THE REACTION OF EMERGENT MARKETS ASSET PRICES ON ECB INTEREST RATE POLICY: UKRAINE'S EXAMPLE

РЕАКЦІЯ ЦІН НА АКТИВИ НА РИНКАХ, ЩО РОЗВИВАЮТЬСЯ, У ВІДПОВІДЬ НА ПРОЦЕНТУ ПОЛІТИКУ ЄЦБ: ПРИКЛАД УКРАЇНИ

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The Euro area has been challenged by numerous range of threats such as deflation pressure, zero output growth rate and lack of liquidity for banking institutions. These problems have more deepen through the modest strengthening in the US economy, the slump in China and the oil price decline. The answer of ECB consists of unconventional Quantitative Easing program and key rate cut. Although such measures provide unpredictable outcomes on asset markets in countries with emerging economies such as Ukraine and provide new causes for volatility risk at financial markets. This sequence has been considered in the article on the example of Ukraine and further suggestions given regardingly to providing sustainable monetary policy model by European and Ukrainian regulators.
Key words: *emerging economies, international transmissions of capital shocks, asset channel, unconventional monetary policy, financial cycle, foreign exchange transmission.*

Єврозона донині страждала від низки макроекономічних проблем такого порядку, як дефляційний тиск, нульовий рівень приросту ВВП та нестача ліквідних активів у банківській системі. Ці проблеми ще більше поглибилися на тлі нормалізації монетарної політики у США, уповільнення економіки Китаю та флуктуації цін на нафту, особливо в бік зменшення. Досі європейський регулятор відповідав застосуванням заходів нетрадиційної монетарної політики кількісного пом'якшення та зниженням процентних ставок. Проте ці заходи неочікувано відгукнулися на країнах із ринками, що швидко розвиваються, наприклад такими, як Україна, та стали ще одним чинником породження волатильності на фінансових ринках та ринках активів. Даний причинно-наслідковий зв'язок досліджується у статті, та пропозиції щодо корекції векторів реалізації монетарних політик європейським та українським регулятором наводяться наприкінці.
Ключові слова: *економіки, що розвиваються, міжнародна трансмісія шоків капіталу, канал активів, нетрадиційна монетарна політика, фінансовий цикл, валютна трансмісія.*

Еврозона до сегодняшнего дня страдала от ряда макроэкономических проблем такого рода, как дефляционное давление, нулевой уровень прироста ВВП и дефицит ликвидных активов в банковской системе. Эти проблемы ещё более усилились на фоне нормализации монетарной политики в США, сокращения экономики Китая и флуктуаций цен на нефть, особенно в сторону их уменьшения. К этому моменту европейский регулятор прибегал к мерам нетрадиционной монетарной политики количественного смягчения и снижения процентных ставок. Но данные меры неожиданно отобразились на странах с быстроразвивающимися рынками, например на таких, как Украина, и стали ещё одним фактором, предшествующим усилению волатильности на финансовых рынках и рынках активов. Данную причинно-следственную связь исследовано в статье, и выдвинуты предложения относительно коррекции векторов реализации монетарных политик европейским и украинским регулятором, которые приводятся в конце.
Ключевые слова: *развивающиеся экономики, международная трансмиссия шоков капитала, канал активов, нетрадиционная монетарная политика, финансовый цикл, трансмиссия валютного канала.*

Introduction. The main goal of this article is to investigate the relationships between interest rate policy decisions of European Central bank (ECB) and asset prices, especially housing prices, in Ukraine. Also, will be making special emphasize on transmitting the fluctuation, which goes from asset market to currency channel of monetary mechanism of Ukraine.

On this issue of explanation relation between advanced monetary policy and supply shocks in emerging economies the wide range of scientists have been dealing. Among them are Dees (2016), Borio (2012), Drehmann (2012), Pesaran (2012), Xu (2012), Eickmeier and Ng (2015) and many other. Firstly, Pesaran had conducted modelling international linkages including financial variables with help of using global VAR model (hereinafter GVAR). It allows for the interdependencies across many countries between national and international factors, including real, monetary and financial variables. Further, Borio has proved that it is not possible to understand business fluctuations and the corresponding analytical policy challenges without understanding the financial cycle. And Drehmann et al. (2012) described clear empirical comovement linkage between financial cycle stage of development and property price owing in international framework.

In work of Marcel Fratzscher, Marco Lo Duca and Roland Straub (2012) [1] has explored some affectations under using non-conventional tools. OMT related announcements (26 July and 6 September 2011) resulted in 74 b.p. decline in 10-year government bond yields in Italy and Spain, while they led to increase on +10 b.p. in yields on bonds of highly wealth Euro area countries. Equity indexes in Italy and Spain lifted by nearly +9%, while bank equity prices went up by around +14%. Also in wealthy Euro area countries, simultaneously equity indexes and bank equity prices went up, while this increase not such accelerated as in Italy and Spain. Nominal euro exchange rate has appreciated on +72 basis point [1],

thus function of credit channel impulse response negatively correlates with foreign exchange variable. So, that's why transmission resulted in increasing deflation and lending margins in countries under sovereign debt default crisis.

