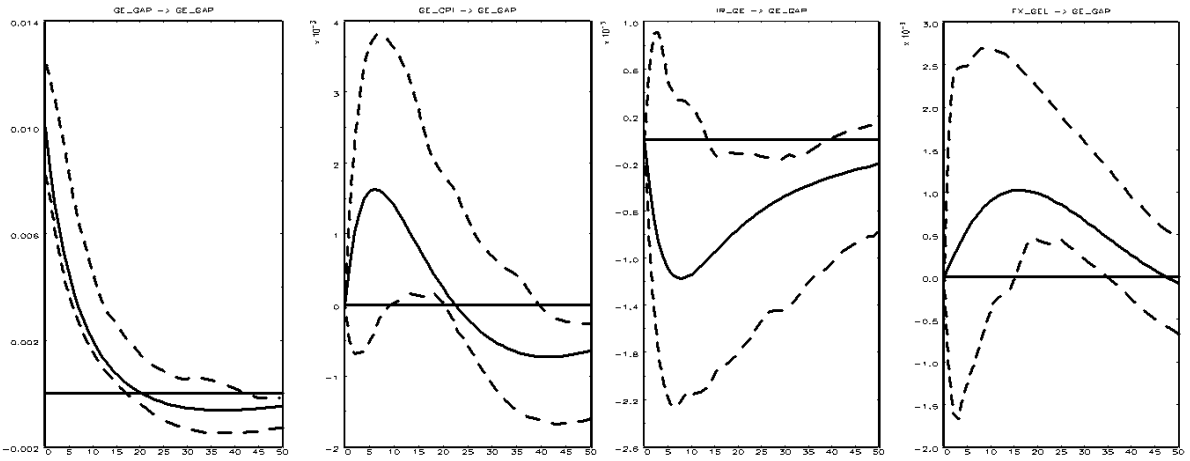
***Figure 3.23: The effect of domestic shocks on Moldova's real GDP, impulse responses***




*Source*: author's computations using JMulti software

Having a look to Georgia's economy, it will fast and positively react to an increase in national prices (+0.17 b.p.), comparing to an augmentation in euro area prices (-0.04 b.p.).

***Figure 3.24: The effect of domestic shocks on Georgia's real GDP, impulse responses***



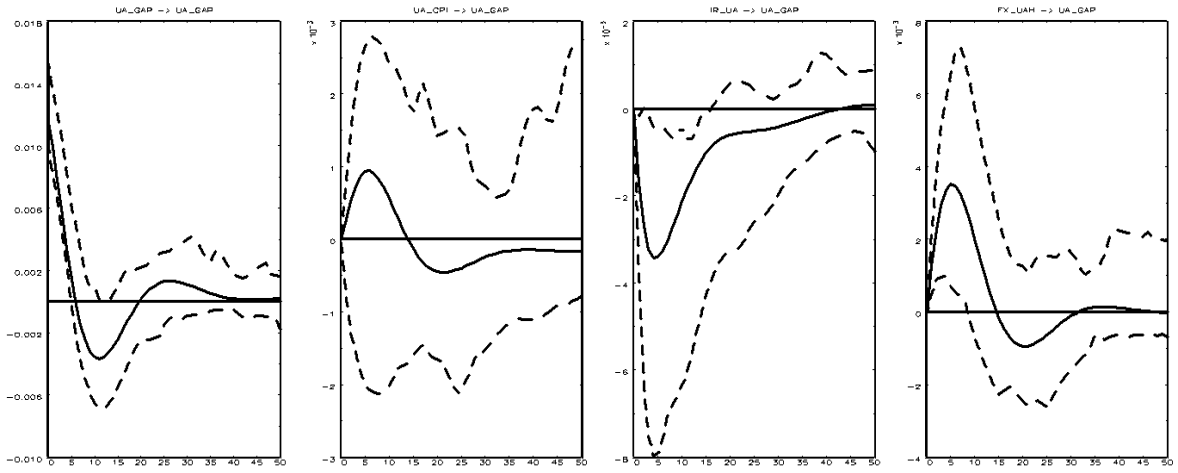

*Source*: author's computations using JMulti software

The national bank's interest rate changes, as well tend to dominate the ECB rate. In approximately 6 months, the increase of short-term interest rate determines an economic

slowdown of 0.12%, which is 0.07% less in case of the foreign shock. As in the Czech Republic, Georgia's economy is expected to grow by 0.12%, as reaction to national currency depreciation and export increase. The results for Georgia support the H1.

The last figure of this sub-chapter (fig. 3.25) presents a picture over Ukraine's economy reactions to national changes. An interesting fact is that magnitude of the euro area and domestic shocks are equal (0.1%). The only difference is that economy reacts faster to national price changes (6 months), than to EU prices (15 months). As for other 3 CEECs, an interest rate increase determines slower economic processes. In maximum a quarter, economic activity will decrease by 0.35%, with 0.3% more than the response to external shock. Encouraging exports, Ukrainian Hryvnia will depreciate, leading to maximum economic growth by 0.35%, in half a year. As conclusion, the H1 is not rejected for Ukraine, as well.

***Figure 3.25: The effect of domestic shocks on Ukraine's real GDP, impulse responses***




*Source*: author's computations using JMulti software

## 3.3. General interpretation

Generalizing the obtained results from 2 previous sub-chapters and referring to aforementioned thesis' hypothesis, it can be emphasized that CEECs have strong connections with the European Union. Established trade linkages and ECB monetary policy are the 2 factors, which play a deterministic role for the EU integration and alignment to EU standards. As expected, EU members (Czech Republic and Romania) are more connected to euro area, due to business cycles synchronization and macroeconomic EU policies that directly and significantly affect these countries. As supported by Campos, et al. (2014), the Czech Republic has smaller, but positive benefits after the integration.

The responses of the Eastern Partnership countries (Moldova, Georgia and Ukraine) display a similarity with the EU's members, this gives to AA signatories a perspective and a model of EU integration.

In addition to impulse responses presented in the sub-chapter 3.1., referring to the second hypothesis: *the ECB's monetary policy shock has a larger effect on price level in Central European countries, rather than in Eastern Neighbour countries,* it is designed the table 3.6.

The share of variance attributed to external shocks in case of the aggregate price levels on short run is higher in the Czech Republic (2%) and Ukraine (4%), other countries being not impacted. On long run, the situation significantly changes. The variance of CEECs prices with respect to euro area monetary policy is driven in proportion of 15% in Georgia, 12% in Romania and Ukraine, 1% less in Moldova and only 1% in the Czech Republic. The ECB shock has a larger effect on prices of EU members only on short run. Thus, H2 is not confirmed.

**Table 3.6: Variance decomposition of the Euro area monetary policy shocks on price level in CEECs**

| Forecast horizon | Czech Republic | Romania | Moldova | Georgia | Ukraine |
|---|---|---|---|---|---|
| 6 | 0.02 | 0 | 0 | 0 | 0.04 |
| 48 | 0.01 | 0.12 | 0.11 | 0.15 | 0.12 |

*Source*: author's computations using JMulti software

The VAR model is used to capture the dynamic interaction among variables. The 3rd research expectation was that: *Central banks of the East European countries react extensively to the ECB monetary policy and follow broadly its short-term interest rate.* Supplementary to impulse responses results interpreted in the chapter 3.1. for every country individually, table 3.7 suggests an overall picture of variance decomposition, in this regard. The findings suggest that transmission mechanism of monetary policy is fairly representative for EU members, as for Eastern European countries. After a monetary contraction, short-term interest rates in CEECs fall in line with intuition. On short run, Moldova is following the ECB policy in proportion of 22%, Georgia - 3% and Ukraine only 1%. Over 4 years, situation does not change significantly; the external monetary shock determines 25% of Moldova's short-term interest rate, 10% of Georgia's TIBR and only 2% in Ukraine. The ability of NBMs' monetary policy to maintain the financial stability of Moldova within the limits, respecting its objectives and duties towards EU is supported by the obtained results. As well, a key role can play the neighbouring factor with Romania, both states following the ECB's policies with the same ratio.

**Table 3.7: Variance decomposition of the Euro area monetary policy shocks on short-term interest rate in CEECs**

| Forecast horizon | Czech Republic | Romania | Moldova | Georgia | Ukraine |
|---|---|---|---|---|---|
| 6 | 0.13 | 0.08 | 0.22 | 0.03 | 0.01 |
| 48 | 0.24 | 0.23 | 0.25 | 0.1 | 0.02 |

*Source*: author's computations using JMulti software

The 4th hypothesis of the present research: *Eastern European countries economic linkages with the EU are much weaker than the linkages between Central European countries and the EU,* is a generalization of the whole study.

Analysing the previous results, it can be observed that euro area shocks have a larger magnitude on EU members' macroeconomic variables. Especially, external shocks' effects on the output, CPI and short-term interest rate are higher in Czech Republic and Romania, comparing to eastern countries. National Banks of Czech Republic and Romania respond extensively (over 20%) to ECB monetary policies.

The average responses to euro area shocks in Czech Republic are noticed after 3-6 months, in Romania between 5-10 months and in Eastern Partnership countries in 10-20 months. Eastern the country is geographically positioned, the reaction to impulses is more delayed. The same is confirmed by the variance decomposition results. External shocks determine, on short run, 15-20% of changes in all macroeconomic variables in the Czech Republic and Romania, which cannot be noticed for AA signatory countries. The national prices and monetary policy of the three eastern countries are substantially impacted by the European factors, and less effect is observed for economic activity and FX rates. In the long run, the situation is recovering, and European policies are showing their influence on the Eastern economies. In conclusion, the last hypothesis is confirmed, as well.

# Chapter IV
# Impact of the EU Eastern Cooperation

*" ... one of the greatest tasks for the EU is to heal the division of Europe and to extend the same peace and prosperity to the central and eastern European countries that the present EU countries have."*[13]

*(Agenda 2000)*

The AA and DCFTA are 2 agreements established by the EU with the Eastern Neighbourhood countries, which in essence, represent a complex policy for strengthening socio-economic aspects of the economy. Overall, the DCFTA approach makes perfect sense and offers a particularly attractive mode of bringing countries that do not face membership prospects closer to the EU (Van Der Loo, 2017).

