Scinetific Review Paper

Carry Trade as a Speculative Investment Strategy in Serbia*

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Summary:
This paper is analyses causes and the consequences of a speculative investment carry trade strategy in the exchange market in Serbia. The presence of such type of investor is related to high yields of risk free securities denominated in dinars, as well as the perception of future movements of dinar exchange rate related to currency that serves as source of investment. The consequences of carry trade may significantly influence exchange rate movements when monetary policy has limited facilities to combat negative and sudden shocks.

Key words:
carry trade, exchange rate, monetary policy, government debt securities.

Rezime:
U radu su analiziranu uzroci i posledice primene špekulativne carry trade strategije na deviznom tržištu u Srbiji. Pojava ove vrste investitora se vezuje za visoke kamate na nerizične finansijske instrumente denominovane u dinarima, kao i percepciju budućeg kretanja deviznog kursa dinara u odnosu na valutu iz koje se ova vrsta investicije finansira. Posledica ove strategije mogu znatno da utiču na kretanje deviznog kursa kada monetarna politike ima ograničene mogućnosti da deluju ne tržištu radi suzbijanja negativnih i naglih šokova.

Ključne reči:
carry trade, devizni kurs, nepokriveni kamatni paritet, državne obveznice, repo operacije, rizik

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1. INTRODUCTION

Relatively small changes of exchange rate and considerable difference in interest rates triggered the world wide implementation of different speculative strategies such as carry trade (herein after: CT). The effects of CT are usually very significant, especially in countries with small but open economies. In such setting, the capital inflow from abroad on domestic exchange rate market necessary cause the appreciation of domestic currency. However, the duration of appreciation depends on favorable conditions for implementation of CT strategy. CT investors are very sensitive to each and every change that can jeopardize their long position in domestic currency; therefore the negative information from the market can turn them towards the exit strategy. One of the characteristic of CT investors is hoarding, that is related to following the investment strategy of some big investors with renown. Hoarding can be attributable to inflow of CT, as well as to outflow. This point that CT has shock effects, which is very important in unexpected leaving investors from the exchange market. In such uncertain environment, the attack on exchange rate can be to such extent that policy makers are unable to react due to limited scope of monetary policy instruments.

This paper will analyze causes and consequences of CT in small and open economy. First part of the paper will analyze theoretical aspect of CT strategy. Second part will present the Republic of Island experience, which is commonly referred as the most outstanding example of CT, and its effect on Republic of Island economy. Third part deals with reasons behind CT activities in Serbia, the effect of CT and possible consequences for dinar exchange rate.

2. CT AS THE STRATEGY ON EXCHANGE MARKET

CT is the investment strategy where investor takes short position (borrows) in currency with low interest rate and invests in currency with higher yield. The potential profit from strategy has two sources: the interest rates differences known in advanced and uncertain movements of the exchange rate during the maturity of the investment. This can be expressed with following formula:

$$y = i_H - i_L - \Delta s$$

Where *s* is log of the exchange rate, so the bigger the value the high yield currency weakens, i_H is interest rate on high yield currency, and i_L is interest rate on low yield currency. In order to be profitable strategy, two currencies must have different sovereign rating as well as the risk related. The profitability of CT is exactly the indication of deviation of uncovered interest rate parity (herein after: UIP). UIP defines that differences in interest rates of risk free financial instruments, denominated in foreign and domestic currencies, is equal to the expected rate for foreign currency to depreciate against domestic currency. If this condition exists, investor who implements CT expects zero yields. The motivation for CT investor is that UIP does not stand in practice. [1]

The equation of UIP can be defined as:

$$E(\Delta s) = i_H - i_L \qquad \textbf{(1)}$$

Regardless of yields on different currencies, it is expected that movements of the exchange rate will balance the yields. This relationship was first tested by Fama, estimating the following equation using the currencies of most developed G10 countries with similar low sovereign risk:

$$\Delta(s) = \hat{\alpha} + \hat{\beta}(i_H - i_L) + \varepsilon \qquad \textbf{(2)}$$

In case that UIP applies, then $\alpha = 0$, $\beta = 0$. Fama (1984) and other authors that tested this equation obtained negative coefficient for β. It means that high yield currency tends to appreciate against the low yield currency, so CT is profitable on long run. This phenomenon is also called the UIP puzzle and has triggered many economists to analyze its characteristics. Nevertheless, CT is very applicable strategy in the exchange market and can be a crucial factor in the process of the formation of target currency exchange rate. [1]