But till today it is not existed investigations in directions of measuring and proving hypothesis on strong dependency of asset prices in Ukraine on answer of developments in ECB monetary policy. As a most neighboring trade partner with year-to-year progressing stake of good and servicing turnover, Euro area's financial cycle has become more transitive for Ukraine real economy. So, this article is dedicated to higher outlined problem.

Literature overview. Successful monetary Quantitative Easing – further QE instruments for the US and partly Japan incentive policies has failed in Europe reality and have been raising up concerns on how does banking supervisor and finance sustainability regulator in face of European Central Bank correct understand monetary mechanism of Euro system and its spillover effects on emerging markets. This paper will be try to answer on this question and predict further plausible steps of regulator.

More skepticism was existing regardingly to QE policy on fact, that lowering loan rate in maturity markets had provided significant outflow of investment funds from ones to emerging economies. When Federal Reserve Bank's Finance open market committee in May of 2013 [1] announced the probable plan of tapering of the security repurchasing program, the policy makers of developing markets expressed their fears on intensifying volatility swing in capital flows and asset prices. Therefore, the issue of coordinating and converging monetary policies of advanced economies to biorhythms of global economic ecosystem has been becoming increasingly important.

"While ECB policies mainly affected financial markets in the euro area, they also had positive spillovers to global markets by increasing equity prices and lowering risk aversion and credit risk… while the overall effect of policies on international yields was negligible. The euro slightly depreciated on average in response to the ECB's unconventional measures…" [1], – summarized Marcel Fratzscher, Marco Lo Duca and Roland Straub in their research paper, published in November, 2014.

But mostly it appears that market volatility and, in particular, "risk on" and "risk off" models in global markets [5] are often determined by exogenous events which are not under the direct influence of central banks, so that's why monetary transmission, which theoretically can lead to desired sustainability, in empirical evidence leads only to unpredictable turmoil. Such situation appears before Euro area, where additional liquidity injecting has not lead to appreciating equity instruments and causes funds outflow.

Due to the reasoning mentioned above, it is important to measure volatility magnitude of European and Ukrainian asset prices as a function of imposed monetary targets on main liquidity programs provided by ECB. Obtained results will help to better understand the main causalities in monetary transmission of ECB policy and provide further proposals in avoiding sluggish economy development in mature market and emerging economic system, such as a Ukraine.

After destroying outcomes of Global financial crisis European Central Bank has seriously rethought its monetary policy and set new objectives' focuses. The Federal Constitutional Court of European Union has requested the ECB on explaining, how Outright Monetary Transactions (OMTs) program could provide carrying out of its main monetary policy mandate in 11th June of 2013. Regulator commented on it in next way: "Fears of involuntary break-up of the single currency led to severe tensions in the capital markets. At the heart of those distortions lay turmoil in the government bond market…" [6]

It is very important to understand relationship between yielding at debt market in European monetary system, i.e. EMS and capital movement to abroad. Thus, we will assess each effect from liquidity injection programs of ECB.

The core of monetary program was relocated to capital market by establishing remembered OMTs and repurchasing of mortgage backed securities, which was named as expanded asset purchase program (APP). The last one provides next channels of liquidity: third covered bond purchase program, asset-backed securities purchase program, public sector purchase program. With help of this non-conventional monetary tools and rates cut the regulator has expected to unfreeze deflationary economy.

The key interest rates decision of the regulator on the last meeting in 8 December 2016 the Governing Council of the ECB decided that the interest rate on the deposit facility will be maintained on 0,25 % level that is bigger on 55 basis points comparatively to the same period at last year. The interest rate on the main refinancing operations and the interest rate on the marginal lending facility will remain unchanged at 0.00% and -0.40% respectively [8]. From 21 of January in 2016 it is a gross decrease in 1.08 % in key rate with average sliding on 10 b.p. Such minus rate move has influenced on desynchronization of lending and saving rate valuing across the Euro area countries.

Regarding non-standard policy measures, regulator will continue its purchases under the asset purchase programme (APP) at the current monthly pace of 80 billion euros until the end of March 2017 [9].

If until to 2009 the variation of credit rate dispersion among advanced and developing European countries was under 15 basis points (fig. 1), so after 2013-2014 it has hit at one third of rate disperse to average value.