The three DCFTA countries have been facing many macroeconomic challenges; thus, their level of development is much lower than in Central European countries. According to the World Bank's ranking, the national income levels belong to the lower or lower-middle level group. Moldova is classified as the poorest country in Europe, with a GDP per capita estimated at EUR 3000 in 2015, while Georgia and Ukraine are performing twice better. Nonetheless, these indicators represent only 10% of the EU average (Adarov & Havlik, 2016).

[13] Summaries of EU legislation "**Agenda 2000: for a stronger and wider Union", available online:**https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al60001

As already mentioned, exactly after signing the AA and DCFTA, Eastern Neighbourhood countries faced many geopolitical problems, this fact generating a feeble economic performance, due to: lower exports, decline in remittances, fiscal austerity, and unstable investment climate. Ukraine's economy knew an essential drop in its economic activity, from a growth of 6.6% in 2014 to -9.9% in 2015. According to Gumene (2017) recession affected Moldova, as well (from 4.8% in 2014 to -0.5% in 2015). Georgia's economy saw a drop of 1.8% from 2014 to 2015. Very high level of inflation, determined in addition a fast increase of prices. In response, central banks increased interest rates, facilitating borrowing and investment. The interaction with the external factor was facilitated by the flexible exchange rate regimes, adopted by the three economies.

Keeping into account the most important obstacle for integration- 'frozen conflicts'[14] and its previous trade dependence on Russia, these 3 countries made significant efforts to align with EU regulations and standards.

## 4.1. AA and DCFTA agreements: barriers and opportunities for Eastern European countries

### *Benefits and opportunities*

The main goal and essential priority for Eastern Neighbourhood countries is future EU membership. In this regard, the AA/DCFTA is the first step for EECs and the best instrument the EU implemented to trigger positive socio-economic and political changes in the region. Successful implementation of these agreements may facilitate EU integration and prospect of EU membership.

As previously noted, facilitation of trade relations is one of the first factors for economic cooperation and one of the key priorities of the DCFTA agreement. The exports of goods from the 6 ENP-East countries[15] to the EU were valued at EUR 32.4 billion in 2016, while imports in these countries at EUR 31.6 billion. The strong trading relations were registered mostly due to Georgia, Moldova and Ukraine, whose main trading partner is EU (Mochvan & Shportyuk, 2016). In order to argument this, table 4.1 is proposed to analysis.

[14] In Georgia, the two separatist regions of South Ossetia and Abkhazia, in Ukraine- Crimea and Donetsk and Luhansk and in Moldova- Transnistria are 'pro-Russian' regions, being politically unstable.

[15] Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine.

**Table 4.1: Trading relations between EU andEastern Neighbours**

(mil.EUR)

| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Exports*** | | | | | | | | | | | |
| **Georgia** | 179 | 196 | 228 | 170 | 233 | 305 | 275 | 457 | 470 | 582 | 517 |
| **Moldova** | 426 | 494 | 560 | 479 | 549 | 779 | 788 | 855 | 940 | 1097 | 1205 |
| **Ukraine(** | 9752 | 13582 | 16188 | 9659 | 14136 | 18805 | 19 | 16 | 11202 | 7036 | 21599 |
| ***Imports*** | | | | | | | | | | | |
| **Georgia** | 891 | 1128 | 1200 | 957 | 1109 | 1476 | 1893 | 1706 | 1785 | 1876 | 2001 |
| **Moldova** | 967 | 1223 | 1432 | 1018 | 1292 | 1621 | 1806 | 1861 | 1935 | 1765 | 1783 |
| **Ukraine(** | 1592 | 18657 | 22824 | 14119 | 20138 | 26733 | 2685 | 2103 | 13005 | 9451 | 20234 |
| ***Trade balance*** | | | | | | | | | | | |
| **Georgia** | -712 | -932 | -972 | -787 | -876 | -1171 | -1618 | -1249 | -1316 | -1294 | -1484 |
| **Moldova** | -541 | -729 | -873 | -539 | -743 | -841 | -1019 | -1006 | -995 | -668 | -578 |
| **Ukraine(** | - | -5075 | -6636 | -4459 | -6002 | -7928 | -7144 | -4416 | -1802 | -2415 | 1366 |

*Note*: excluding the annexed Autonomous Republic of Crimea and the City of Sevastopol

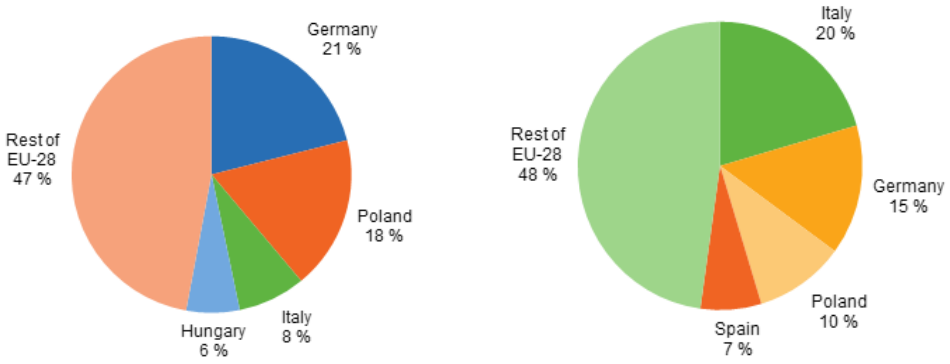
*Source*: author's computation based on http://ec.europa.eu/eurostat/

It can be easily observed that Georgia's and Moldova's exports to EU increased almost 3 times, between 2006-2016. A progress is attested in Ukraine, with the remark that 2014-2016 period does not contain exports for Crimea and Sevastopol. As regards to import level in the DCFTA countries, Ukraine is by far the country with the most significant increase (+18 642 mil. EUR). Georgia is importing from EU in 2016, with mil. EUR 1110, more than in 2006. Moldova increased its imports only by 816 mil. EUR in 10 years. It is worth to mention that the trade balance is negative for Georgia and Moldova, Ukraine obtaining a positive result only in 2016. For more precise products' classification and their exact value in trading relation, are presented 3 individual tables in Appendixes.

The principal EU trading partners that exported their products in ENCs, in 2016, are: Germany with a 21 % share, due to the manufacture of machinery and equipment exports; Poland (18 %), followed by Italy (8 %), and Hungary (6 %).

By contrast, ENCs exported 20% of their goods to Italy, 15%, followed by Poland (10 %) and Spain (7 %).

**Figure 4.1.: Share of goods exported by the EU and by the ENC in 2016**




*Source*: computed by author, using: http://ec.europa.eu/eurostat/

Elimination of trade barriers is another beneficial point of the DCFTA. Before signing the DCFTAs, the DCFTA signatory countries already had the access to the EU market. The most preferential tariff access was provided for Moldova (autonomous trade preferences) and the least preferential for Ukraine (ATPs). Georgia and Ukraine were enrolled in the EU Generalised Scheme of Preferences (Emerson & Movchan, 2016).

After DCFTA implementation, the trade barriers were immediately eliminated for all products, except for products subject to tariff rate quotas (table F.4, Appendix F) or entry price regulation with an exemption of ad valorem component of the import duty. Ukraine obtained slower its access to EU market, the full trade barriers elimination being estimated in seven years.

Among the direct benefits of the EU association is the EU financial, which in most of the cases takes the form of humanitarian aid grants or non-reimbursable development assistance.

Moldova benefited from an EU financial assistance of EUR 310 million, between 2014 and 2017. According to Bartczak (2017): "The financial aid supported public finance reform (€37 million), agriculture and rural development (€64 million), DCFTA implementation (€30 million), PAR (€15 million), police reform (€57 million), civil society cooperation (€8 million), and a technical cooperation facility (€ 5 million). An additional contribution of EUR 5 million was made available for Moldova's participation in the Danube Transnational Programme." In these 3 years, Moldova was granted, additionally by the

European Neighbourhood Instrument with approximately EUR 410 million. The EU assistance with the EUR 400 million loans given by the Neighbourhood Investment Facility permitted to implement in Moldova several infrastructure projects in the transport, energy, and SME sector[16].

The EU is supporting in the same way Georgia, providing annually over EUR 100 million for technical assistance projects. Another EUR 410 million were redirected to judiciary, public administration, agriculture, rural development and civil society reforms. As well, Georgia is benefiting from EU MFA, receiving EUR 46 million, half of which is reimbursable.[17]

Three packages of Macro-Financial Assistance were addressed to Ukraine, since 2014, with a total amount of EUR 3.4 billion. An essential remark is that about EUR 665 million do not take the form of loan, but as a non-reimbursable assistance. After Donbas conflict, the EU addressed an additional financial package of EUR 12.8 billion, in order to support Ukraine.[18]

The access to the EU market, trade liberalization, technology modernization and better business environment determine higher investment attractiveness and accelerate FDI inflows. According to Adarov & Havlik (2016): "By 2015, FDI stocks in Georgia reached almost 90% of GDP (the highest share not only among the DCFTA peers but also in comparison with CIS)." FDI contribute to industrial modernization, economic restructuring, improvement in business sector, supporting SMEs.

In conclusion, all these beneficial perspectives contribute to better regulatory environment and facilitate the market integration.

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[16] European Union External Action Service: *EU and Moldova meet to discuss relationship and reforms*, 2016. Available online: https://eeas.europa.eu/headquarters/headquarters-homepage/3556/eu-and-moldova-meet-discuss-relationship-and-reforms_en

[17]European Union External Action Service: *EU-Georgia relations, factsheet*, 2017. Available online: https://eeas.europa.eu/delegations/venezuela/23634/eu-georgia-relations-factsheet_fi

[18] European Commission: *Report from the Commission to the European Parliament and the Council on the implementation of macro-financial assistance to third countries in 2017*, 2017. Available online: https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/international-economic-relations/enlargement-and-neighbouringcountries/neighbouring-countries-eu/neighbourhood-countries/ukraine_en

***Costs and barriers***

Despite the benefits that can be estimated in time, the main weakness remains the difficult measurable costs of the DCFTA implementation. Lack of experience and low awareness about the DCFTA and AA are the basic challenges. As expected, costs are paid on short run, while benefits can be reached after some period after the DCFTA implementation. An example could be national currency depreciation in 2015, as response to export increase. Moreover, the implementation strategy and invested costs do not guarantee any future reward; therefore, the implementation of every reform meets uncertainty in the national economies.