3. ISLAND AS AN EXAMPLE OF NEGATIVE EFFECTS

In recent literature the Republic of Island experience is referred as the most prominent example of negative CT effect. The so called geyser crisis had two sources: the aggressive international expansion of the investment banking and overheating of domestic economy followed by enlarging the speculative bubble caused by CT activities. Island banking sector was somewhat different from the rest of Europe due to its quite forceful international expansion, predominantly focused on corporate and investment banking. Domestic deposit base was too small serve as the

source for such escalation. Three biggest banks, due to high-quality sovereign rating, had easy access to finance in international money market. Moreover, in 2005 these banks issued securities with value of 15 billion Euros, which was higher than GDP of Island. A special feature of Island banking sector that it was financed by 2\3 from abroad and that the capital was placed on domestic market as well as in Scandinavian countries and Great Britain. [2]

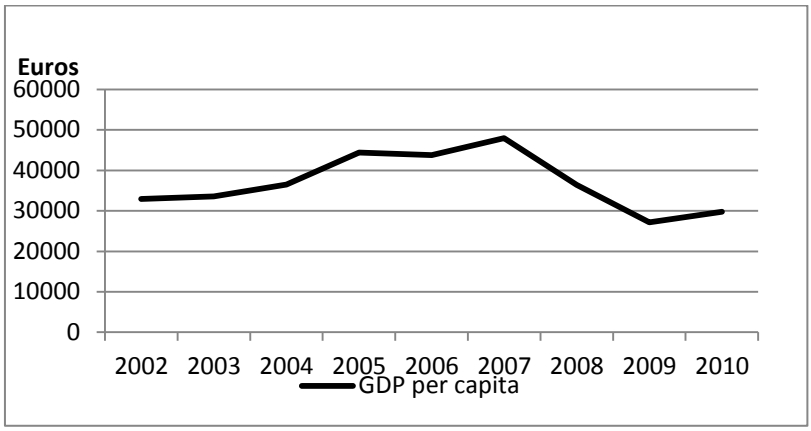

Figure 50. GDP per capita in Iceland, [3]

The problems for small and open economy Island economy started in 2003 and were caused by three important factors: massive energy project financed by foreign investments, quantitative easing of monetary policy and privatization of banking sector followed by credit expansion. Each one of these factors was sufficient to activate overheating of small and open economy, but the combination of the three headed it to a boiling point. By the end of 2005 interest rates doubled, stock exchange index ICEX grew by four times, whereas real estate prices in Island's capital doubled for the same period. [2]

In 2001, Island central bank (herein after: ICB) adopted new monetary policy regime of inflation targeting and was determinant to keep inflation rate within the targeted range. According to the circumstances during 2004, ICB gradually increased key interest rate which caused the rise of the interest rate in financial markets. In small and open economy, the increase of the interest rate as a reaction to economy overheating can be contra productive, because it attracts short term speculative capital that leads to currency appreciation. By the end of 2005, key interest rate was around 10.5% which was much higher than interest rates on Euro and US dollar on international money market. This attracted CT investors to Island market. Sudden increase of CT activity in Island is related to the appearance of so called "glacier bonds" which were denominated in Island koruna, but were

sold to investors outside Island. The concept was the following: the issuer buys domestic bonds or secures interest rates with swap contract, than repackage to issue a new bond denominated in Icelandic koruna that was guaranteed by financial institution with high AAA rating. The repackaged bonds had 2-3% lower yields than the underlying Icelandic assets. Therefore, the issuer would receive a high spread. [2]

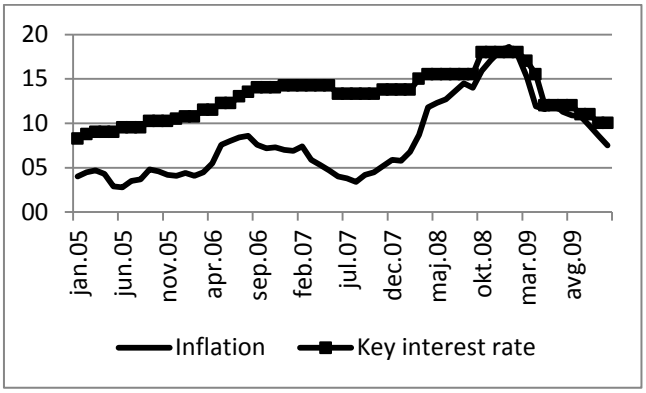

Figure 51. Inflation and Key Interest rate Development [3]

The appreciation of koruna at that time was favorable for ICB, and there was a widely spread opinion that CT investors worked in favor of the macroeconomic stability of Island.