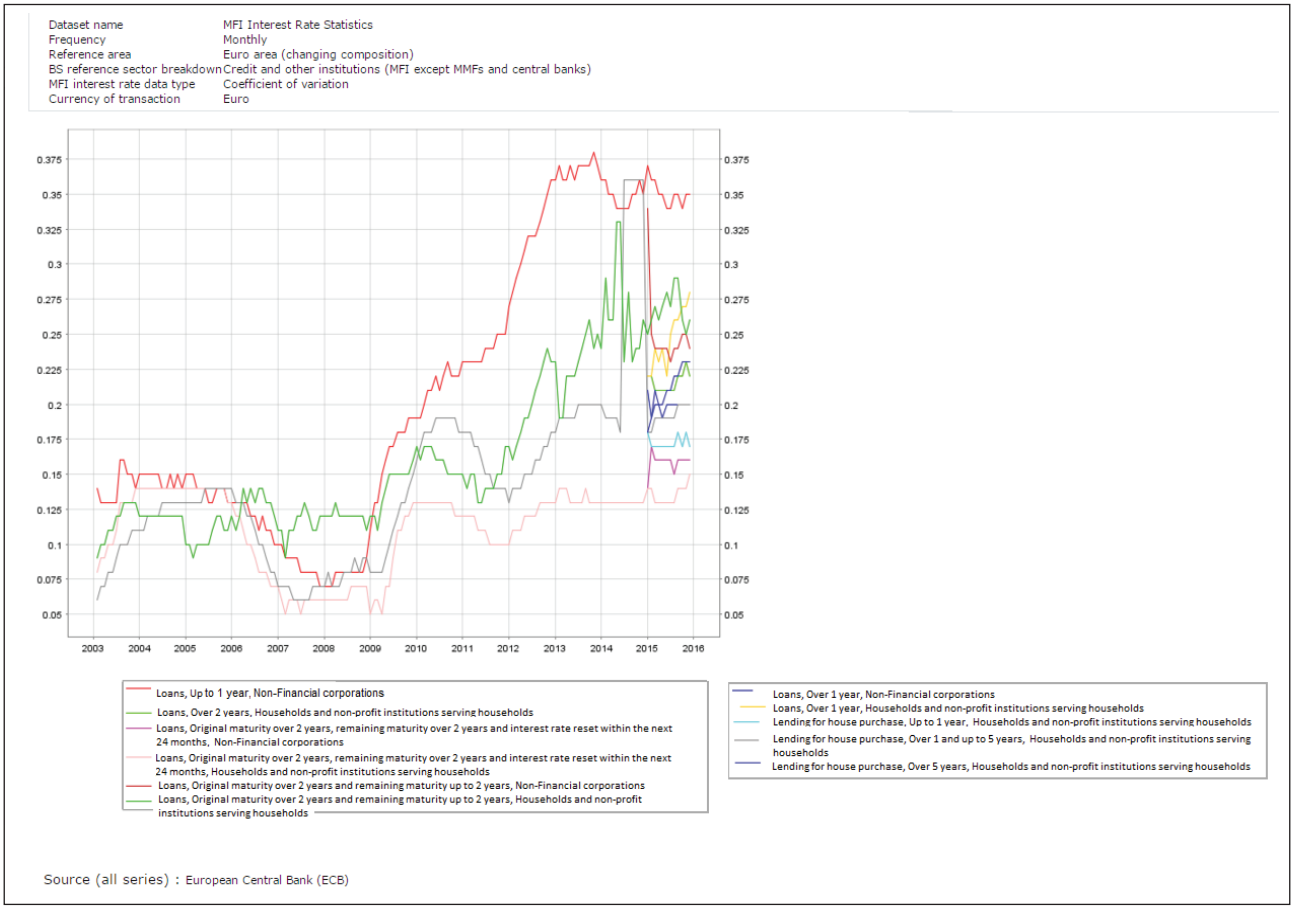

Fig. 1. The coefficient of variation of the credit rate disperse within countries in EU

Source: European Central Bank (2016) [12]

It can be explained by over margined credit market of such countries as Spain, Italy, Greece and Ireland due to their rising defaulting risk. Due to that reason the ECB next decisions on downing key lending rates will fail and provide new risen volatility in Euro quoting, unemployment rising and output slowing.

The most volatility is being seen in short-term loans for non-financial corporations and indeed most stable lending rate is been seeing in loan with over and up 2 years' maturity. The last conclusion non-standardly contradicts the duration theory and its must be considered in further assumptions on poor performance of the monetary transmission mechanism.

Such causality we can find in deposit facility valuing, where the overnight savings for non-financial corporation demonstrated the 2,6 times variance of random variable from average point. Surprisingly current deposit rate has moved more homogeneously and REPO instruments also has stable pace of yield growth (fig. 2).

Summarizing all above saying we conclude that slow pace of yield growth and risen volatility under outflow funds pressure loops to new circle of deflation pressure. The same conclusions have been done at World Economic Forum at the beginning of 2016, where the European finance crisis was one of the first issue on agenda. For instance, the Italian ministry of finance Pier Carlo Padoan said at CNBC panel: "The way the US responded to financial crisis was proved to be more efficient [than in EU] in a few ways. The sequencing of adjustments was different: the US first target of adjustments was financial system and fiscal position came after of that. EU done the opposite" [11]. The prevailing of rebounding balance of fiscal position for EU monetary strategy is more important, than sustainability in finance system. And last one is the main reason of ineffectiveness of monetary transmission in EU and risen volatility in a capital markets.

If we will make some comments on National Bank of Ukraine (hereinafter – NBU) unconventional actions, we will get next conclusions.

At the period of anchoring hryvnia's rate the discount rate was set without assuming the objectives on meeting desired level of CPI and exchange rate passthrough into asset channel prices. But after restoring the stability in banking sector the worth of liquidity has been gradually lowered on 40 basis points, but it has not affecting into the rising of aggregate demand due to poor level of credit transmission channel in monetary mechanism in Ukraine (28.7% share of credit channel in 2011, and 4 % – in 2014, 3.9% – in 2016) [13] (fig. 3).

