

## Did the banks in Croatia have extra interest income from CHF appreciation?

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### Abstract:

Recent appreciation of CHF has caused uproar in Croatia and other Eastern European countries. Ever since the Swiss central bank has removed parity with the Euro, sudden appreciation of CHF has caused retail annuities tied to the CHF to increase significantly. Once again the issue of the legality and morality of loans in CHF has been brought back to the media spotlight. In Croatia in particular there has been prevalent the argument that the banks have heavily profited from the appreciation of the CHF. Croatian central bank has responded to these allegations with the press release clearly stating that the open currency position of the banks has been around 0, ever since CHF loans started in Croatia, therefore it was impossible for the banks to profit from the CHF appreciation. This paper investigates did the banks have extra income interest income because of the appreciation of CHF even with the open currency position of 0. The answer is yes, however overall profitability of CHF loans as a banking product is doubtful at best.

### 1. Introduction

The Central bank of Switzerland has removed the CHF / Euro parity on 15<sup>th</sup> of January and CHF has appreciated more than 20% in one day. The event all in itself is in interesting one in terms of conduct of monetary policy, but it is even more detrimental when it comes to the fundamental problem of loans in CHF and loans with CHF clause, which were widely popular and prevalent in some eastern European country. Croatia is not exempt from this problem.

Croatia central bank has issued a special press release in order to clarify some facts regarding the loans in CHF<sup>1</sup>. In this press release it is explicitly stated the banks have not made any money on the FX speculation and the open currency position in CHF. Explicit data was given on page 7 of the press release, clearly showing the open currency position was never more than  $\pm 0,5\%$  of the aggregate capital of banks in Croatia.

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1 *Neke činjenice o kreditima u švicarskim francima i nekim mogućnostima državne intervencije* from [www.hnb.hr](http://www.hnb.hr)

However even with the open currency position close to 0, there has been a strong opposition to the CHF loans. There are three main objections to the loans in CHF in Croatia: the central bank has never done anything to stop them, CHF and loans with foreign currency clause should be removed from bank's balance sheets in Croatia and Croatian banks have made significant positive income from the appreciation of the.

The first issue is easy to resolve. Central bank in Croatia never dealt with the currency structure or sector distribution of loans. This is the official policy position of the CNB and this problem was already addressed in Radošević and Vidaković (2014). Second issues will be addressed in the conclusion of this paper. The third issue, profit from CHF appreciation, is the one which we are going to formally analyze in this paper. Have the banks made extra profit from appreciation of the CHF, even if their open currency position was 0? The answer is yes.

## **2. Model set up**

In order to prove how it is possible to have positive exchange rate effects even if the open currency position of a bank is 0, we will create a simple example. First we are going to go step by step through the example and then we are going to discuss the example.

Let's start with some initial assumptions. These assumptions serve in order to simplify the example, but do not diminish the significance of the example. First we have to note that we are only going to address bank's interest income, not other variables which could be affected by the CHF appreciation. For mathematical simplicity we are going to assume the initial exchange rates are  $1\text{€} = 7,5\text{ HRK}$  and  $1\text{ CHF} = 5\text{ HRK}$ . The exchange rate shock will be when the CHF appreciates towards kuna to new exchange rate of  $1\text{ CHF} = 8\text{ HRK}$ . We shall assume the exchange rate vs. kuna is always the same. We shall also assume the interest rates on liabilities are 0. Interest rates on liabilities are set to 0, again to keep the math simple. There is no reserve requirement. Since we are dealing with the impact of the exchange rates, not the impact of the interest rates the reserve requirement is irrelevant. There is also no capital, if we include the capital the example would just be more complicated, but it would not change the outcome.

We shall assume a representative bank has the following balance sheet.

### **Picture 1: Bank's initial balance sheet**

ASSETS	LIABILITIES
€ 100	€ 100
HRK 1000	HRK 1000

As we can see there are two elements in the bank's liabilities: a deposit for 100 euros and a deposit for 1000 kunas. The structure of the assets is the same. The initial value of the balance sheet is 1750 HRK, since the exchange rate EUR/HRK is 7,5.

Based on the structure of the assets and the currency exposure we can now calculate the initial open currency position. Which is given in the picture below:

**Picture 2: Bank's initial open currency position**

SPOT POSITION		FORWARD POSITION	
ASSETS	LIABILITIES	LONG	SHORT
€ 100	€ 100		

Using the formula for the open currency position from Gregurek, Vidaković (2013) which is:

$$(\text{ASSETS} - \text{LIABILITIES}) + (\text{LONG} - \text{SHORT}) = \text{NET OPEN CURRENCY POSITION}$$

We can calculate the open currency position of this bank and it is 0.

Now we are going to allow our bank to give out one loan in the amount of 100 CHF, this loan is going to be a loan with a foreign currency clause. The length of the loan will be 1 year and the loan is given on the 1<sup>st</sup> of January. The interest rate on the loan is 10%. After the loan the new balance sheet of the bank is:

**Picture 3: Bank's balance sheet after one CHF loan**

ASSETS	LIABILITIES
€ 100	€ 100
HRK 500 – cash	HRK 1000
HRK 500 – loan (100 chf)	

As we can see the structure of liabilities in the bank has remained the same, but the structure of the assets has changed, since the bank has given out a loan in cash to a customer. Below the value of the loan which is 500 HRK is the value of the loan in foreign currency, which is 100 CHF.

