

JEL: F31, F32, F37

A. Zahariev, prof., PhD, Department of Finance and Credit at D. A. Tsenov Academy of Economics, Svishtov, Bulgaria

D. Kostov, assist. Prof. PhD, Department of Finance and Credit at D. A. Tsenov Academy of Economics, Svishtov, Bulgaria

THE PRICE OF CRUDE OIL AS A FACTOR FOR USD VOLATILITY

The area of research in the paper is the USD as the leading currency on the foreign exchange market, while the research problem – the crude oil price volatility as a factor with an effect on the USD exchange rate. The analysis focuses on the proposition that there exists a correlation between the price volatility of the petrol, as a strategic energy commodity and the USD as a global leading reserve currency. The purpose of this article is to present a contemporary perspective to the assessment of the price volatility of crude oil, as a leading external to the US economy factor that influences the USD exchange rate as a global reserve currency with a dominant role in the volume of transactions on world currency markets. The expected results are focused on the establishment of the level of correlation or/and co-integration between the volatility of crude oil prices and the USD volatility compared to a “basket” of currencies.

Key words: currency markets, USD, crude oil price volatility

Problem setting. The foreign exchange market is the basis for the functioning of the modern international and national financial systems. With its global continental positioning, reported daily turnover, 24-hour trading platforms and accessibility, the foreign exchange market is an attractive area for business and profit opportunities. The latest official three-year measurements of the Bank for International Settlements (before the disclosure of data from April 2016) report a 5.35 billion USD daily turnover in the global foreign exchange market for the year 2013, which is approximately equal to the world’s monthly GDP. In those turnovers, the USD still has the leading role as the global reserve currency. The dynamics of the USD exchange rate often puts to a test both officials, and institutional and individual investors. Apart from the dependence of the USD exchange rate on the data on the development of the US economy, there are other factors influencing the USD exchange rate including the price of crude oil as a strategic energy resource.

On that basis the research area of the present article is the USD as the dominant currency in the global foreign exchange market and the research problem - the price of crude oil as a factor to influence the volatility of the exchange rate of USD, incl. through the prism of the world's leading economy – USA. The focus of the analysis is the proposition that there exists a correlation between the price of crude oil as a strategic energy resource and the USD exchange rate as a global reserve currency. The purpose of this article is to present a contemporary perspective to the assessment of the price volatility of crude oil, as a leading, external to the US economy, factor that influences the USD exchange rate as a global reserve currency with a dominant role in the volume of transactions on world currency markets. The article is structured in two main parts. The first part focuses on the assessment of the role and the size of the US economy and its currency – USD – in the global foreign exchange and commodities trade. The second part explores the existence of a correlation, respectively, co-integration dependencies between the dynamics in the price of crude oil as a strategic energy resource, and the USD exchange rate, as the pricing currency for crude oil compared to a "basket" of currencies.

I. The USD and the US economy – are they still in dominant positions in the world?

The transactions and the operations in the foreign exchange markets are performed at national and global (international) level. The global foreign exchange market can be defined as a set of institutions, instruments, technical means of global communication, payment systems and rules for accounting and settlement by which the parties that supply and demand currency and currency

denominated financial assets perform counter transactions with exchange effects on an agreed date. A distinctive feature of the global foreign exchange market is its continuous operation. This operation can be established both in terms of the time and of the geographic territory (in time zones deviation relative to GMT) factors. The specific size of the daily turnover in the global foreign exchange market is in practice measurable with the monthly global GDP. The latest data released by the Bank for International Settlements in Basel, Switzerland is for a daily turnover in the global foreign exchange market of 5.345 billion USD (see Table 1) as of April 2013. In the measurement for 2016 it can be predicted to reach the level of over 7 billion USD daily turnover. The increase in daily turnover of currency trading in the global market for 15 years is 3.50 times.