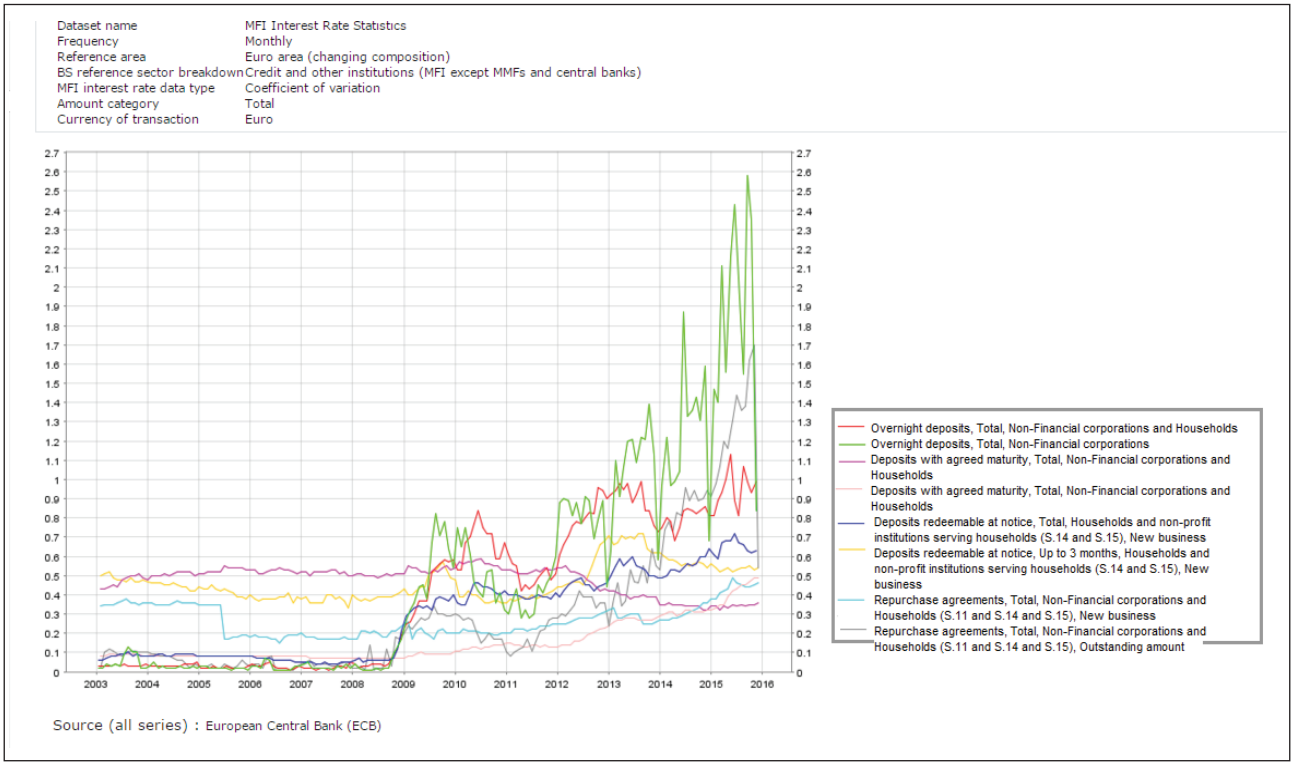

Fig. 2. The coefficient of variation of the deposit rate disperse within countries in EU

Source: European Central Bank (2016) [12]