**It is important to notice the loan was not paid out in CHF or Euros, it was paid out in kunas.** The currency used for the actual transaction was kuna, not the currency in which the loan is denominated. This is an important characteristic of loans with foreign currency clause. In terms of accounting for the purposes of the exchange rate risk evaluation, a loan in foreign currency clause is treated as a loan in foreign currency. However, in terms of liquidity of the actual loan transaction, a loan in foreign currency clause is paid out in domestic currency. Also when the loan is paid back, the annuities are also paid back in local currency<sup>2</sup>, but the amount is calculated based off of foreign currency. The picture below shows the open currency position with a new loan in CHF.

**Picture 4: Bank's open currency position after the loan**

SPOT POSITION		FORWARD POSITION	
ASSETS	LIABILITIES	LONG	SHORT
€ 100	€ 100		
CHF 100			

The new open currency position for all currencies in the bank's balance sheet is as follows:

For Euro:  $(ASSETS - LIABILITIES) + (LONG - SHORT) = 100 - 100 + 0 - 0 = 0$

For CHF:  $(ASSETS - LIABILITIES) + (LONG - SHORT) = 100 - 0 + 0 - 0 = 100$

Lending in foreign currency clause has created an exchange risk for the bank, the bank is long 100 CHF in its open currency position. It is extremely important to point out that the bank has created this risk, even without actual liquidity in the foreign currency. Because of a particularity of the loans in CHF (accounting on clause currency, but transaction in domestic currency) a bank can give out a loan in any currency it wants, since the actual currency of the transaction is domestic currency, not foreign currency.

For a bank to eliminate the exchange rate risk the bank has two options. First one is to obtain actual deposits in CHF and then sell if for some other currency, however this would increase

<sup>2</sup> The liquidity of the actual transaction as described here is true for the case of Croatia.

the balance sheet and create additional liquidity which is unnecessary. Much simpler way is to short CHF on the foreign forward market. This can easily be done using a CHF / EUR futures contract which is traded on the CME exchange under symbol RF<sup>3</sup>. In order to cover the margin for the futures contract the bank can use the 100 euros which it has in its assets. With the use of the futures contract the new open currency position of the bank is:

**Picture 5: Bank's open currency position after the CHF hedge**

SPOT POSITION		FORWARD POSITION	
ASSETS	LIABILITIES	LONG	SHORT
€ 100	€ 100		
CHF 100			CHF 100

$$\text{For Euro: (ASSETS – LIABILITIES) + (LONG - SHORT) = 100-100+0-0=0}$$

$$\text{For CHF: (ASSETS – LIABILITIES) + (LONG - SHORT) = 100-0+0-100=0}$$

As we have seen the bank has hedged its position in assets with a short position in the CHF futures. The resulting hedge has removed the exchange rate risk from the bank's balance sheet. All this is done on the 1<sup>st</sup> of January when the loan is given to the client.

### 3. The shock

Now we are going to introduce our currency shock. On the 2<sup>nd</sup> of January the CHF appreciates vs. the Euro and consequently vs. the kuna and the new exchange 1 CHF = 8 HRK. The new value of the balance sheet is

**Picture 6: Bank's balance sheet after CHF appreciation**

ASSETS	LIABILITIES
€ 100	€ 100
HRK 200 – cash	HRK 1000
HRK 800 – loan (100 chf)	

And the new open currency position is:

**Picture 7: Bank's open currency position after the appreciation**

<sup>3</sup> <http://www.cmegroup.com/trading/fx/g10/euro-fx-swiss-franc.html>

SPOT POSITION		FORWARD POSITION	
ASSETS	LIABILITIES	LONG	SHORT
€ 100	€ 100		
CHF 100			CHF 100

As we can see the open currency position has not changed at all. The size of the bank's balance sheet has not changed at all as well. It is still 1750 HRK (there is a deposit in the amount of 100€ = 750 HRK and a deposit in the amount of 1000 HRK). The structure of the liabilities has not changed, but as we can see, the structure of the assets has changed a lot.

Let's start with the euro. The value of the euros in assets has remained the same and it is 100€. However the value of the kuna has decreased by 300 HRK, now the value of kuna liquidity in the assets is 200 HRK. The reason for this is simple. When CHF has appreciated the bank has lost money on its short futures position. This loss had to be paid out of the bank's margin account and it has decreased the amount of euros in the bank's margin account. In order to maintain the open currency position of 0 in euros the bank has to purchase euros. It has done that by selling 300 hrk in order to get 40 € (300 HRK / 7,5). This explains why amount of kunas in the balance sheet has decreased and the amount of euro has remained the same. We can see that the new value of the position in CHF is 800 hrk, since CHF has appreciated<sup>4</sup>.