Table 1**Global foreign exchange market turnover (In billion USD)**

	1998	2001	2004	2007	2010	2013	2013/ 1998
Foreign exchange instruments – total:	1527	1239	1934	3324	3971	5345	3,50
Spot transactions	568	386	631	1005	1488	2046	3,60
Outright forwards	128	130	209	362	475	680	5,31
Foreign exchange swaps	734	656	954	1714	1759	2228	3,04
Currency swaps	10	7	21	31	43	54	5,40
Options and other products	87	60	119	212	207	337	3,87

Source: BIS

Through global positioning of dealer offices in the world's financial centers, the banking institutions are able to provide their customers with 24-hour access to assets and financial instruments for sale and purchase of currency and foreign exchange assets. The leader in terms of reported daily turnover in the global foreign exchange market is the financial center and the capital of UK - London, which accounts for 40.9% of all daily exchange operation worldwide. The second position holds the USA with 18.9%. In the top five are also Singapore with 5.7%, Japan 5.6% and Hong Kong with 4.1%.

In terms of currencies, in which transactions are made, the leading position holds the USD (see Table 2) used in 87% of all foreign exchange transactions worldwide, followed by the EUR with a share of 33.4%, the JPY with a share of 23%, the GBP with a share of 11.8%. In the top ten of the most traded currencies also are the AUD (share of 8,6%), the CHF (share of 5,2%), the CAD (share of 4,6%), the MXN (share of 2.5%) and the CNY (share of 2.2% and growth from the 17th position in 2010 to the 10th position in 2013).

Table 2**Currency distribution of global foreign exchange market turnover**

	2004		2007		2010		2013	
	Share	Rank	Share	Rank	Share	Rank	Share	Rank
USD	88,0	1	85,6	1	84,9	1	87,0	1
EUR	37,4	2	37,0	2	39,1	2	33,4	2
JPY	20,8	3	17,2	3	19,0	3	23,0	3
GBP	16,5	4	14,9	4	12,9	4	11,8	4
AUD	6,0	6	6,6	6	7,6	5	8,6	5
CHF	6,0	5	6,8	5	6,3	6	5,2	6
CAD	4,2	7	4,3	7	5,3	7	4,6	7
MXN	1,1	12	1,3	12	1,3	14	2,5	8
CNY	0,1	29	0,5	20	0,9	17	2,2	9
NZD	1,1	13	1,9	11	1,6	10	2,0	10
...
Общо	200,0		200,0		200,0		200,0	

Note: Because two currencies are involved in each transaction, the sum of the percentage shares of individual currencies totals 200% instead of 100%; The bases for calculation is "net- net".

Source: BIS.

The analysis of the global trends in currency transactions and the operations logically focused attention on the world's leading currency – the USD, which acts as a global reserve currency. The term "reserve currency" itself refers to the national currencies which in performing international money functions serve as official reserves in foreign currency of other governments and are kept in significant amounts as assets on account or in the form of investments in securities denominated in the corresponding reserve currency.

The leading role in the "family" of global reserve currencies plays the USD, followed by the EUR, GBP, CHF and the YPY. As of the year 2016, with the inclusion of the SDR in the "basket", the Chinese yuan has also acquired the status of a world reserve currency. The Australian dollar, the dollar of New Zealand and the dollar of Canada are considered to have "quasi" reserve currency features.

Until September 11, 2001 the dollar was considered to be one of the safest and most preferred reserve currencies, equivalent to the so-called "safety currency". A number of studies establish a trend for negative correlating of the rate of the dollar against the movement of the prices of the investment gold. This gives most of the major economies arguments to make a decision to peg their exchange rates to the dollar. An example of this is China, which has repeatedly changed the mode of determining the exchange rate over the last decade. In case the stock market quotes of the shares of the leading companies go up, the foreign investors are firmly attracted by the favourable investment opportunities. The USA are a positive example for a quick recovery of a capital market after the bankruptcy of Lehman Brothers.

The dominant role of the USD as a reserve currency and a participant in the major currency "pairs" in forex trading is a logical consequence of the share and the contribution of the US economy in the global GDP.