Adjustment to EU standards is another challenge for an efficient DCFTA implementation. ENC are required to adjust their safety and environmental standards, especially for agriculture and food products, which is difficult to achieve in several years. The eastern economies are not very competitive with their western neighbours. For example, in DCFTA countries, manufacturing industry values only 10 - 14% of GDP, twice less than in the new EU Member States (Adarov & Havlik, 2017).

Regarding to business environment in the ENCs, it is still affected by corruption and inconsistent policies, remembering for example the banking fraud in Moldova. This is definitely a disadvantage for potential investors.

Last but not least, Adarov & Havlik (2016) emphasized that it should be taken into account the opportunity cost for an alternative integration. Reorientation on EU market has disrupted ENCs' trade relationship with Russia, which represented an important trade market for these 3 countries. This fact was, in essence, inherent, because of imposed embargo for the agro-food products coming from the Ukraine, Georgia and Moldova.

A comparative cost-benefits analysis is required for DCFTA regulations, in order to correctly estimate the net effects and the implementation horizon.

## 4.2. EU advantages from Eastern Neighbourhood economic cooperation

The AA and DCFTA do not have only a unilateral impact to East European Neighbours; it is a mutual beneficial cooperation. Within the economic partnership, the EU members are allowed to explore[19]:

- new potential suppliers, service providers and outsourcing opportunities;
- attractive investment opportunities for extending their production sectors;
- new markets to export their products.

Duties and trade barriers liberalization gives to EU companies the possibility to save several million EUR, in the sectors with high export: machinery, chemicals and manufactured goods. In case of an eventual commercial dispute between the parties, the DCFTA gives businesses the ability to defend their commercial rights, accessing the mediation mechanism (Dispute Settlement Mechanism).

In the context of trade, the ENCs' alignment to EU standards means fewer technical obstacles to their exports and less frauds. Harmonisation of regulations will result in positive investment opportunities and lower costs, for companies trading in: agro-food products, textiles, cars, machinery and electronics.[20]

The AA and DCFTA agreements are beneficial not only for producers, but same for the EU suppliers. They can attend the public tenders in different sectors (infrastructure, medicine, education, etc.), where in regard of their experience and high standards, the EU suppliers might be more competitive. This ensures a fair and equitable competition, being motivating to improve the service quality from the both sides.

All these economic advantages are suggested by the high level of ENCs' imports (table 4.1).

[19] European Commission report: *EU-Ukraine Deep and Comprehensive Free Trade Area. Economic benefits and opportunities*, page 3, 2015. Available online: http://trade.ec.europa.eu/doclib/docs/2015/december/tradoc_154128.pdf

[20]European Commission report: *EU-Ukraine Deep and Comprehensive Free Trade Area. Economic benefits and opportunities*, page3, 2015. Available online: http://trade.ec.europa.eu/doclib/docs/2015/december/tradoc_154128.pdf

## 4.3. Policy recommendations for future economic partnership

There are two main pre-conditions for a successful AA/DCFTA implementation: macroeconomic stabilisation and secure political background. Given the limits of the administrative and financial capacity, it is essential to prioritise national reforms (access to EU market, industrial competitiveness or attractiveness for EU investors), in order to avoid excessive pressures on producers or population (Adarov & Havlik, 2016).

All the costs addressed to DCFTA and AA implementation should be efficiently oriented over time. As discussed earlier, there is much asymmetry between costs and benefits along the time dimension. Instead of pushing for quick alignment, EU officials should try to minimise the gap between costs and benefits. On the other hand, ENCs can start with a cost - benefit analysis, regulating the sectors where the EU reforms will achieve the greatest potential and impact (Velickovski & Stojkov, 2014).

No matter how many reforms would be implemented, if ENCs face a pandemic corruption, the EU regulatory policies will not be efficient. In this concern, a strict monitoring of all the received grants is absolutely necessary. The good money management and a correct investment can generate profit and successful DCFTA implementation. A functional scoreboard system may ensure the funds orientation at national and regional levels.

The EU assistance should be strictly conditioned. More financial support is required by rural regions, until now most of the grants being addressed to bigger cities or capitals.

In terms of trade facilitation, it is essential to continue implementing the tools and measures, facilitating customs processes: Authorised Economic Operators; e-customs declarations; Dual system (green and red channels at border crossing points).[21]

ENCs must diversify their export markets and find new trading partners. Moreover, in the longer run DCFTA countries should not be oriented only on the EU market, they must diversify their trade destinations and, as possible, to avoid conflict relations with Russia, assuring FDI attractiveness.

[21] European Commission Report: *Association Implementation Report on the Republic of Moldova*, 2017. Available online:https://eeas.europa.eu/sites/eeas/files/association_implementation_report_on_the_republic_of_moldova_2017_03_10_final.pdf

Last but not least, should be implemented information campaign on DCFTA opportunities and benefits, facilities to access EU markets, boosting producers and consumers' confidence. In this way, ENC population will be aware of tangible results of the AA/ DCFTA implementation.

# Conclusion

Despite the socio-economic challenges euro area is facing today, the EU has an active influence on Eastern Neighbourhood countries, providing help and assistance to incentivise democracy and economic development. Georgia, Moldova, and Ukraine are the 3 countries, which are making a constant progress towards EU integration and closer economic linkages with EU market. The success of these countries is noticeable after signing, in 2014, the AA and DCFTA agreements - important instruments to modernise national economies.

In order to evaluate economic linkages between the Eastern Neighbourhood countries and the euro area, was applied a VAR model for small open economies, which allows assessing the magnitude and persistence of euro area shocks on domestic economies. As expected, the eastern countries repeat development path of their western neighbours (Czech Republic and Romania), with whom they shared a common economic and political past.

Firstly, were estimated VAR models for the EU members (Czech Republic and Romania). Afterwards, the obtained results were compared with responses for the Eastern European Neighbours (Moldova, Georgia and Ukraine), underlining the differences in economic connections and business cycles synchronization, and assessing impulse responses within eastern economies, based on domestic shocks.

Answering to the 4 hypothesis stated at the beginning of this study, it is worth to mention that almost all the suppositions were confirmed by the VAR results. Eastern European countries economic linkages with the EU are weaker than the linkages between Central European countries and the EU. On average, the obtained responses to euro area

shocks in the Eastern Partnership countries are noticed after 10-20 months, comparing to Romania (5-10 months) and Czech Republic (3-6 months). Interpreting the variance decompositions, the euro area output growth determines, on short run, a higher effect on EU members' economies than on ENCs: 15-20% on Czech's economy, 10-20% on Romania's, Georgia's and Ukraine's, and only 2 % in Moldova.

Central banks of the East European countries react extensively to the ECB monetary policy and follow broadly its short-term interest rate. On long run EURIBOR changes determine 25% of Moldova's short-term interest rate, 10% of Georgia's TIBR and only 2% in Ukraine. Before the war, Ukraine showed the quickest reaction to ECB monetary shock, in just 5 months reaching its peak. Moldova answers 4 months later after Ukraine to the same euro area shock, and Georgia's short-term interest rate achieves maximum effect after 24 months.

Although ECB reforms have a large impact on monetary policy in the CEECs, contrary to initial expectations, the euro area monetary policy shock has a larger effect on price level in Eastern Neighbour countries than in EU members (Czech Republic and Romania). On long run, prices are driven in proportion of 15% in Georgia, 12% in Ukraine, and 11% in Moldova, comparing to only 1% in the Czech Republic.

Based on restricted models' results for ENCs, Ukraine had a higher prospect of EU integration and membership, before 2014. However, Ukraine's political instability and economic recession in the last years, offer equal chances to the three eastern countries to align in the same and with the same pattern to EU's economy.

Generalizing the present study, it is important to mention that domestic shocks are the dominant force in the Central and Eastern EU economies. Because the magnitudes of responses to the main macroeconomic shocks have roughly the same values in the CEECs, the eastern countries can implement Czech Republic's and Romania's EU integration models. They could respond more quickly to external factors implementing DCFTA reforms, assimilating modern technologies, and diversifying their production and exports.

The AA and DCFTA reforms incur significant costs over short and medium term, thus it is essential to implement less costly regulations with a significant effect on profit generating sectors: the investment climate, trade facilitation and entrepreneurial development.

In conclusion, without implementing the required standards and reforms introduced by the EU, it is difficult to engage in a dialogue on the EU Eastern enlargement. Having a very good example of Romania and Czech Republic, the AA signatory countries might apply the same development levers.

The European integration concept significantly changed over the time. One thing has remained unchanged, it is important to cooperate with EU members and find an advocate which will support and argue the necessity of the EU Eastern enlargement for Moldova, Georgia and Ukraine. As Germany facilitated Poland's EU integration, and France was a support for Romania; in the following years, Poland can sustain its eastern neighbour Ukraine, Romania standing up for Moldova.