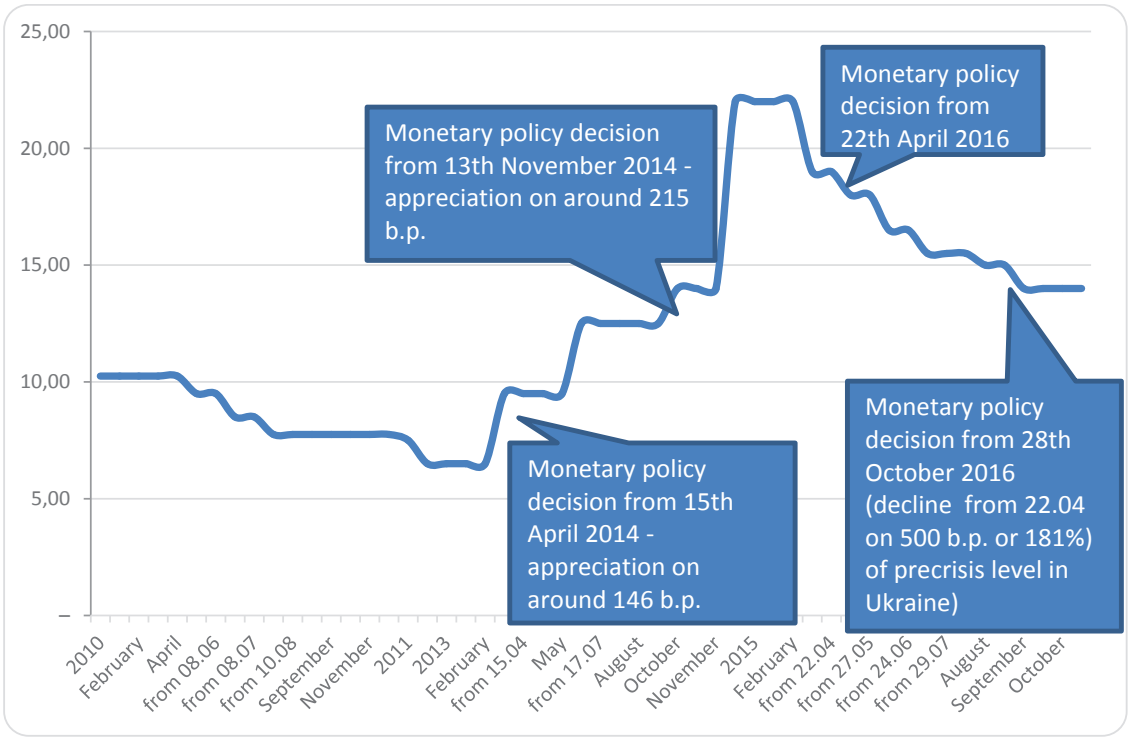

Fig.3. The dynamics of NBU's discount rate

Source: Monetary statistics of NBU (2016) [13]

Also, Lepushynskiy [5, p. 11-12] argued that low efficiency of monetary transmission was related to lack of flexibility in foreign exchange rate setting and therefore level of responsiveness of reaction function was very unpredictable and caused a very dispersive change in CPI level. But after political crisis in

2013-2014 at the beginning of 2014 NBU has made decision on putting foreign exchange rate in free-float with the record low level of international reserves with 26.4% of level in January 2017 and 19.9% of pre-crisis level [14]. That's why NBU had to rise discount rate on 338%. Now after implementing de-jure of the regime framework of inflation targeting the NBU has stabilized inflation at 13% and provided several cut rates, the schedule of which it can be seen at figure 3.

Although after such step of releasing foreign exchange rate pricing into free-float leads to more openness Ukrainian to external shocks, and especially negative interest rate policy of mature economies monetary authorities.

Main results. Thus, let consider how percent targets of ECB have been affecting the capital and equity market in European countries and one emerging country (in modeling is figured Ukraine example). We used approach as proposed by Stephane Dees (2016) in exercise for European countries suffered from sovereign debt crisis. from Ukraine was included with the aim to assess the influence from interest rate policy of European regulator on asset price channel in first one. EU is the second largest world market, neighbor, and strategic trade partner of Ukraine today with constant level of import share of 37% in October of 2016, which is exceeded CIS counties' stake of trade on 170% [12]. We make hypothesis that interest rate policy of ECB supports rising of net financial account in Ukrainian balance of payment, which further transmits to increasing of volume real estate building and due to poor aggregate demand in Ukraine nowadays it might be caused price slump in real estate assets and depreciation of hryvnia's exchange rate.

For that we have built system of VAR equations, which describes relationships between asset yield curve (Yt) and rates of OMTs, SMP, SLTRO (Supplementary Long-term Refinancing Operations) and VLTRO (Very Long-term Refinancing Operations):

$$Y_t = \beta_t \cdot MP\left[OMT_t, SMP_t, SLTRO_t, VLTRO_t\right] + \\ + \sigma\left(OMT_t, SMP_t, SLTRO_t, VLTRO_t\right)\varepsilon_t \quad , \quad (1)$$

where β – slope of endogenous variable, MP [OMTst, SMPt, SLTRt, VLTROt] – matrix missives from non-conventional liquidity injections.

We also has included for increasing LR statistics lagged values of residuals, thus we have obtained ARIMA(*p,t,q*) process. Therefore, we will use GARMA-CH process, where standard error will adjust biased estimators and make ones robust to heteroscedasticity.

So, the model will be transformed in a next way:

$$Y_t = \beta \cdot MP\left[OMT_t, SMP_t, SLTRO_t, VLTRO\_t\right] + \\ + \sum_{i=1}^{P} P_i^{p-i} \cdot \varepsilon_{t-i} + iu_i \quad , \quad (2)$$

This function will be an interest rate transmission link, which impulse furtherly will be included into regression of Ukrainian asset market. Assessments result will be shown in Result section.

Results. But this approach does not consider whether financial variables data set makes a significant contribution on changing real sector business cycle. In this way, we may use approach of Stephane Dees (2016), which extends research in this field in a next way: proposed model now includes additionally property prices, which comprises monetary and credit variables in terms of determining how is housing market capturing all the features of the financial cycle [2, p. 22-23].

Therefore, we will assess relationship between interest rate policy targets of ECB and Ukrainian capital movement tendency and next its influence on the asset price transmission.