Table 3**GDP at market prices (current US\$) / (in billion USD)**

Country	2011	2012	2013	2014	2014/2011
USA	15517,9	16161,2	16768,0	17419,0	1,1225
China	7492,4	8461,6	9490,6	10354,8	1,3820
Japan	5905,6	5954,5	4919,6	4601,4	0,7792
Germany	3757,4	3539,6	3745,3	3868,3	1,0295
France	2865,2	2681,4	2810,2	2829,2	0,9874
UK	2594,9	2630,4	2712,3	2988,9	1,1518
Brazil	2614,6	2460,7	2465,7	2416,6	0,9243
Russian Federation	1904,8	2016,1	2079,0	1860,6	0,9768
Italy	2278,1	2074,6	2133,6	2141,2	0,9399
India	1835,8	1831,8	1861,8	2048,5	1,1159
Total top 10	48777,7	49823,9	50999,1	52542,5	1,0772
World	72660,3	74221,4	76338,9	77960,6	1,0729
Top 10/World	67,13%	67,13%	66,81%	67,40%	
USA/World	21,36%	21,77%	21,97%	22,34%	

Source: The World Bank

The data for the global GDP identify the USA as a leading economy. Its GDP at current prices for 2011 exceeds twice that of the second economy in the world - China, though by 2014 the ratio of the first two economies is now only 1.68 times for the United States (see Table 3). For the period 2011-2014, the top 10 economies produce between 66.81% and 67.40% of the global GDP. The US economy has a leading share of 22.34% in 2014. The increase in the global GDP for the studied period is 1.0729 times and it follows the growth of the top 10 economies, which is 1.0772 times. The group of the ten leading economies includes five countries with positive growth: China, UK, USA, India and Germany. The remaining 5 economies have reported a reduction in their annual GDP, Japan reporting the most degraded performance.

Table 4

Top U.S. Trade Partners, Total Import Value for Goods (2011;2015)

2011			2015		
Country	Import (mln. \$)	Import	Country	Import (mln. \$)	Import
China	417303	18,4%	China	481881	17,4%
Canada	319101	14,1%	Canada	295190	10,7%
Mexico	265347	11,7%	Mexico	294741	10,7%
Japan	132442	5,9%	Japan	131120	4,7%
Germany	100393	4,4%	Germany	124139	4,5%
Korea	58580	2,6%	Korea	71827	2,6%
UK	52058	2,3%	UK	57805	2,1%
Saudi Arabia	48760	2,2%	France	47644	1,7%
Venezuela	43863	1,9%	India	44741	1,6%
Rest Asia	42651	1,9%	Italy	44005	1,6%
Total	2263619	100,0%	Total	2763374	100,0%

Source: U.S. Department of Commerce, UN Comtrade

The USA is the third largest exporter in the world. The country exports in the largest volume industrial supplies (34% of total exports) and capital goods (33%). About 9% of its export accounts for food, animal feed and beverages, another 9% - for vehicles, parts and engines, while exports of consumer goods amount to 12%. Its major trading partners (see Table 4 and Table 5) in commodities trade are Canada, Mexico, China, Japan, Britain and Germany, both in terms of exports and imports. The data on its imports, however, clearly show that the traditional crude oil exporters as Saudi Arabia and Venezuela drop out of the top ten importers in the United States. This can be explained not only by the "revolution" in technology in extracting crude oil in the US from own shale deposits, but in the global trend towards a decrease in the price levels of crude oil, measured in USD / Barrel. Thus, ceteris paribus, at the same volume of crude oil imports in the US, a decrease in stock quotes by 50% would lead to a reduction in the reported value of imports, measured in USD also by 50%. This will respectively be reflected (as a decrease) in the export data on the crude oil exporters and on their revenues in USD from this export.