Next figure presents the movement of koruna exchange rate against three low yield currencies; US dollar, Euro and Swiss franc.

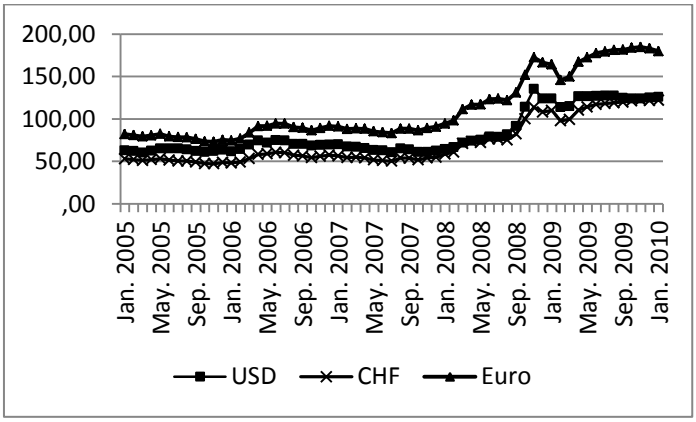

Figure 52. Development of Exchange rates [3]

Furthermore, according to theoretical postulates currency appreciation should calm the overheating of the economy by rising export prices and directing domestic demand to imported products. However, already at begging of 2005 Island experience showed exactly the opposite. The central bank high interest rate policy aimed towards restraining the inflation was not efficient and led country to inevitable currency crisis. Under the circumstances, domestic corporations had two choices. One was to accept two digit inflation rates or to borrow in foreign currency taking the exchange rate risk. Both scenarios carried significant risk, but speculative activities in the market continued to increase.

In such difficult economic conditions, the objective of the central bank is to create sufficient foreign currency reserves to protect itself from rapid currency depreciation as well as from likely negative macroeconomic effects. Despite the chances to form sufficient level of foreign reserves, ICB did not increase foreign currency reserve and was left without a crucial tool which would allow it to intervene on the exchange market and avoid rapid weakening of koruna. At the end of 2008 and the beginning of 2009, when financial crisis reached its peak, the abrupt koruna depreciation was inevitable. The huge foreign debt, mostly created by financial institutions, was eight times bigger than Icelandic GDP. This amount of foreign debt was caused by the fact that domestic banks did not secure their lending to corporate and household sector through counterbalanced formation of the domestic deposit base. Big exposure of banks was the main reason for rapid collapse of banking sector at the very beginning of global financial crisis in 2007. One of the main characteristics of CT investors is their sudden withdrawal even at the first signal of system instability. Therefore, already at the beginning of 2008 there was an immediate capital outflow from Icelandic financial market and consequently currency depreciation. In addition to banking sector collapse, CT was the important cause of financial crisis occurrence in Island.

4. CARRY TRADE IN SERBIA

The emergence of CT investors in Serbia follows the investing in repo operation of National bank of Serbia (herein after: NBS) and Treasury Bills. Namely, the main market participants are foreign investment banks and foreign investment funds which invest in repo operation and government securities through domestic custody banks. Furthermore, investors arrange currency swaps with commercial banks which are another type of CT activity in Serbia. However, it should be noted that precise identification of CT activity is particularly complicated, but there are some data sources that could indicate its presence. With regard to the availability of public data, in

this analysis it is possible to follow activities on foreign exchange market, development of repo stock and treasury bills.

High interest rate on repo operation and treasury bills is strong motivation for investing money. Although repo operations are primarily a monetary policy instrument for keeping inflation rate within the targeted range, the efficiency of such instrument is disputable in situation where commercial banks are motivated to profit from repo operation instead of placing extra liquidity. Moreover, this is what attracts investor in search for high, quick and secure profit. On the other side, it is problematical when part of government budget is financed through imported short term money.