Targeted in Ukrainian variable set asset prices series depend on euro area interests and capital movement into Ukrainian next sequence:

$$\begin{gathered} Y_t = -6.511 \cdot DF_{t-4} - 24.769 \cdot DF_{t-5} + 4.922 \cdot EONIA_{t-2} - \\ - 14.577 \cdot EONIA_{t-3} - 0.2198 \cdot MLF_{t-2} + 21.114 \cdot MLF_{t-3} + \\ + 8.212 \cdot PP_{EUt-1} + 0.531 \cdot PP_{EUt-2} - 12.216 \cdot SLTRO_{t-1} + \\ + 16.402 \cdot SLTRO_{t-2} + 2.230 \cdot VLTRO_{t-2} - 0.018 \cdot VLTRO_{t-3} - \\ - 0.405 \cdot NFA_{t-1} - 0.162 \cdot NFA_{t-2} - 0.089 \cdot DI_{t-1} - 0.005 \cdot DI_{t-2} \\ + 0.012 \cdot NEFER_{t-1} - 0.032 \cdot NEFER_{t-2} - 21.852 \end{gathered} \quad , \quad (3)$$

where DF_{t-i}, $EONIA_{t-i}$, MLF_{t-i}, PP_{EUt-i}, $SLTRO_{t-i}$, $VLTRO_{t-i}$, NFA_{t-i}, DI_{t-i}, $NEFER_{t-i}$ – respectively deposit facility, interest rate EONIA, marginal lending facility, property prices in 18 EU countries, supplementary long-term refinancing operation rate, very long term refinancing operation rate, net financial account of balance of payments in Ukraine, direct investment into Ukraine, t – time period, i – lag (i=1_2).

Estimation was done for 22 quarters from fourth quarter of 2010 year till to third quarter of 2016. Model was adequate in terms of unbiasness of estimators, consistency of chosen variable set (accordingly to ACF and LM test), and fulfilling statistical references. For this panel, it has been obtained next summarization. The estimation was conducted in R software, package "var" and "forecast".

In second quarter increasing spiral of the direct investment in 100 basis point causes the next consequent decreasing of 8.9 b.p. in asset prices in Ukraine. More quickly the net financial account reacts in downward movement on 40.5 b.p. in next quarter. Such effect supports by increasing rate of supplementary long-term refinancing, marginal lending facility and deposit facility in 1 % in first quarter after event and evokes next decreasing of asset prices in Ukraine on 12.216, 0.22 in next first, second quarters and 6.511 in fifth quarters respectively. Rising in third quarter of EONIA rate influences on a sliding of asset prices on about 14.6 %.

But If we consider effects on net financial account of a balance of payment in Ukraine, we will see that

increase in deposit facility rate will in third quarter reinforce deficit in financial operation result and in second quarter it will be widen on around 50%. Financial account balance will be risen on 27 times after 1% increase of flexible rate EONIA in next two consecutive quarters, further effect is eroding. Increase in property prices in European market leads firstly to growing inflows on financial operation on 26.7 % and then it moderates to a size of 4.2% per 1% of appreciation of real estate.

Very interesting fact that rising of asset prices in Ukraine provokes elevating of a worth of real estate in 18 EU countries on 12.2 basis point in second quarter and approximately 1.88% of depreciation in third quarter. Thus, it has proved that capital spillover in Ukraine strongly depends on interest rate policy persuaded by ECB and subsequently effects on future asset market appreciation. But it contradicts that fact of increasing of inward capital movement from wealth European countries capital provokes rising of asset prices' level in Ukraine.

But negative interest rates policy decision under such conditions still lead to depreciation of hryvnia's rate. Under decreasing deposit facility rate foreign exchange rate is devaluated on 53 times after 2 consecutive quarters. Therefore, our hypothesis is justified in place of devaluation of foreign exchange rate under risen financial capital inflow movements (fig. 4).

The size of heteroscedasticity of asset price channel has increased starting from 3 till 17 quarters and at 18th quarter it has been gone out. Also, we must consider that each percentage point of appreciation of asset prices affecting in 5.1 points of appreciation exchange rate of hryvnia, that it has proved an existing relationship between asset channel variable and foreign exchange rate of hryvnia.

If we will consider the time of response of an inward direct investment on an answer of appreciation of assets in Ukraine, we can experience that in sixth month after inward price trend at real estate market on each percent of appreciation will be obtained a 32.7 b.p. of gain in net direct investment position (fig. 5).

And we see controversial relationship if direct investment will rise at present time the asset prices in next two months will be declined in 31 b.p. That's why additional direct inward investments influence on reducing of asset prices and then transmits into devaluation of foreign exchange rate (fig. 6).

The financial account time series are considerably moving homogeneously and error only increases in 7 and then 11 quarters. Thus, internal factor autocorrelation relationship does not effect on asset price channel regression model (fig. 7).

The EONIA rate function has more homogenously distributed error, which increases from 6 to 9 quarter

Table 1

VAR model of interest rate policy of ECB transmission on Ukrainian asset market with lagged variable in 1 and 2 quarters[1]