Table 5

Top U.S. Trade Partners, Total Export Value for Goods (2011;2015)

2011			2015		
Country	Export (mln. \$)	Export	Country	Export (mln. \$)	Export
Canada	280710	19,0%	Canada	280327	18,6%
Mexico	197544	13,3%	Mexico	236377	15,7%
China	103878	7,0%	China	116186	7,7%
Japan	66160	4,5%	Japan	62472	4,2%
UK	55939	3,8%	UK	56353	3,7%
Germany	48779	3,3%	Germany	49947	3,3%
Korea	43505	2,9%	Korea	43499	2,9%
Brazil	42943	2,9%	Netherlands	40706	2,7%
Netherlands	42826	2,9%	Hong Kong	37147	2,5%
Hong Kong	36489	2,5%	Belgium	34790	2,3%
Total	1481682	100,0%	Total	1504914	100,0%

Ever since the eighties of the twentieth century, the USA has constantly reported deficit in the trade balance, which is particularly strong in the last decade due to higher imports than exports of goods and services. The last five years have also been no exception, as this deficit is formed mainly by the trade with China, Japan, Germany, Mexico and Saudi Arabia. The United States have recorded trade surpluses in the trade with Hong Kong, Australia, the Netherlands and Belgium.

Table 6

Basic indicators of the US economy

Year	Inflation	CPI	Unemployment rate
2010	1,64%	218,055	9,30%
2011	3,16%	224,939	8,50%
2012	2,07%	229,594	7,90%
2013	1,47%	232,957	6,70%
2014	1,62%	236,736	5,60%
2015	0,12%	237,017	5,00%

The most significant macroeconomic indicators, important for the behavior of traders in currency pairs that involve USD may include: data on the number of employed; the index of consumer prices (see Table 6); the index of producer prices; the dynamics of the gross domestic product; the data on international trade; the index of labor costs; the industrial production; the index of consumer confidence; the retail sales; the data on international capital flows, the data on employment, respectively, unemployment.

Data publication has an immediate effect on the behavior of foreign exchange dealers and on the transactions on the "spot" and the "forward" markets. Of significant importance for the trading in currency pairs involving the USD is the so-called dollar index (U.S. Dollar Index, USDX). It is used as an indicator of the strength or the weakness of the US currency. The interest rate differential between the US Treasury Bills and the bonds of other countries is also considered by the professional traders in FX to be indicative. Its dynamics is a strong indicator of the potential changes in the exchange rate of the USD, as the American market is the world leader and the investors monitor and evaluate the profitability the American assets provide. The US dollar is also a leading currency in the pricing in the markets for strategic raw materials, metals and foods. Among the strategic raw materials a particular role has crude oil as a leading energy resource, which geographically divides the world into two major groups: countries, that are net crude oil exporters and countries that are net users (importers) of crude oil. In this regard the European Union as an issuer of the EUR currency and the USA as an issuer of the USD currency suffer certain effects (fiscal, inflation and macroeconomic) from the price dynamics of crude oil, measured in USD in light of the rapidly changing exchange rate of the currency pair "USD / EUR".

II. The USD and the crude oil price volatility – a correlation analysis

Any investigation of the relationship between crude oil prices and the USD can probably start with the axiom that crude oil is quoted in dollars, which has some normative and psychological effect on the market of both variables. These effects shed some light on the relationship between crude oil prices and the US dollar, but do not thoroughly elucidate all its aspects. In search of price correlation between the dollar and crude oil through econometric analysis below, we will determine whether and to what extent there is a strong dependence (reverse), the power of which is however changed in the recent years as a result of some significant events of economic, technological and political nature.