5. SOURCES

Purely based on the public data, it is quite difficult to identify a capital inflow from abroad motivated by this type of speculative strategy. CT investors with interest to invest in repo operation or government securities operate through domestic commercial banks which act as custody banks. Accordingly, it is essential to distinguish capital inflow regarding these operations. CT investors deposit funds denominated in dinars at commercial banks, which later are invested in repo operations as an extra liquidity. The deposits are rolled over until there is favorable yield based on interest rate and exchange rate arbitrage. CT investors in Serbia are registered as companies and therefore the corporate deposits at commercial banks are relevant for this analysis. Capital inflow in commercial banks balance sheets based on CT strategy can be analyzed as a difference between dinar corporate deposits, banks capital, the outflow of commercial banks dinar funds and obligatory reserves denominated in dinars. (Stancic, Cupic, & Sladjana Barjaktarovic Rakocevic, 2012)

Therefore, it can be presented by following equation:

The assumed inflow = dinar corporate deposits + commercial bank capital – short and long term dinar loans – current account at NBS *(obligatory reserves of commercial banks denominated in dinars)*

As it can be seen from Fig. 4, which presents the development of capital inflow and stock of repo operations, there is a clear correlation between variables. However, repo stock trend in second quarter of 2010 declines faster than sources due to dinarisation strategy of NBS, the release of subvention loans and intensifying treasury bills selling.

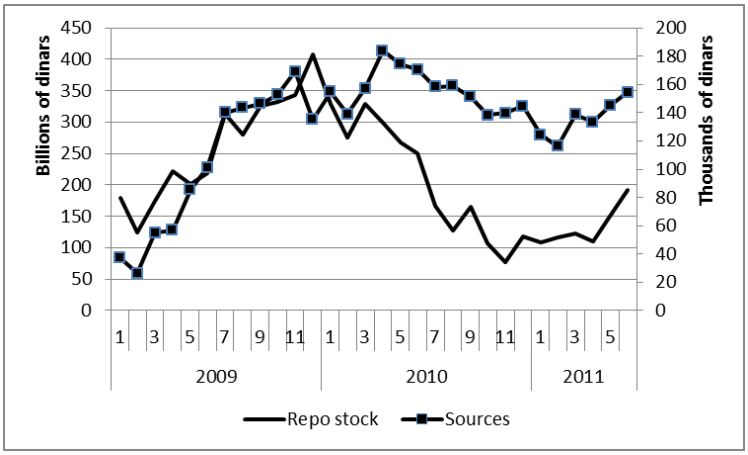

Figure 53 Repo stock and Sources, in dinars, [5]

Regarding the investment in T-Bills, the portfolio investment in debt securities from capital account of Republic of Serbia is an excellent indicator. The development of these indicators is presented in the next figure.

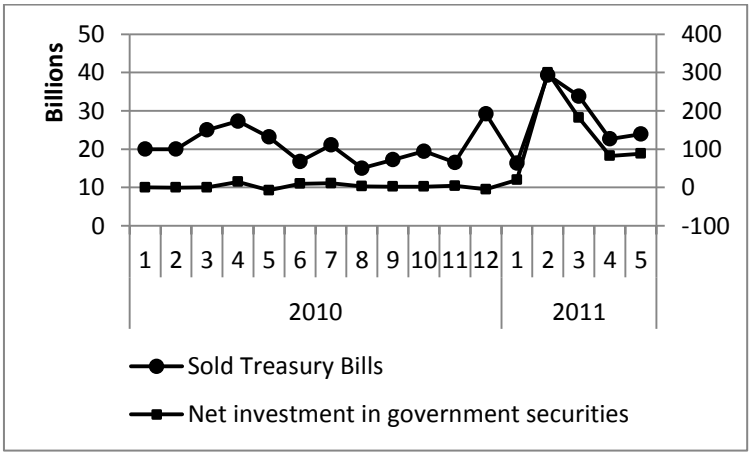

Figure 54 Development of Sold Treasury and NET foreign investments in government securities [5]

Portfolio investment in debt securities from capital account of Republic of Serbia is presented in net amount, which was mostly close to zero during

the year 2010. This is an indication that Serbian government during this period repaid the similar amount to foreign investors that they were investing in government securities. However, since the September of 2011 this amount had a significant increase caused by growing interest of CT investors in treasury bills.