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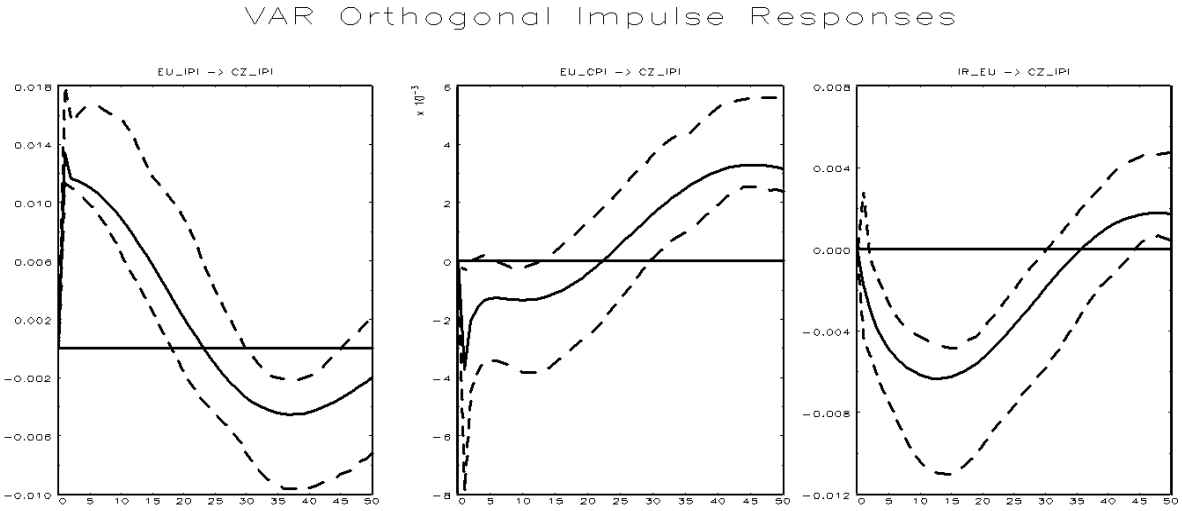
# APPENDICES

## Appendix A – *Czech Republic*

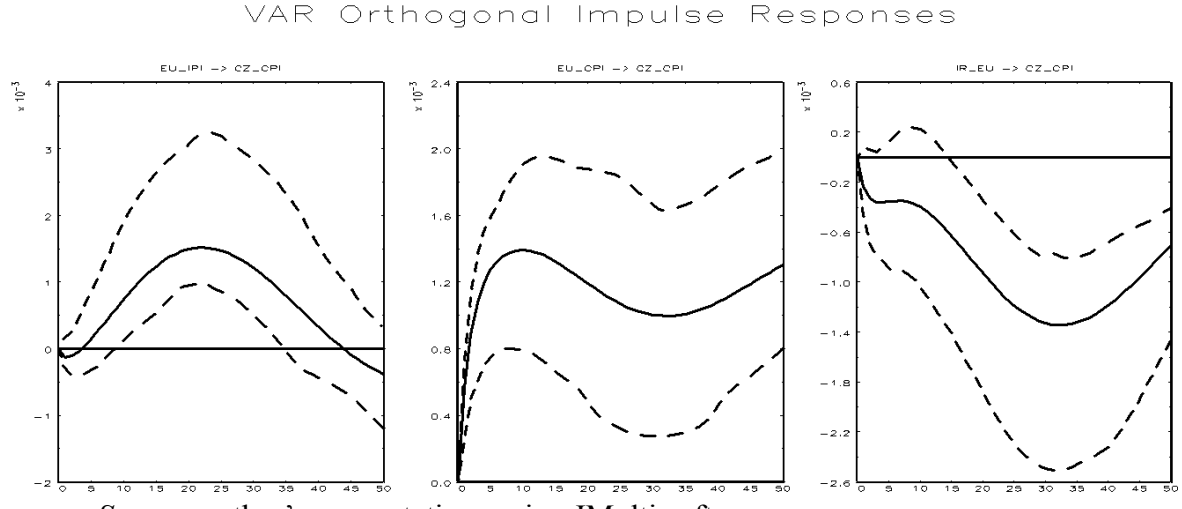
Full sample model using IPI as economic indicator.

***Figure A.1: The effect of the Euro area shocks on the Czech IPI, impulse responses***



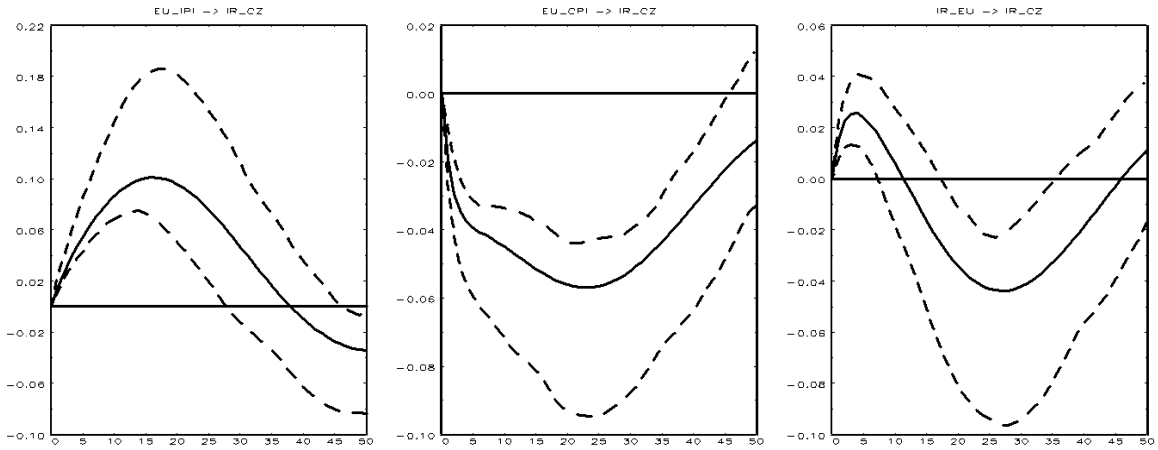

*Source*: author's computations using JMulti software

***Figure A.2: The effect of the external shocks on the Czech price level, impulse responses***



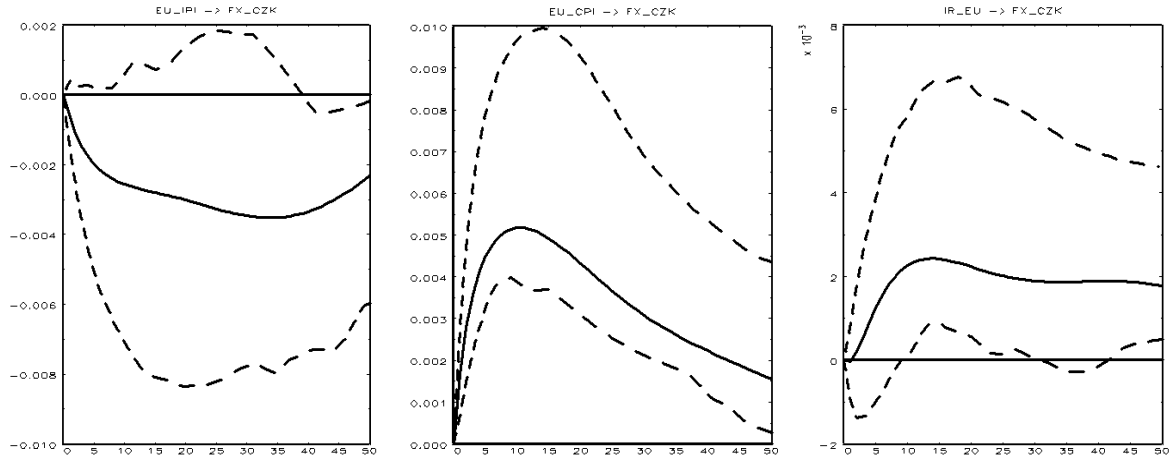

*Source*: author's computations using JMulti software

***Figure A.3: The effect of the foreign shocks on the Czech 3M PRIBOR, impulse responses***




*Source*: author's computations using JMulti software

***Figure A.4: The effect of the external shocks on the Czech FX rate, impulse responses***




*Source*: author's computations using JMulti software

**Table A.1: Variance decomposition of domestic vs. Euro area shocks in the Czech Republic**

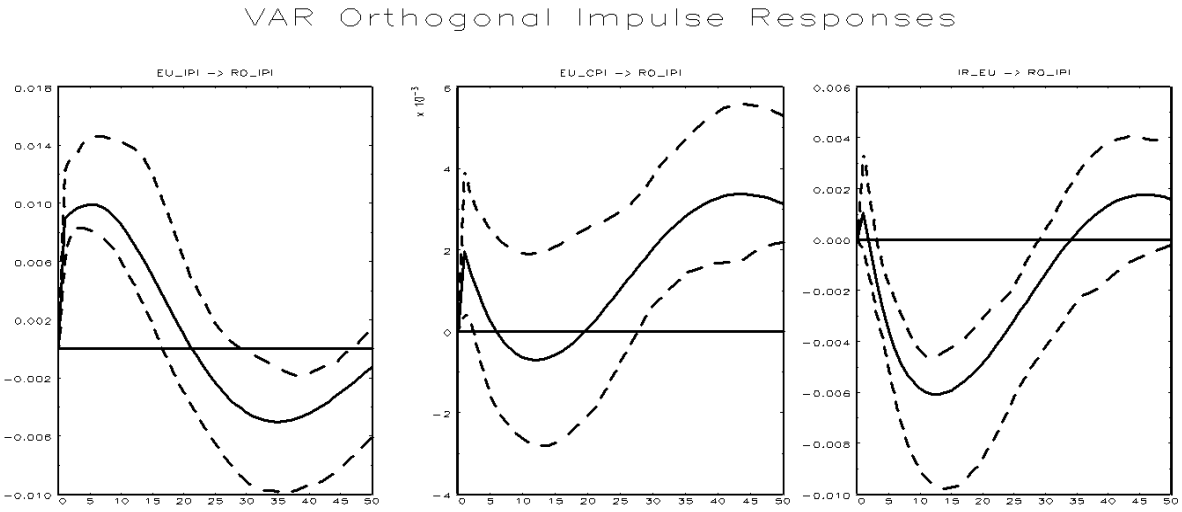
| Forecast horizon | IPI | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.68 | 0.32 | 0.87 | 0.13 | 0.71 | 0.29 | 0.9 | 0.1 |
| 12 | 0.55 | 0.45 | 0.77 | 0.23 | 0.55 | 0.45 | 0.81 | 0.19 |
| 24 | 0.48 | 0.52 | 0.61 | 0.39 | 0.37 | 0.63 | 0.73 | 0.27 |
| 36 | 0.45 | 0.55 | 0.54 | 0.46 | 0.32 | 0.68 | 0.69 | 0.31 |
| 48 | 0.44 | 0.56 | 0.51 | 0.49 | 0.32 | 0.68 | 0.65 | 0.35 |