On the world commodity exchanges crude oil is quoted in US dollars. But what are the "channels" through which this determines the relationship between the two variables? First, any change in the nominal price of crude oil in USD, should be reflected in the nominal value in all other currencies. This inevitably leads to a certain "pressure" on the bilateral exchange rates between the US dollar and these currencies. Second, there is inverse proportion related to the effects on the crude oil exporters and their pricing policy. Any depreciation in the value of USD at unchanged nominal price of crude oil will lead to a decline in the real price of crude oil and its "purchasing power", which encourages exporting countries to increase compensatory the nominal price of crude oil. This channel of influence is largely connected with the monetary policy of the

Federal Reserve, which through devaluation or revaluation of the dollar, can affect the price of crude oil. Another important channel is connected with the opposite point of view - the impact of crude oil prices on the US economy, which is a net importer. An increase in the real prices of crude oil creates an inflationary pressure on the US economy, which ceteris paribus should lead to a decline in the dollar. Last, but not least, is the impact of crude oil prices on the currencies of the exporting countries. The increase or the decrease in their relative value as a result of the prices of the exported crude oil on the balance of payments of these countries will have an impact on the bilateral exchange rate between the currencies of these countries and the US dollar (for example, the Russian ruble has been steadily losing its value in the recent years which coincides with the collapse of crude oil prices).

In an attempt to explore the issue thoroughly, authors like Aloui, Aiss & Nguen using copula-Garch to examine the conditional interdependence between the exchange rate of the US dollar and the price of crude oil for the period 2000-2011 have found out that there is a symmetrical and inverse proportion for all investigated currency pairs. Beckman, Berger & Czudaj in an article from 2014 examined the issue in the period from 2003 to 2013, the divide being the bankruptcy of Lehman brothers. The authors found that over time the relationship is strengthened and also that extreme price events occur symmetrically in both series.

Table 7

Empirical research guidelines

		Period		
		Prior to 2011	After 2011	
Data frequency	Monthly	Complete period	Complete period	Table 8
	Weekly	Complete period	Complete period and year by year	Table 9.1 Table 9.2

Table 8

An analysis of monthly data for crude oil prices and USD correlation

Descriptive statistics and interdependency: monthly data				
	1995 to 2011 (T=205)		After 2011 (t=52)	
	Crude oil WTI nominal	U.S. Dollar Broad Index	Crude oil	U.S. Dollar
Maximum	133,88	114,82	106,57	101,24
Minimum	11,35	80,471	30,32	83,217
Mean	36,62	94,984	79,767	88,445
Standard deviation	26,705	7,7883	24,962	5,5539
Coefficient of variance	0,72923	0,07903	0,31293	0,062795
Correlation coefficient/ p-value	-0,36611851	0,0000	-0,96216952	0,0000
Co-integration				
Unit root test p-value	0,9513	0,4455	0,7963	0,5634
From co-integration regression				
Intercept	98,8943 / 8,43e-284 ***	155,859 / 1,95e-017 ***	462,242 / 1,02e-033 ***	105,521 / 1,19e-067 ***
betha	-0,106777 / 2,49e-011 ***	-1,25535 / 2,49e-011 ***	-4,32444 / 6,77e-030 ***	-0,214079 / 6,77e-030 ***
Unit root test in residuals p-vau	0,5948	0,9562	0,5181	0,4751
	=> not co-integrated		=> not co-integrated	

Beckman и Czudaj explore two new aspects of the problem, namely non-linear movements and the difference between real and nominal values and relationships. They analyze monthly data for the period from 1974 to 2011, using a wide exchange index for the exchange rate of USD, representing a weighted average of the rates of a big number of currencies against the US dollar. The authors test several hypotheses, including: (1) The nominal effective exchange rates and the nominal crude oil prices are co-integrated; (2) The prices in the US and nominal crude oil prices are co-integrated; (3) The real effective exchange rates and the nominal crude oil prices are co-integrated. The results obtained do not confirm hypothesis 1, but prove hypotheses 2 and 3.