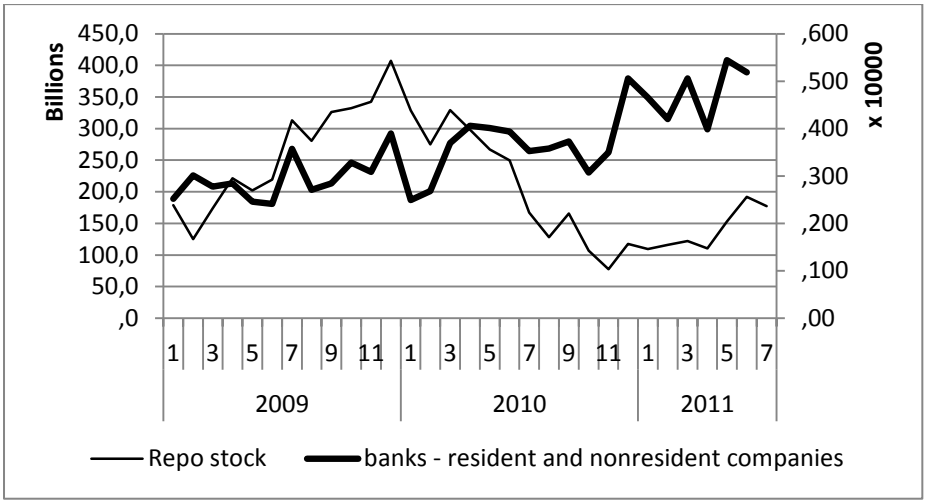

Figure 55 Repo stock and FOREX trading between banks and resident and nonresident companies [5]

In addition to previous analysis, it is also possible to follow the development on foreign exchange market. The intensifying activity in exchange market could indicate exchanging foreign currency in dinars in order to invest in CT, or could indicate opposite as an exit from CT. The assumption is that CT investors are registered as nonresident companies and therefore it will be analyzed the volume of transactions between commercial banks and nonresident companies. Taking in consideration that NBS publishes aggregate data for residents and nonresidents transactions, we will use available data as an approximation of nonresident companies role in foreign exchange market. Based on following graph it can be recognized that the peaks of transaction volume are mostly followed by the peaks of repo stock. Therefore, we can conclude that there wasn't considerable withdrawal from repo operation and that CT investors are still present in Serbian market. The same assumption stand for value of sold T-Bills.

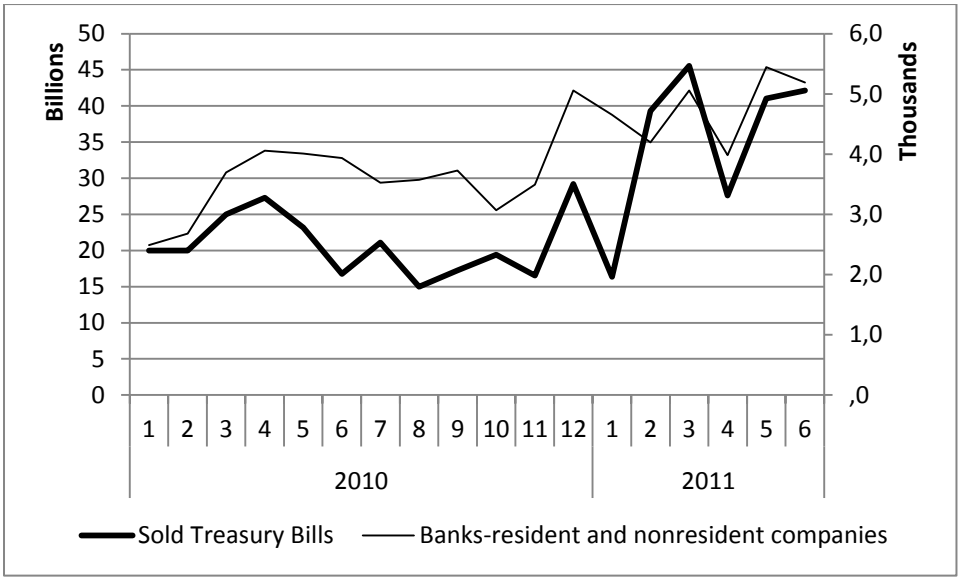

Figure 56 Development of sold Treasury Bills values and FOREX trading between banks and resident and nonresident companies [5] [6]

6. CT AND CHANGES ON FOREIGN EXCHANGE MARKET

The high volatility of the exchange rate makes is an uncertain environment for conducting CT. For that reason, in periods with high volatility the decrease of CT activities can be expected. Large volumes of transactions on foreign exchange market cause high exchange rate volatility. To calculate profitability of CT strategy, the analysts commonly use carry-to-trade ratio, as the relationship between interest rate differences and implied volatility which is based on forward exchange rate volatility. Due to unavailability of forward exchange rate date, it is not possible to calculate implied volatility for Serbia. Nevertheless, actual exchange rate volatility can indicate expected changes in the exchange rate, and therefore the changes in CT activities. Fig 8 and 9 presents development of repo stock and sold T-Bills compared to exchange rate volatility. Volatility is calculated as monthly standard deviation of daily dinar exchange rate changes against Euro.