*Source*: author's computations using JMulti software

## Appendix B – Romania

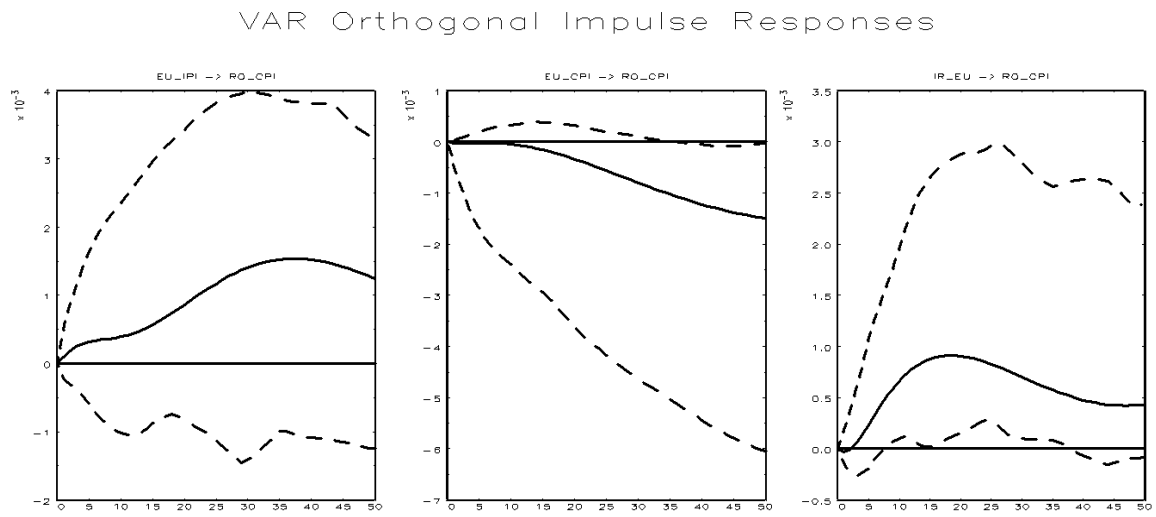
Full sample model using IPI as economic indicator.

***Figure B.1: The effect of the Euro area shocks on the Romania's IPI, impulse responses***



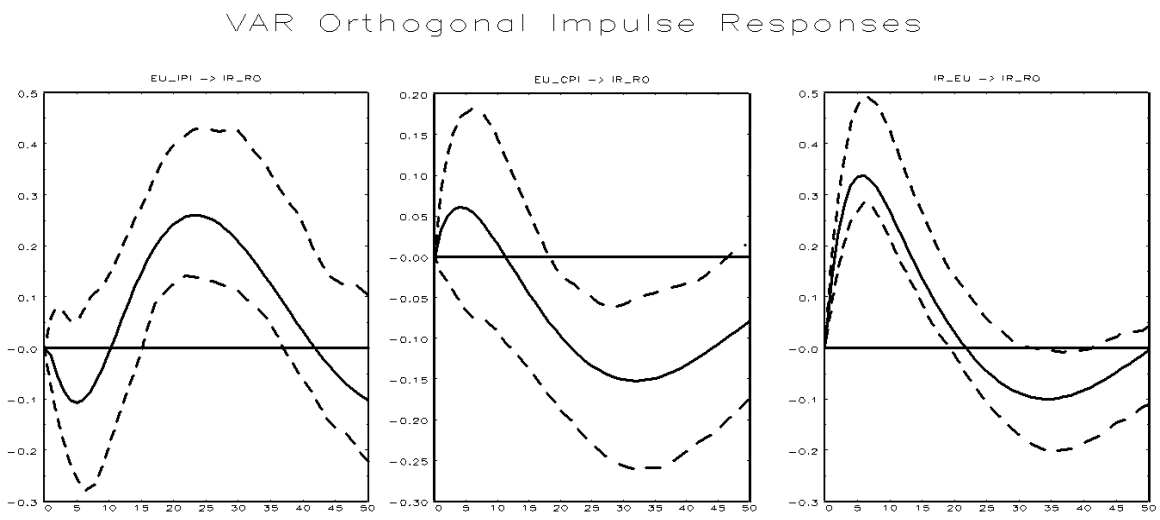

*Source*: author's computations using JMulti software

***Figure B.2: The effect of the external shocks on the Romanian price level, impulse responses***



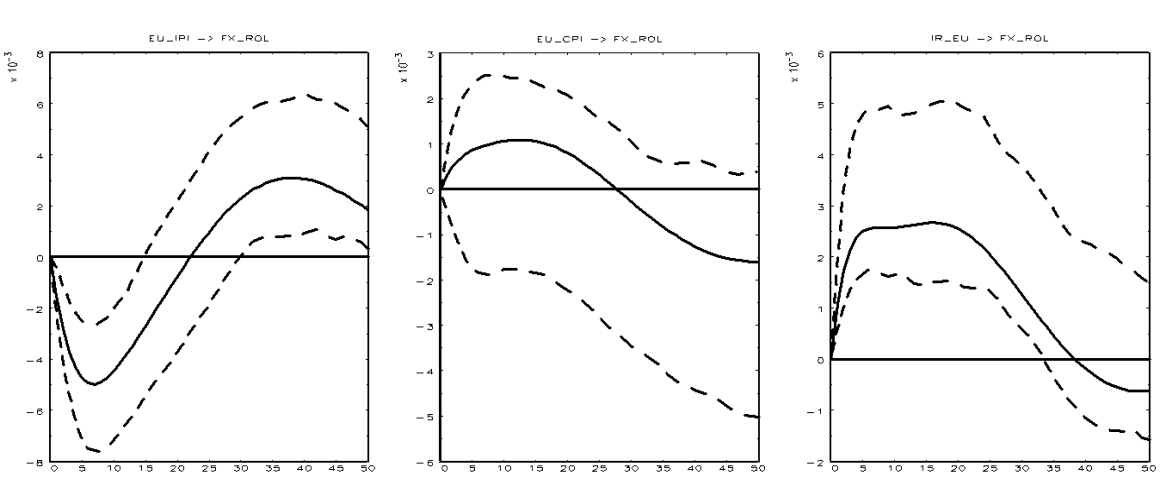

*Source*: author's computations using JMulti software

***Figure B.3: The effect of the Euro area shocks on the Romanian 3M ROBOR, impulse responses***




*Source*: author's computations using JMulti software

***Figure B.4: The effect of the foreign shocks on the Romanian FX rate, impulse responses***




*Source*: author's computations using JMulti software

**Table B.1: Variance decomposition of domestic vs. Euro area shocks in Romania**

| Forecast horizon | IPI | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.78 | 0.22 | 1 | 0 | 0.81 | 0.19 | 0.87 | 0.13 |
| 12 | 0.62 | 0.38 | 0.98 | 0.02 | 0.67 | 0.33 | 0.73 | 0.27 |
| 24 | 0.55 | 0.45 | 0.94 | 0.06 | 0.57 | 0.43 | 0.68 | 0.32 |
| 36 | 0.52 | 0.48 | 0.9 | 0.1 | 0.48 | 0.52 | 0.66 | 0.34 |

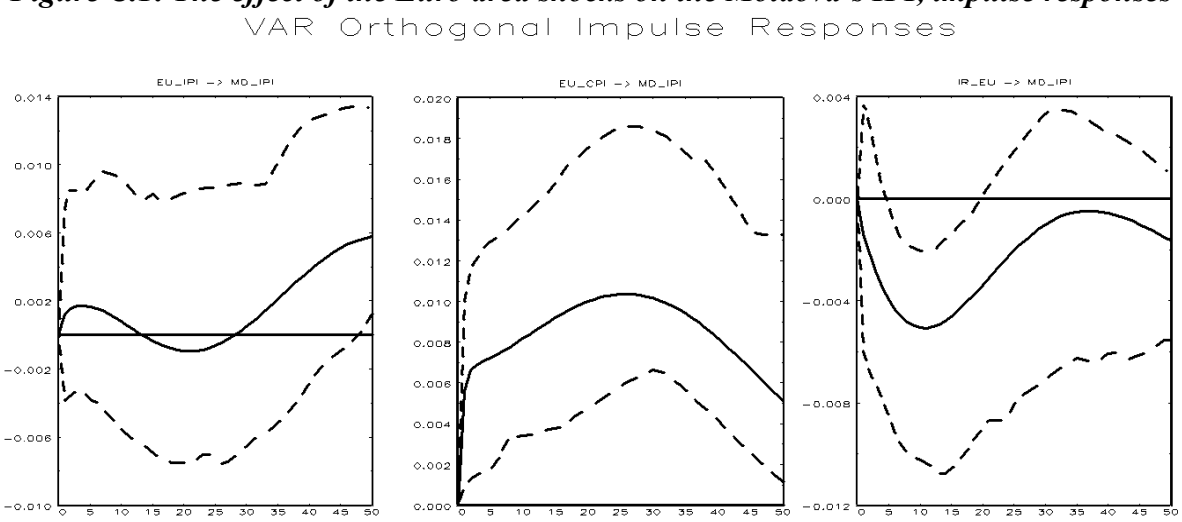
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 48 | 0.48 | 0.52 | 0.86 | 0.14 | 0.47 | 0.53 | 0.62 | 0.38 |

*Source*: author's computations using JMulti software

## Appendix C – *Republic of Moldova*

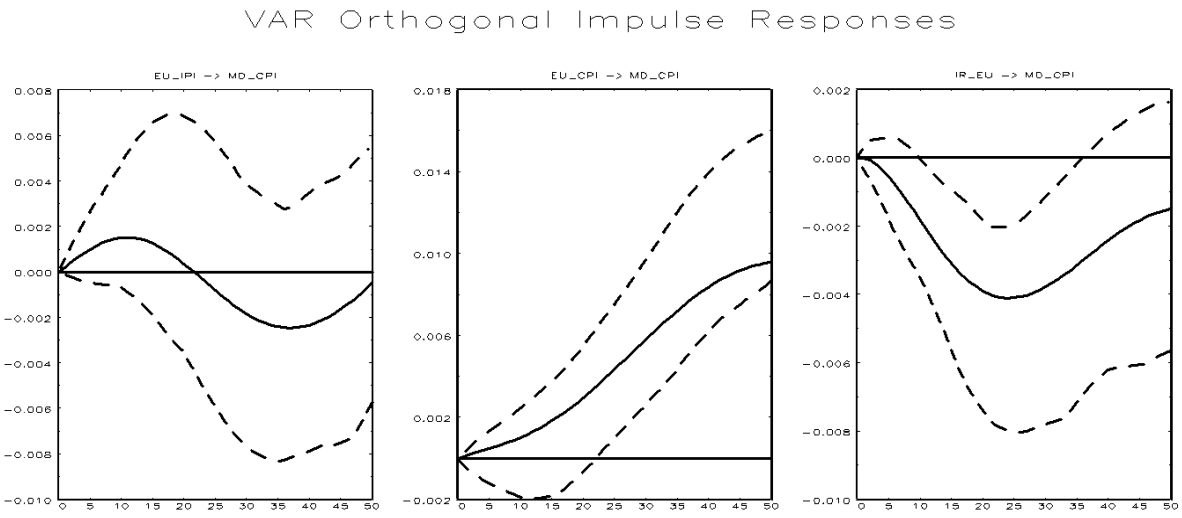
Full sample model using IPI as economic indicator.