Coefficient, standard error, t-statistics	Ukrainian variables			European variables					
	Yt	Net financial account (0)	Direct investment (0)	Deposit_ facility (-3)	EONIA (-1)	MLF (-1)	PROPERTY_ PRICES_IN_ EU_COUNTRIES(0)	SLTRO_ MRO(0)	VLTRO (-1)
Net financial account (-1)	-0.405 0.665 [-0.609]	-0.985 0.174 [-5.664]	0.048 0.147 [0.323]	0.021 0.001 [27.776]	0.003 0.045 [0.055]	0.035 0.013 [2.698]	0.166 0.244 [0.679]	-0.002 0.028 [-0.074]	-0.007 0.035 [-0.209]
Net financial account (-2)	-0.162 0.383 [-0.423]	-0.705 0.1 [-7.048]	0.209 0.084 [2.478]	-0,021 $4.000 \cdot 10^{-4}$ [-48.311]	-0.019 0.026 [-0.737]	-0.016 0.007 [-2.113]	0.097 0.14 [0.691]	-0.015 0.016 [-0.911]	-0.082 0.02 [-4.083]
Direct investment (-1)	-0.089 0.738 [-0.12]	-0.282 0.193 [-1.464]	1.29 0.163 [7.924]	-0.029 0.001 [-34.738]	-0.042 0.05 [-0.847]	-0.013 0.014 [-0.928]	-0.015 0.271 [-0.054]	0.011 0.031 [0.346]	-0.058 0.039 [-1.495]
Direct investment (-2)	-0.005 0.757 [-0.007]	-0.569 0.198 [-2.873]	1.711 0.167 [10.241]	-0.068 0.001 [-78.344]	-0.047 0.051 [-0.931]	-0.061 0.015 [-4.167]	-0.125 0.278 [0.452]	-0.047 0.032 [-1.48]	-0.097 0.03 [-2.467]
Intercept	-21.852 416.384 [-0.053]	-656.657 108.919 [-6.029]	947.629 91.913 [10.31]	-20.814 0.477 [-43.602]	-3.511 28.227 [-1.124]	-23.343 8.019 [-1.137]	2.203 0.056 [0.014]	-41.55 17.352 [-2.395]	21.601 21.716 [0.995]
R^2	0.928	0.999	0.999	0.999	0.977	0.993	0.973	0.942	0.977
Akaike informational criterion (AIC)	53.317	7.342	-23.859	-20.782	-18.417	-12.611	38.382	-20.952	35.694
Schwarz criterion (SC)	73.231	27.256	-3.944	-0.866	1.498	7.303	58.296	-1.037	-15.779

[1] ECB data warehouse [12], NBU website statistics [13–15] and author's estimation. In second line and squared brackets gives the standard error value and t-staticstics.

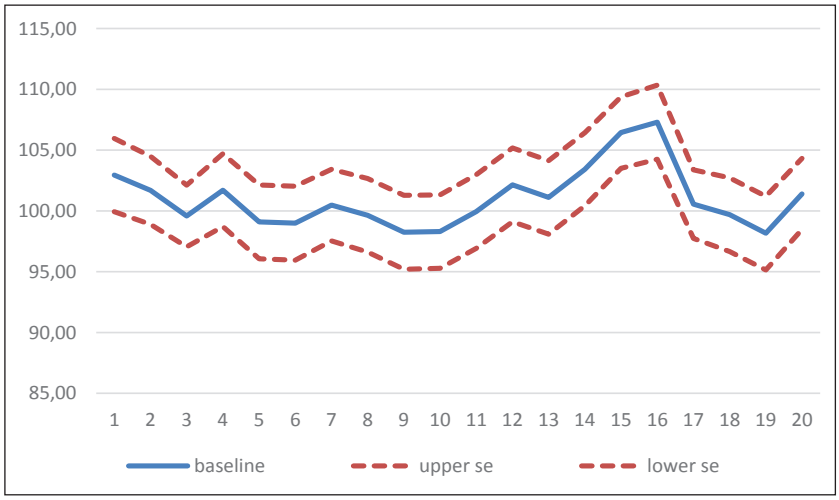

Fig. 4. Reaction function of asset prices in Ukraine in one standard error

Source: author's estimations

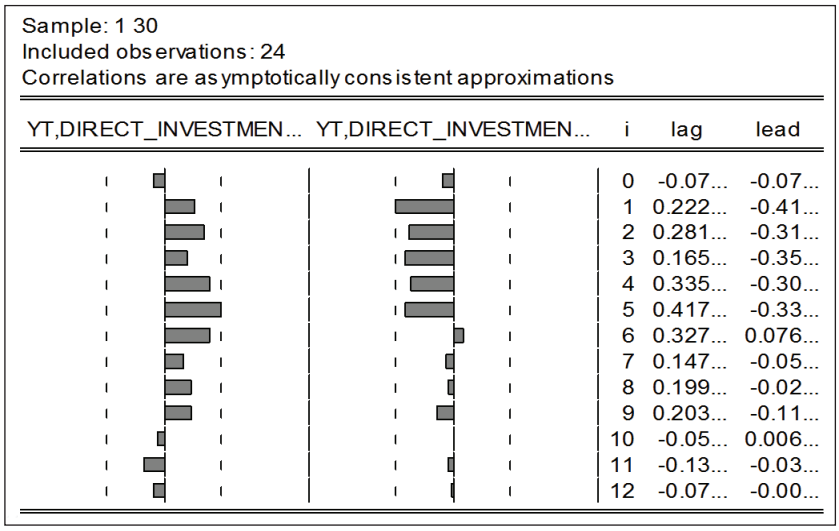

Fig. 5. Correlogram for asset prices in Ukraine and Direct inward investment data set