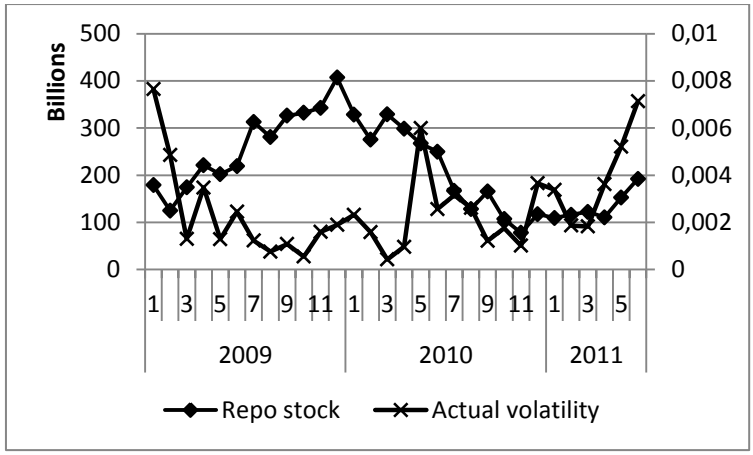

Figure 57 Development of repo stock and actual volatility of dinar exchange rate, author's calculation [5]

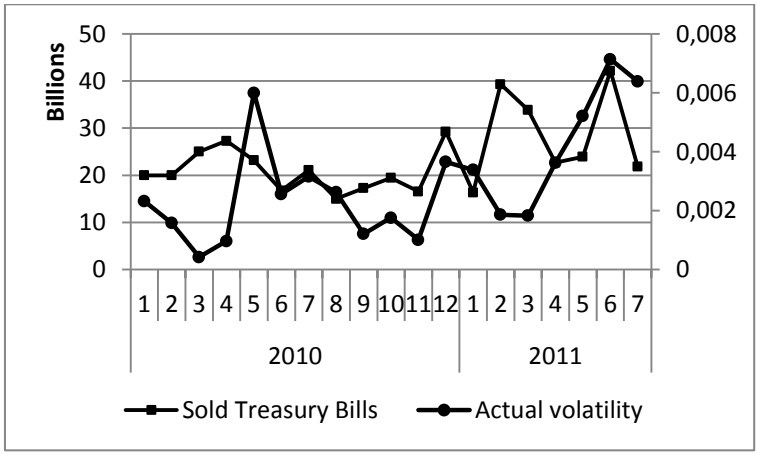

Figure 58 Development of sold T Bills values and actual volatility of exchange rate, author's calculation, [5]

Bearing in mind the actual volatility, the change in volume of sold T-bills and repo stock has to be considered with lag. This means if there was high volatility during the certain period, it is expected that the volume of transaction would decline in the next period. Depending on expectations, lag can vary from one month to more months. Based on data presented, it is evident that if volatility is high there will be a significant decline in government securities transactions already in the following month. The most recent episode of volatility jump was in June 2011, caused by matured

sixth month treasury bills indexed in Euros, followed by strong dinar depreciation. As a consequence, there was a decline in sold treasury bills even in July, since the depreciation of target currency endangered the profitability of CT strategy.

7. YIELD ON CT INVESTMENT

CT investors are primarily interested in appreciation of targeted currency (in our analysis it is dinar) whereas dinar depreciation decrease the real yield. Profitability of CT strategy can be analyzed through real yield on repo operations and government securities.

CT is profitable up to the moment where the uncovered interest parity equilibrium is reached. [7] UIP presents relations between interest rates on same maturity instruments of two different countries and expected change of exchange rate between two countries during the investment maturity.

UIP is presented by following formula:

$$(1+i) = \frac{E(S_{t+k})}{S_t}(1+i^*) \qquad \textbf{(3)}$$

where *i* is interest rate on domestic currency, $\frac{E(S_{t+k})}{S_t}$ is expected change of exchange rate, i^* is interest rate on foreign currency.

Deviation from equilibrium present real yield on CT strategy that can be calculated as:

$$r_{ct} = \frac{E(S_{t+k})}{S_t}(1+i^*) - (1+i) \qquad \textbf{(4)}$$

i- two weeks Euribor interest rate

i^* - two weeks interest rate on repo operation of NBS

$\frac{E(S_{t+k})}{S_t}$ - expected change of exchange rate dinar/Euro

In our analysis we use Euribor interest rate assuming that main source of CT financing in Serbia are funds denominated in Euros due to availability of Euro currency in Serbian market. Furthermore, it can be considered other low yield currencies, such as Swiss franc or Japanese yen.