***Figure C.1: The effect of the Euro area shocks on the Moldova's IPI, impulse responses***



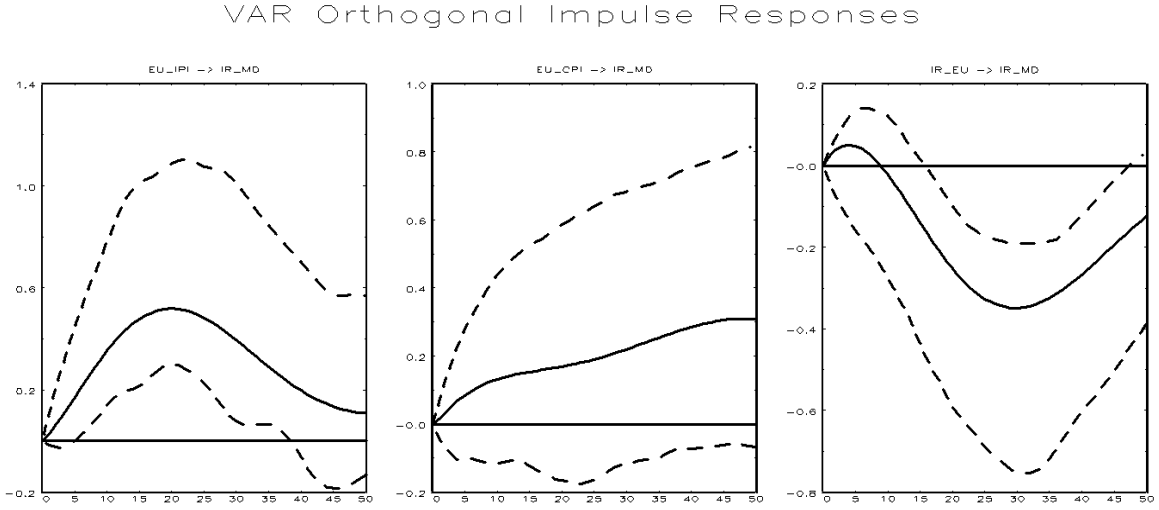

*Source*: author's computations using JMulti software

***Figure C.2: The effect of the Euro area on the price level in Moldova, impulse responses***



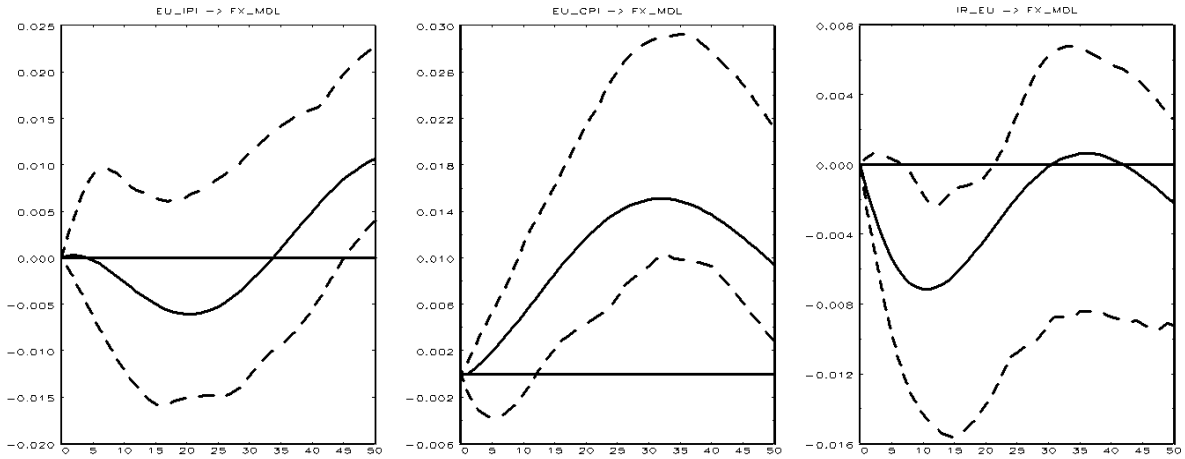

*Source*: author's computations using JMulti software

***Figure C.3: The effect of the external shocks on the 3M CHIBOR, impulse responses***




*Source*: author's computations using JMulti software

***Figure C.4: The effect of the foreign shocks on the Moldova's FX, impulse responses***




*Source*: author's computations using JMulti software

**Table C.1: Variance decomposition of domestic vs. Euro area shocks in Moldova**

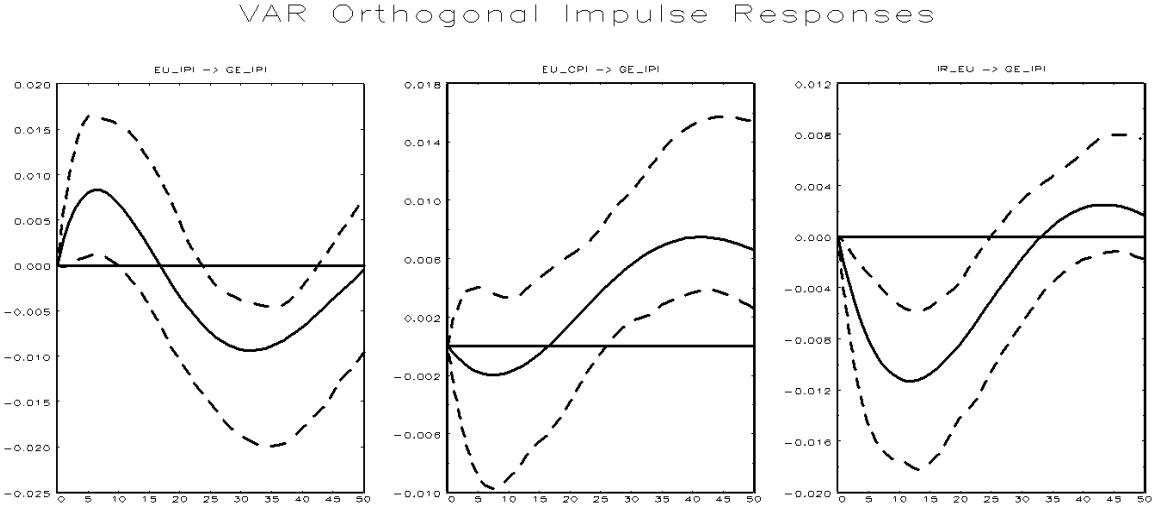
| Forecast horizon | IPI | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.96 | 0.04 | 0.98 | 0.02 | 0.97 | 0.03 | 0.97 | 0.03 |
| 12 | 0.91 | 0.09 | 0.93 | 0.07 | 0.9 | 0.1 | 0.9 | 0.1 |
| 24 | 0.82 | 0.18 | 0.77 | 0.23 | 0.74 | 0.26 | 0.74 | 0.26 |
| 36 | 0.75 | 0.25 | 0.61 | 0.39 | 0.66 | 0.34 | 0.62 | 0.38 |
| 48 | 0.7 | 0.3 | 0.48 | 0.52 | 0.64 | 0.36 | 0.55 | 0.45 |

*Source*: author's computations using JMulti software

**Appendix D – *Georgia***

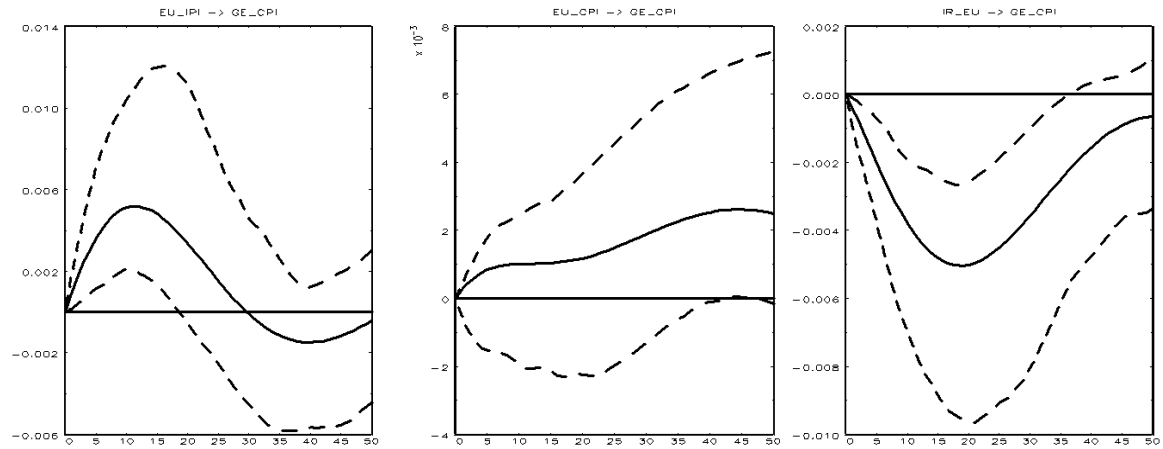
Full sample model using IPI as economic indicator.