Table 9

Analysis of weekly data before and after the year 2011

Table 3.1. Descriptive statistics and interdependency: weekly data				
	1995 to 2011 (T=887)		After 2011 – Complete (T=230)	
	Crude oil	U.S. Dollar	Crude oil	U.S. Dollar
Maximum	142,52	130,06	108,77	125,6
Minimum	11	89,339	28,14	97,965
Mean	45,917	109,38	79,434	107,05
Standard deviation	28,947	10,283	24,965	8,4535
Coefficient of variance	0,63042	0,094011	0,31429	0,078967
Correlaion coefficient/ p-value	-0,46276693	0,0000	-0,95384862	0,0000
Co-integration				
Unit root test p-value	0,4883	0,5717	0,8328	0,976
From co-integration regression				
Intercept	116,931 / 0,0000 ***	188,407 / 2,18e-076 ***	132,708 / 9,98e-275 ***	380,989 / 2,80e-142 ***
betha	-0,164395 / 2,81e-048 ***	-1,30268 / 2,81e-048 ***	-0,322986 / 4,18e-121 ***	-2,81692 / 4,18e-121 ***
Unit root test in residuals p-vauae	0,435	0,5552	0,3369	0,2635
	=> not co-integrated		=> not co-integrated	

Based on the review of the cited studies, we can make several conclusions. First, most of the the studies cover the period until the end of 2011. Second, they have mostly used monthly data. Third, there was no breaking of the period of investigation into sub-periods, which is a basis for a comparative analysis of the dynamics of the studied lines and the relationship between them. Fourth, the efforts are focused mostly in two directions: (1) identifying the presence of dependence, its type and its power (using co-integration analysis); (2) establishing the direction of the relation (by Granger causality test). So several avenues for further research can be outlined, and namely: (1) a description of the dynamics of prices using their average, maximum and minimum values as well as variability indicators; (2) an analysis of data in the period after 2011; (3) an analysis of data of a different frequency. (See Table 7). The purpose of the present study is primarily to identify and describe interdependencies (by calculating the coefficients of correlation and co-integration analysis), while setting its direction is the subject of future research work. The systematized data is on the prices of crude oil in the US for the period 1995-2015 (a total of 257 observations). For the movements

in the USD exchange rate we have used the wide index of the USD exchange rate (weighted currency basket of the currencies of a wide range of US trading partners) calculated by the US Federal Reserve.

Table 10

Analysis of the period after 2011 by years and on a weekly basis

Descriptive statistics and interdependency: weekly data								
After 2011 – By year								
	2012 (T=103)		2013		2014		2015	
	Crude oil	U.S. Dollar	Crude oil	U.S. Dollar	Crude oil	U.S. Dollar	Crude oil	U.S. Dollar
Maximum	107,52	103	108,77	103,25	107,23	111,18	60,07	122,94
Minimum	80,23	97,965	88	98,664	55,58	101,9	35,78	111,18
Mean	94,217	99,833	97,776	100,98	93,744	104,12	49,022	117,11
Standard deviation	7,6729	1,3357	5,4694	1,1138	12,935	2,5746	6,6729	3,1686
Coefficient of variance	0,081439	0,01338	0,055938	0,01103	0,13798	0,024726	0,13612	0,027058
Correlaion coefficient/ p-value	-0,545876	0,0000	0,49163302	0,0002	-0,9652198	0,0000	-0,75046749	0,0000
Co-integration								
Unit root test p-value	0,09602	0,4779	0,3152	0,1932	0,9621	1	0,84	0,6875
From co-integration regression								
Intercept	108,044 / 1,45e-066 ***	216,744 / 8,99e-010 ***	91,1914 / 8,43e-039 ***	-146,006 / 0,0194 **	122,132 / 8,04e-073 ***	598,687 / 6,28e-035 ***	134,576 / 1,16e-049 ***	234,100 / 5,46e-014 ***
betha	-0,101372 / 0,0002 ***	-1,24082 / 0,0002 ***	0,100120 / 0,0002 ***	2,41414 / 0,0002 ***	-0,192112 / 2,22e-031 ***	-4,84950 / 2,22e-031 ***	-0,356360 / 9,81e-011 ***	-1,58043 / 9,81e-011 ***
Unit root test in residuals p-vaue	0,7304	0,2343	0,2397	0,4691	0,0004535	0,0004976	0,5008	0,5386
	=> not co-integrated		=> not co-integrated		=> co-integrated		=> not co-integrated	

The analysis of the interdependence between the surveyed lines for the period before 2011 can be seen in Tables 9 and 10. It is made for two purposes. First, by analyzing the monthly data we aim to confirm the validity of the findings in the study of Beckman and Czudaj. As the results also coincide - namely indicate the presence of a correlation, but a lack of co-integration, we can consider the methodology to be approbated. Secondly, the analysis of the weekly data aims to find a difference in the results which could be due to a change in the frequency of the data.