The expected change of exchange rate is calculated as investors expectations regarding the future exchange rate developments based on changes in the last three months.

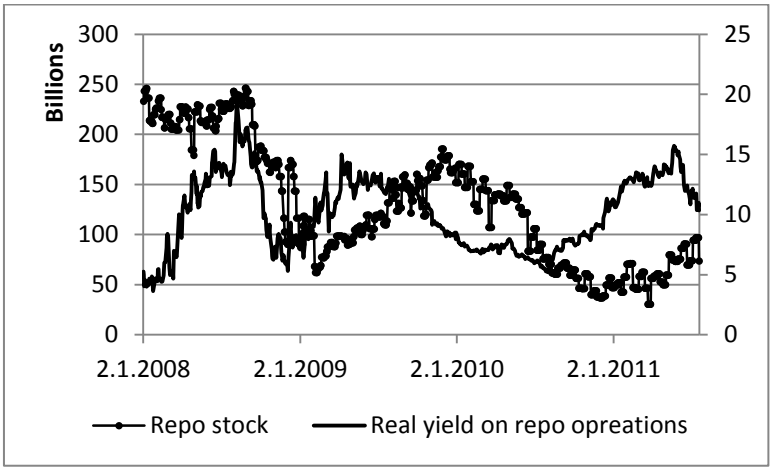

Figure 59 Development of repo stock and real yield on repo operations, author's calculation, [5]

The graph above indicates that real yield on repo operations follows the movement of repo stock, although it is obvious that from December 2010, despite the significant rise in real yields, repo stock has not completely followed this trend. This is primarily caused by intensifying transaction of government securities that moved funds on this market, and also by begging of dinar denominated loans subvention.

Figures 11. and 12. present real yields on treasury bills, where are considered maturities of six and twelve months and proportions of sold securities relative to offered volumes, that serve as indication of investors interests to invest in treasury bills. The expected change of exchange rate is again presented as changes in the last three months. In accordance to UIP postulate, to calculate real yield on six and twelve months treasury bills we used Euribor interest rate with maturity of six and twelve months, respectively.

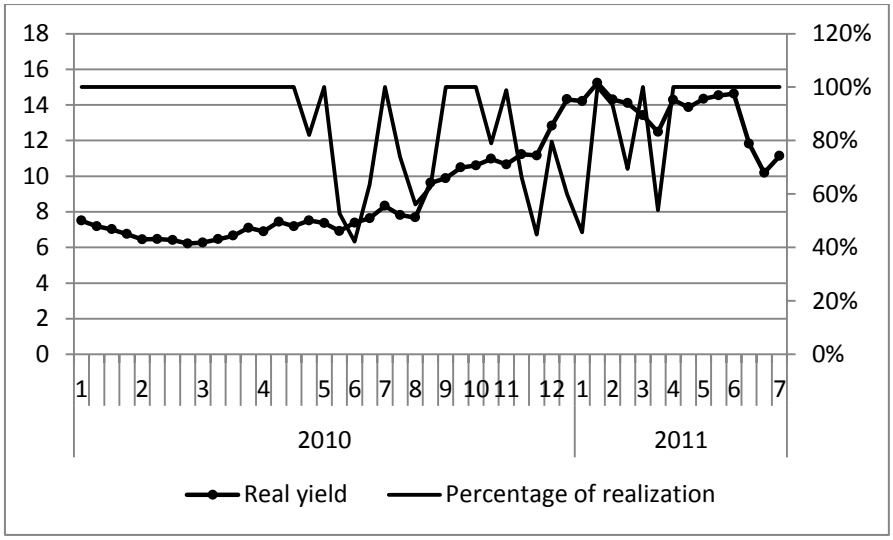

Figure 60 Real yield on six month T-Bills and percentage of sale realization, author's calculation, [5]