***Figure D.1: The effect of the Euro area shocks on the Georgia's IPI, impulse responses***



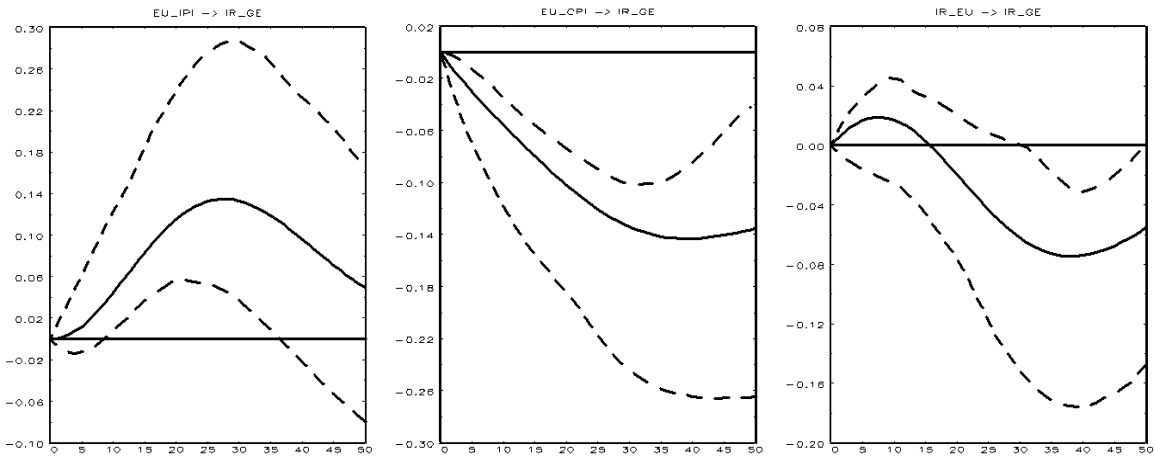

*Source*: author's computations using JMulti software

***Figure D.2: The effect of the external shocks on the price level in Georgia, impulse responses***



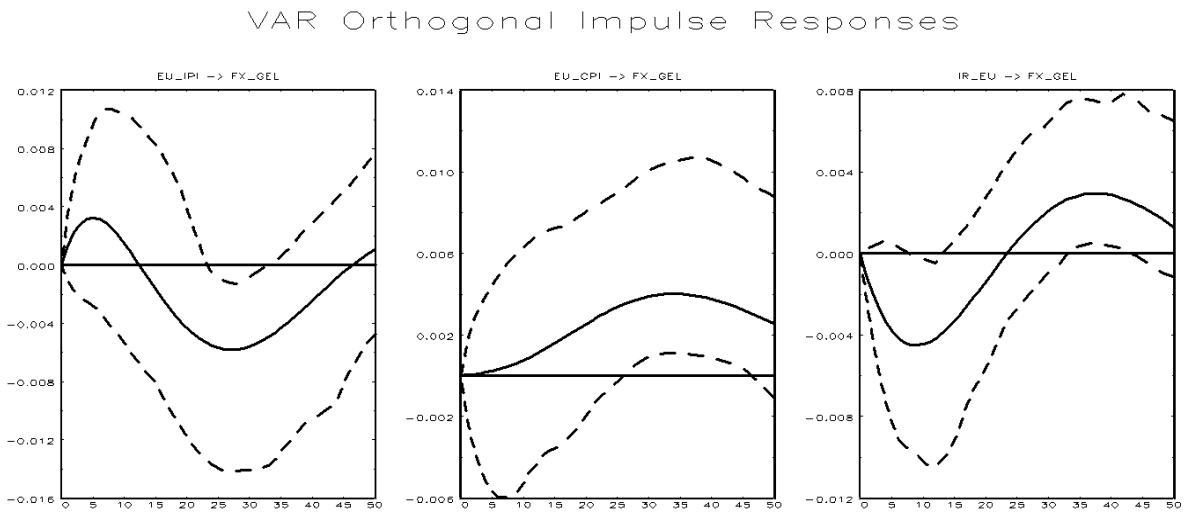

*Source*: author's computations using JMulti software

***Figure D.3: The effect of the foreign shocks on the 3M TIBR, impulse responses***




*Source*: author's computations using JMulti software

***Figure D.4: The effect of the external shocks on the Georgian FX rate, impulse responses***




*Source*: author's computations using JMulti software

**Table D.1: Variance decomposition of domestic vs. Euro area shocks in Georgia**

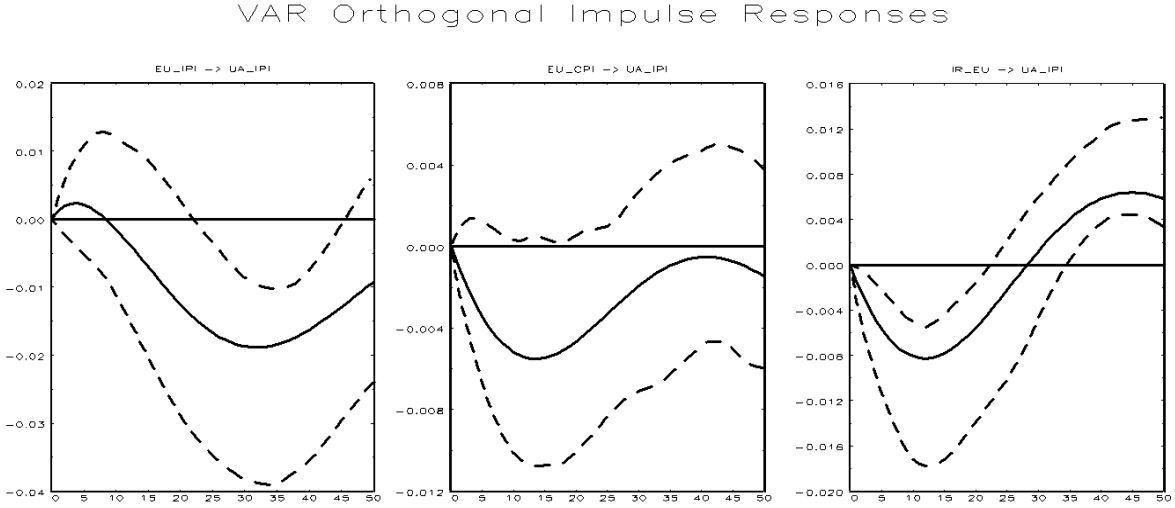
| Forecast horizon | IPI | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.91 | 0.09 | 0.91 | 0.09 | 0.96 | 0.04 | 0.97 | 0.03 |
| 12 | 0.76 | 0.24 | 0.78 | 0.22 | 0.86 | 0.14 | 0.94 | 0.06 |
| 24 | 0.63 | 0.37 | 0.69 | 0.31 | 0.62 | 0.38 | 0.91 | 0.09 |
| 36 | 0.54 | 0.46 | 0.66 | 0.34 | 0.48 | 0.52 | 0.83 | 0.17 |
| 48 | 0.47 | 0.53 | 0.64 | .36 | 0.45 | 0.55 | 0.79 | 0.21 |

*Source*: author's computations using JMulti software

**Appendix E – *Ukraine***

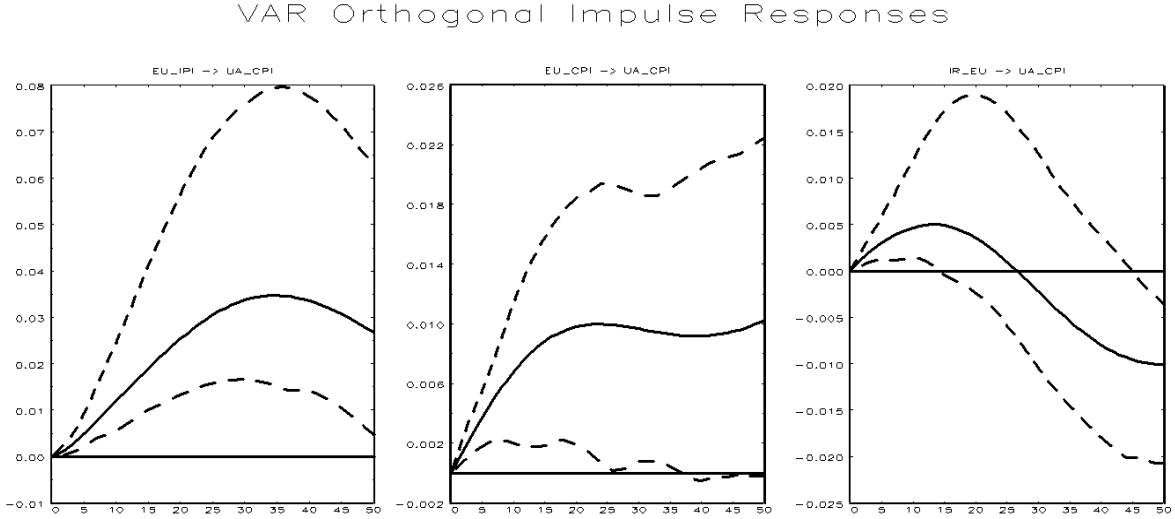
Full sample model using IPI as economic indicator.