First we have to address was there any profit on the changes of the exchange rate and the appreciation of the CHF? The answer is no. As we can see from the balance sheet the increase in the value of the CHF loans (asset long position), was offset by a loss on the derivatives side, because of the futures hedge. This outcome is not surprising at all. The open currency position before the CHF appreciation was 0, therefore the bank did not have any FX risk. Since FX risk was 0, there was no possibility for a bank to have positive P&L from FX position.

However, at the beginning of this paper we have stated the banks have had positive net income from the appreciation of the CHF. Here is how. One year after the loan was given at 10%, the exchange rate with CHF is still 1CHF = 8 HRK, the client repays the loan and the bank closes out its currency future position. Let us first start with the FX position. Once the

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<sup>4</sup> This can also be seen in the real data, since in 2010 the banks have had cca 500 million euros cost on short derivative position.

CHF loan is repaid back, the futures position is closed out. So the new open currency position is:

**Picture 8: Bank's open currency position when the loan is paid back**

SPOT POSITION		FORWARD POSITION	
ASSETS	LIABILITIES	LONG	SHORT
€ 100	€ 100		

This open currency position is the same as the starting position. When there was no CHF loan. The bank once again has 100€ is both assets and liabilities, without any open FX position. No mystery there. Here is the new balance sheet once the CHF loan is repaid.

**Picture 9: Bank's balance sheet after the CHF loan is repaid**

ASSETS	LIABILITIES
€ 100	€ 100
HRK 1080 – cash	HRK 1000
	80 hrk

As we can see once after the CHF loan was repaid the amount of euros in the balance sheet has remained the same: 100€. However the amount of kunas has increased to 1080. The increase of 80 HRK was also noted in liabilities, but this time under capital since it is current year profit and it is equal to the net interest income of 80 hrk.

**4. Bank's profit from CHF appreciation**

The obvious question is: where is the extra profit for the bank in the appreciation of CHF? The answer is this, if the exchange rate has remained at 1 CHF = 5 hrk, total net interest income would have been only 50 hrk, but since CHF has appreciated to 1 CHF = 8 HRK the amount of interest income has increased from 50 HRK to 80 HRK. The amount of interest on 100 CHF loan at 10% is 10 CHF. The interest income originally should have been 50 HRK (1 CHF = 5 HRK), but because of the appreciation it was 80 HRK. This is a clear proof the banks have had positive effect from the appreciation of the CHF.

The puzzle is, how did the banks managed to have positive P&L effect from CHF appreciation if the open currency position was 0. The answer lies in the amount of hedged

used by the banks. **Banks have hedged only principal from the balance sheet, not the expected future net interest income.**

Future cash flows are not registered in the balance sheet of the banks and therefore are not part of the open currency position and cannot be hedged. Since interest income was not hedged, the banks were able to have positive effect from the appreciation of CHF from the interest paid by the customers on their loans.

## 5. Discussion

First let us start with the possible complaints regarding the example. The bank in the example does not have capital; there is no cost to the liabilities; the process of loan repayments is bullet, which is exceptionally rare in banks; the interest rate is fixed and it could be variable; the banks were also exposed to a credit risk and the banks themselves have suffered the burden of credit risk.

All of the above arguments are true. But as stated at the beginning of the paper, we are only interested in the relation of interest income and exchange rate, not other variables. The main point of this paper is to address a question: did the banks have an extraordinary income from the FX appreciation of the CHF? The answer is yes. By increasing the complexity of the example the this fact do not change. The banks in Croatia did not hedge future net interest income and they have had more interest income on a loan at higher exchange rates of CHF than at lower exchange rates.

In its document CNB on several occasions states the banks did not have positive P&L from the FX position in CHF<sup>5</sup>. This paper clearly shows that statement is not correct.

What was the overall profitability of CHF loans? That has to be determined by summing up all the income and expenses for each loan. Considering the fact rate of the bad loans in CHF is 17%, and once the cost of liabilities are included it is reasonable to say the overall CHF loan clause adventure was bad for Croatian banks even with the strong collateral of cars and houses.

## 6. Conclusion

In the conclusion I will not offer a solution to the CHF problem, because loans in foreign currency clause are only part of the overall problem on monetary policy in Croatia. Croatian

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<sup>5</sup> Point 6, on page 6 of „Neke činjenice o kreditima u švicarskim francima i nekim mogućnostima državne intervencije“ from [www.hnb.hr](http://www.hnb.hr).

monetary policy has two main problems. One problem is conceptual and another one is more practical.

The conceptual problem is the fact that Croatian National Bank has never paid attention to any other economic variables, except stability of the exchange rate. Here the most detrimental neglect was in the sector distribution of credit. The effects of credit rampage in the time period 2000 – 2008 have now come due. The problem of loans in CHF is not a cause, but one of the results of a monetary policy solely focused on the stability of the exchange rate. Therefore the solution to the problem of CHF loans is a transformation of the purpose of the monetary policy in Croatia.

Second problem is the overall problem of the high euroization of the Croatian economy. This problem has always been referred as something which cannot be solved. This is not true, there are solutions to deeuroize the economy, but not if the initial thesis is: it cannot be done. The only question remains will the central bank try to do this.

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