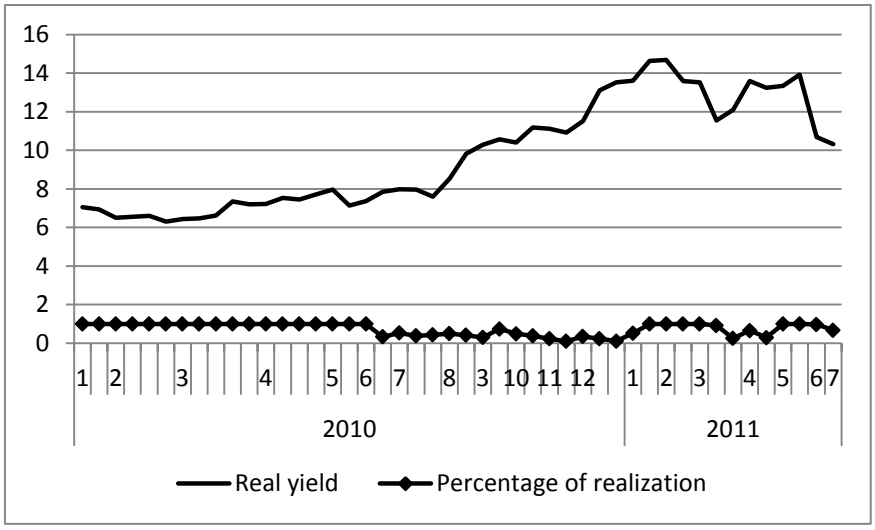

Figure 61 Real yield on twelve month T-Bills and percentage of sale realization, author's calculation [5]

Tangibility of treasury bills selling related to real yield is more sensitive for longer maturities, whereas investing in short term bills is still attractive. In the case of larger disturbances on foreign exchange market and high volatility, it can be expected lower interests for all range of maturities, a

therefore for the shortest. Thereby financing government budget through issuing treasury bills will be jeopardize.

8. CONCLUSION

CT strategy, although profitable for investors, can create great difficulties for monetary authorities and macroeconomy. It can impose following threats:

- Key interest rate as main monetary policy instrument has significantly smaller influence on money market and commercial banks interest rates. Therefore, the important channel of monetary policy transmission - interest rate channel, gradually becomes inefficient.
- Exchange rate channel of monetary policy has rising importance
- The bigger exposure to systemic risk due to possibility of sudden withdrawal of CT investors

This speculative strategy may have particular effect in small and open economies, where exchange rate has a great influence in keeping macroeconomic stability. Since the exchange rate becomes the dominant instrument of monetary policy, its stabilization and keeping at the level that does not evoke financial market disturbances, implies very expensive option for monetary authorities in Serbia.

Strong dinar appreciation that occurred in second quarter in 2011 was not caused by positive structural changes in Serbian economy, but primarily by the inflow of short term capital. Since this is highly speculative capital, mainly intended for short term and easy profit, any danger that can jeopardize its aim will cause the outflow. In our case, with assumption that CT activity has large influence on the exchange rate development, considering the short term source, it will have and short term consequences, i.e. short term appreciation. It was proved during June 2011 when there was depreciation of dinar due to matured six month treasury bills indexed in Euros followed by decreased sale of treasury bills already in the next month.

REFFERENCES:

[1] K. Kisgergely, "Carry Trade," *Bulletin of National Bank of Hungary,* p. 15, December 2010.

[2] A. Jonsson, Why Iceland?, New York: McGraw-Hill, 2009.

[3] "Central Bank of Island," [Online]. Available: www.sedlabanki.is.

[4] P. Stancic, M. Cupic and S. B. Sladjana Barjaktarovic Rakocevic, "Dominant Shareholder, board structure and bank performance: Evidence from Serbia," *Industrija,* vol. 40, no. 2, pp. 51-68, 2012.

[5] "National Bank of Serbia," [Online]. Available: www.nbs.rs.

[6] "Treasury Directorate of Governemnt of Serbia," [Online]. Available: www.trezor.gov.rs.

[7] C.Burnside, M. Eichenbaum, I. Kleshchelski and S.Rebelo, ""Do Peso Problems Explain the Returns to the Carry Trade?"," *Review of Financial Studies,* vol. 24, no. 3, pp. 853-891, 2008.

[8] C. Burnside, E. M., K. I. and R. S., "The Returns to Currency Speculation," *NBER,* vol. 12489, 2006.

[9] J. Gali and M. T, ""Monetary Policy and Exchange Rate Volatility in a Small Open Economy"," *Review of Economic Studies,* vol. 72, pp. 707-734, 2005.

[10] J. Gyntelberg and E. M. Remolona, " Risk in carry trades: a look at target currencies in Asia and the Pacific," *BIS Quarterly Review,* pp. 73-82, December 2007.

[11] P. G. and S. H., "Carry Trades, Monetary Policy and Speculative Dynamics," in *CEPR Discussion Papers*, 2011.

[12] E. Fama, "Forward and spot exchange rates," *Journal of Monetary Economics,* vol. 14, no. 3, pp. 319-338, 1984.

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