The comparison between the values before and after 2011 on the monthly basis shows strengthening the dependency (the correlation coefficient of -0.3661 falls to -0.9621, which is actually a perfect inverse proportion). The sign of dependency is also in line with the earlier studies.

Significant differences in the frequency of the data for the period before 2011 are not found, either. (see. Table 9). However, the survey for the period after 2011 by years on a weekly basis (see. Table 10) reveals two interesting moments. First, while for the entire period we have found close to perfect negative correlation, within the period we can see the dynamics of the correlation coefficient, including to significant positive values (in the year 2013). Second, only in 2014 there is a positive co-integration between the lines (using the Engle-Granger testing approach lines that are separately non-stationary (p-value not

significant) have been co-integrated, but the remainders from the regression between them are stationary (p-value significant)). To some extent we observe the following phenomenon - with increasing the volatility of the lines in the years following 2011, the relationship between them also grows.

Conclusions. The US dollar is a main global reserve currency, the US economy holding a leading position and contribution in the structure of the global GDP. Besides the macroeconomic factors, the price dynamics of the strategic raw materials, led by the crude oil prices, have an effect on the market quotes of the USD. Numerous studies on time series of monthly and weekly data confirm the correlation between the value of the USD as measured against a "basket" of currencies and crude oil prices. This article confirms, using data until the year 2015, the existence of this relationship, despite the significant decline in the price levels of crude oil and the "revolution" in crude oil production in the US from shale deposits. Based on the results of empirical research we can arrive at the conclusion that there is an inverse relationship between the exchange rate of the US dollar and the price of crude oil. It is maintained in the period after 2011, too, exhibiting a strengthening, shown by the approximation of the correlation coefficient to perfect negative, which confirms the formulated proposition and provides the basis for future work in establishing the direction of influence between the two studied variables.

LITERATURE

1. Aloui, R., M. Aissa, D. Nguen. Conditional dependence structure between crude oil prices and exchange rates: A copula-GARCH approach. // *Journal of International Money and Finance*, 2013.
2. Beckman, J., T. Berger, R. Czudaj. Crude oil price and FX-Rates Dependency. // *Quantitative Finance*, 2016, N 3.
3. Beckman, J., R. Czudaj. Crude oil prices and effective dollar exchange rates. // *International review of Economics and Finance*, 2013.
4. Lizardo, R., A. Mollick. Crude oil price fluctuations and U.S. Dollar exchange rates. // *Energy Economics*, 2010.
5. Moffet, M., Stonehill, A. and Aiteman, D. *Fundamentals of Multinational Finance*. Pearson, 2006.
6. Patev, Pl. *International Financial Management*. V. Tarnovo, ABAGAR, 2012.
7. Pavlov, Ts. Application of Behavioral Finance in Modeling Bulgarian Equity Risk Premium. // *Business Management*, 2015, vol. 2, AI Tsenov, 2015, pp. 89-120
8. Prodanov, St. and Pavlov, Ts. Comparative Analysis of the Leading Consumption-Based Asset Pricing Models. // *Narodnostopanski arhiv*, 2016, volume 1, pp. 20-46.
9. Zahariev, A. The Gold Reserves and National Deficits. // *Narodnostopanski arhiv*, 2012, volume 1, pp. 26-40.
10. Zahariev, A. *Debt Management*. V. Tarnovo, ABAGAR, 2012.
11. Zahariev, A. The global FOREX market and the reserve currencies – macrofinancial aspects. // *Almanach "Scientific Research"*, Svishtov, 2015, pp. 119 – 146
12. Institutional Data Sources via Internet