Source: author's estimations

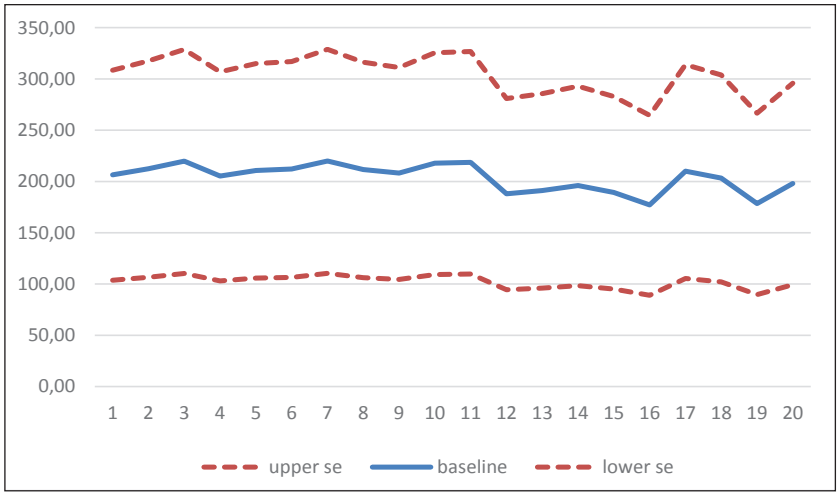

Fig. 6. Reaction function of net financial account in Ukraine in one standard error

Source: author's estimations

and then decreases at 11th quarter. Also, all interest rate panel has significant time drift, which will cause the cointegration in asset autoregression model. Using error-correction procedures of Engle (1987) and approach described in previous our investigation [4] such error variation can be overcome.

Conclusions. The relation between liquidity injection of ECB and capital spillover in emerging economy system is clear and demonstrates negative correlation in EU countries under sovereign stress and Ukraine and positive direction vector of yields movement in advanced countries. It is the cost of saving single currency model, where obtaining the convergence of finance indicators becomes increasingly complicated and produces new trade off in small open economies such as Ukraine, which is more depended from EU market. Under continuing movements in negative interest rates zone it might have been affected the inflows in net financial account and depreciation of hryvnia's exchange rate. Due to decreasing of purchasing power of economic agents in Ukraine the real estate price asset will be declined. Therefore, with aim to rebound finance balance in Ukraine next consequences must be considered and employed:

1. Gradually must be employed target on raising rate of the marginal lending facility with an aim to thinning lending margins in European countries under default pressure.
2. The further extension of the liquidity injection through asset purchase program will strengthen capital spillover between EU market and Ukraine.
3. Net financial account shifts will cause the depreciation of real estate market and effect on hryvnia's exchange rate devaluation.

Therefore, proposed VAR model will throw the light on effects caused by external capital market shocks in Ukraine and further transmission into foreign exchange transmission channel.

That is why European Central Bank must provide unconventional

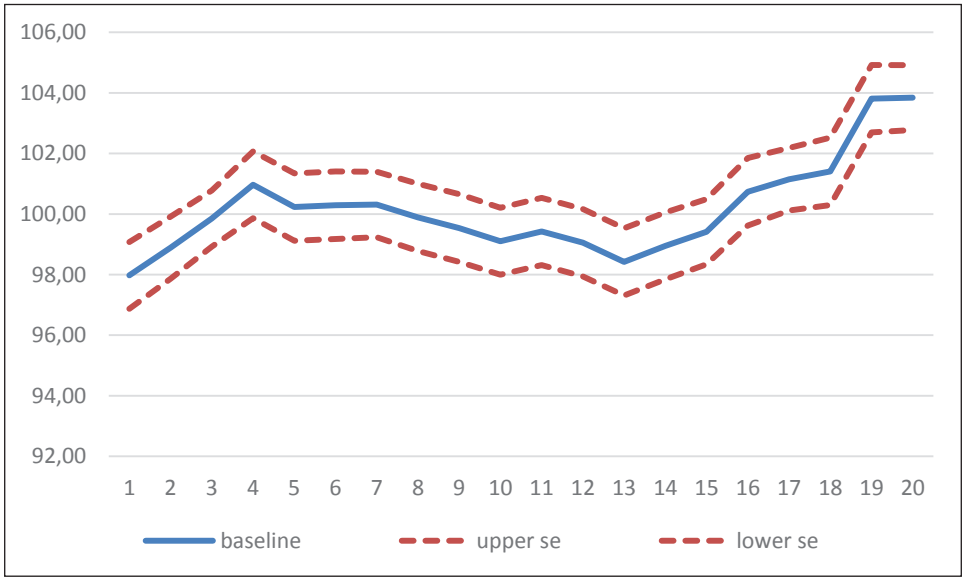

Fig. 7. Reaction function of EONIA in EU countries in one standard error

Source: author's estimations

monetary policy by setting such level of interest rates, that will transmit into lowering margin between wealth countries and countries of Euro area under sovereign stress. Furthermore, National Bank of Ukraine in an answer of such unconventional measurement taken by ECB must considered risk of additional appreciation pressure of hryvnia and that's why must ease the regulation limits on outflow of capital.

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