***Figure E.1: The effect of the Euro area shocks on the Ukrainian IPI, impulse responses***



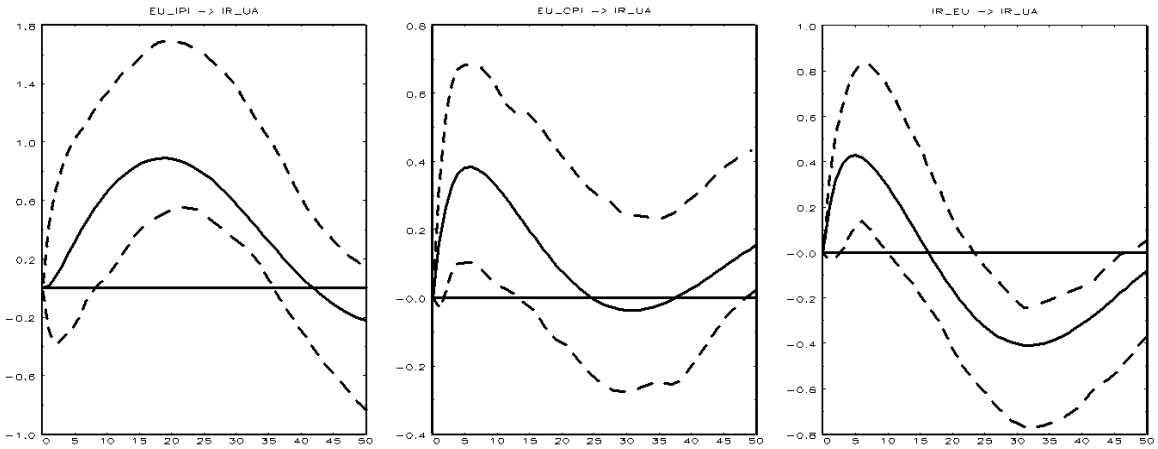

*Source*: author's computations using JMulti software

***Figure E.2: The effect of the Euro area shocks on the price level in Ukraine, impulse responses***



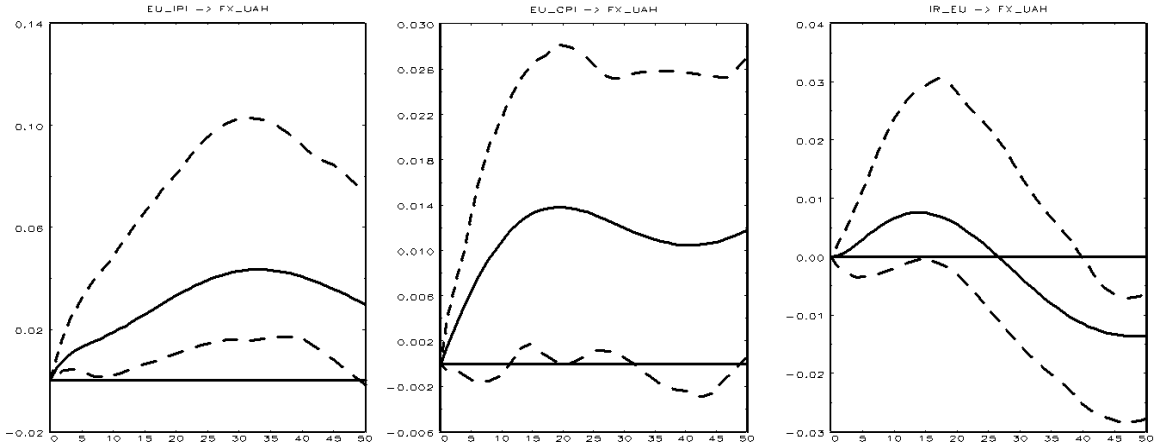

*Source*: author's computations using JMulti software

***Figure E.3: The effect of the foreign shocks on the 3M interbank rate in Ukraine, impulse responses***




*Source*: author's computations using JMulti software

***Figure E.4: The effect of the external shocks on the Ukrainian FX rate, impulse responses***




*Source*: author's computations using JMulti software

**Table E.1: Variance decomposition of domestic vs. Euro area shocks in Ukraine**

| Forecast horizon | IPI | | CPI | | IR | | FX | |
|---|---|---|---|---|---|---|---|---|
| | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. | D.S. | E.S. |
| 6 | 0.96 | 0.04 | 0.92 | 0.08 | 0.95 | 0.05 | 0.95 | 0.05 |
| 12 | 0.92 | 0.08 | 0.83 | 0.17 | 0.86 | 0.14 | 0.89 | 0.11 |
| 24 | 0.78 | 0.22 | 0.68 | 0.32 | 0.68 | 0.32 | 0.76 | 0.24 |
| 36 | 0.62 | 0.38 | 0.57 | 0.43 | 0.59 | 0.41 | 0.63 | 0.37 |
| 48 | 0.56 | 0.44 | 0.51 | 0.49 | 0.58 | 0.42 | 0.56 | 0.44 |

*Source*: author's computations using JMulti software

## Appendix F

### Table F.1: Trade between the EU and Moldova by product group, 2016

| Standard International Trade Classification (Rev.3) product group | EU-28 exports to and imports from Moldova | | | | | |
|---|---|---|---|---|---|---|
| | Exports | | | Imports | | |
| | Value (million EUR) | (% of EU-28 exports) | Rank | Value (million EUR) | (% of EU-28 imports) | Rank |
| 0: Food and live animals | 175.8 | 8.7 | 6 | 301.3 | 22.9 | 2 |
| 1: Beverages and tobacco | 30.6 | 1.5 | 8 | 43.8 | 3.3 | 6 |
| 2: Crude materials (inedible) except fuels | 49.8 | 2.5 | 7 | 121.5 | 9.2 | 5 |
| 3: Mineral fuels, lubricants and related materials | 316.7 | 15.7 | 3 | 3.1 | 0.2 | 9 |
| 4: Animal and vegetable oils, fats and waxes | 2.9 | 0.1 | 10 | 36.8 | 2.8 | 7 |
| 5: Chemicals and related products n.e.s. | 287.5 | 14.2 | 4 | 17.6 | 1.3 | 8 |
| 6: Manufactured goods | 411.5 | 20.4 | 2 | 175.0 | 13.3 | 4 |
| 7: Machinery and transport equipment | 549.9 | 27.2 | 1 | 238.1 | 18.1 | 3 |
| 8: Miscellaneous manufactured articles | 181.5 | 9.0 | 5 | 379.1 | 28.8 | 1 |
| 9: Commodities and transactions not classified elsewhere | 9.2 | 0.5 | 9 | 1.4 | 0.1 | 10 |
| Total | 2 021.9 | 100.0 | – | 1 317.7 | 100.0 | – |

Note: as reported by EU Member States.
*Source:* Eurostat (online data code: DS-018995)

### Table F.2: Trade between the EU and Georgia by product group, 2016

| Standard International Trade Classification (Rev.3) product group | EU-28 exports to and imports from Georgia | | | | | |
|---|---|---|---|---|---|---|
| | Exports | | | Imports | | |
| | Value (million EUR) | (% of EU-28 exports) | Rank | Value (million EUR) | (% of EU-28 imports) | Rank |
| 0: Food and live animals | 146.2 | 7.5 | 6 | 144.7 | 26.7 | 1 |
| 1: Beverages and tobacco | 48.7 | 2.5 | 7 | 34.1 | 6.3 | 7 |
| 2: Crude materials (inedible) except fuels | 22.6 | 1.2 | 8 | 143.5 | 26.5 | 2 |
| 3: Mineral fuels, lubricants and related materials | 354.2 | 18.1 | 3 | 34.4 | 6.4 | 6 |
| 4: Animal and vegetable oils, fats and waxes | 18.5 | 0.9 | 9 | 1.9 | 0.4 | 10 |
| 5: Chemicals and related products n.e.s. | 360.8 | 18.4 | 2 | 50.7 | 9.3 | 4 |
| 6: Manufactured goods | 171.0 | 8.7 | 5 | 82.3 | 15.2 | 3 |
| 7: Machinery and transport equipment | 582.6 | 29.7 | 1 | 4.8 | 0.9 | 8 |
| 8: Miscellaneous manufactured articles | 236.1 | 12.0 | 4 | 35.7 | 6.6 | 5 |
| 9: Commodities and transactions not classified elsewhere | 16.7 | 0.8 | 10 | 4.5 | 0.8 | 9 |
| Total | 1 961.4 | 100.0 | – | 542.3 | 100.0 | – |

Note: as reported by EU Member States.
*Source:* Eurostat (online data code: DS-018995)

### Table F.3: Trade between the EU and Moldova by product group, 2016

| Standard International Trade Classification (Rev.3) product group | EU-28 exports to and imports from Ukraine | | | | | |
|---|---|---|---|---|---|---|
| | Exports | | | Imports | | |
| | Value (million EUR) | (% of EU-28 exports) | Rank | Value (million EUR) | (% of EU-28 imports) | Rank |
| 0: Food and live animals | 1 060.6 | 6.4 | 5 | 2 347.2 | 17.8 | 2 |
| 1: Beverages and tobacco | 232.9 | 1.4 | 8 | 18.5 | 0.1 | 10 |
| 2: Crude materials (inedible) except fuels | 470.2 | 2.9 | 7 | 2 287.0 | 17.4 | 3 |
| 3: Mineral fuels, lubricants and related materials | 1 034.4 | 6.3 | 6 | 544.9 | 4.1 | 7 |
| 4: Animal and vegetable oils, fats and waxes | 37.4 | 0.2 | 10 | 1 112.0 | 8.5 | 5 |
| 5: Chemicals and related products n.e.s. | 3 438.7 | 20.8 | 2 | 396.5 | 3.0 | 8 |
| 6: Manufactured goods | 2 448.3 | 14.8 | 3 | 3 631.9 | 27.6 | 1 |
| 7: Machinery and transport equipment | 5 994.1 | 36.3 | 1 | 1 586.4 | 12.1 | 4 |
| 8: Miscellaneous manufactured articles | 1 525.2 | 9.2 | 4 | 790.2 | 6.0 | 6 |
| 9: Commodities and transactions not classified elsewhere | 161.2 | 1.0 | 9 | 29.4 | 0.2 | 9 |
| Total | 16 497.0 | 100.0 | – | 13 159.2 | 100.0 | – |

Note: as reported by EU Member States.
*Source:* Eurostat (online data code: DS-018995)

**Table F.4: Tariff rate quotas applied by EU in framework of DCFTAs**

| Description of broad category | Ukraine | Georgia | Moldova |
|---|---|---|---|
| Beef meat | YES | NO | NO |
| Pork meat | YES | NO | NO |
| Sheep meat | YES | NO | NO |
| Poultry meat and poultry meat preparations | YES | NO | NO |
| Milk cream, condensed milk and yogurts | YES | NO | NO |
| Butter and dairy spreads | YES | NO | NO |
| Eggs and albumins | YES | NO | NO |
| Honey | YES | NO | NO |
| Garlic | YES | YES | YES |
| Sugars | YES | NO | NO |
| Sugar syrups | YES | NO | NO |
| Common wheat, flours and pellets | YES | NO | NO |
| Barley, flour and pellets | YES | NO | NO |
| Oats | YES | NO | NO |
| Barley groats and meal, cereal grains | YES | NO | NO |
| Malt and wheat gluten | YES | NO | NO |
| Starches | YES | NO | NO |
| Mushrooms | YES | NO | NO |
| Processed tomatoes | YES | NO | NO |
| Grape juice | YES | NO | YES |
| Apple juice | YES | NO | NO |
| Fermented – milk processed products | YES | NO | NO |
| Processed butter products | YES | NO | NO |
| Sweet corn | YES | NO | NO |
| Cigars and Cigarettes | YES | NO | NO |

*Source*: author's compilation from Association Agreements EU-Georgia, EU-Moldova, EU-Ukraine