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THE INFLUENCE OF CURRENCY RISK UPON THE MARKET VALUE OF COMMERCIAL BANKS OPERATING IN THE POLISH BANKING SECTOR

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Abstract

The objective of the paper is to analyse the impact of the Swiss National Bank's decision to introduce the floating exchange rate of the franc on January 15th, 2015, upon the market value of commercial banks operating in the Polish banking sector. The analysis involved twelve commercial banks quoted on the Warsaw Stock Exchange. The results are inconclusive. The predicted reduction of the banks' market value was less significant than indicated by market investors' reaction on the day after the announcement of the decision to introduce the floating exchange rate of the franc. The banks most prone to granting credit denominated in CHF did experience the largest reduction of their share quotations. However, the Pearson product-moment correlation coefficient calculated for the correlation between the average cumulative abnormal returns on shares for the entire analysed sample, and the proportion of credits denominated in Swiss francs in the total credit portfolio, indicated only a moderate correlation between both variables.

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Introduction

The unexpected decision of the Swiss National Bank, which on January 15th, 2015 abandoned the policy of maintaining a fixed exchange rate to the euro at the level of 1,2, and at the same time decided to reduce interest rates from -0,25% to -0,75%, once again illustrated how tightly connected the financial and capital markets of individual countries are. The decision led to rapid appreciation of the Swiss franc exchange rates in relation to other currencies, including the Polish zloty. The strengthening of the franc completely reoriented the existing perception of foreign currency credits and loans in Poland (and in particular mortgages), and exposed the dangers of currency risk, both to the banks and to their clients (Buszko, 2016, p. 129-145). The objective of this article is to analyse the influence of the decision to introduce the floating exchange rate of the Swiss franc upon the market value of commercial banks operating in the Polish banking sector. The analysis included twelve commercial banks quoted on the Warsaw Stock Exchange.

The essence of currency risk measurement

Although up to the present it has been very difficult to provide a uniform definition of the risk phenomenon, the revolutionary theory by F. H. Knight (who was the first to define risk as a measurable value) was a seminal point leading to his synthetic definition (Knight, 1921). Risk is usually defined as the danger of not achieving the desired result (the negative concept of risk), or the possibility of obtaining a result different from expected - the neutral concept (Jajuga, 2007, p. 13). Market risk is the danger of reduction of a bank's income or its net value, as a result of unfavourable changes of interest rates, exchange rates or security prices (Figure 1.)

Market risk is the risk of a change in the value of a financial position or portfolio due to the changes in the value of the underlying components upon which that portfolio depends (McNeil, Frey & Embrechts, p. 5). One of the most important types of risk accompanying banking operations, which is a part of market risk, is the currency risk. It is defined as the probability of loss caused by changes in currency exchange rates. The risk grows along with:
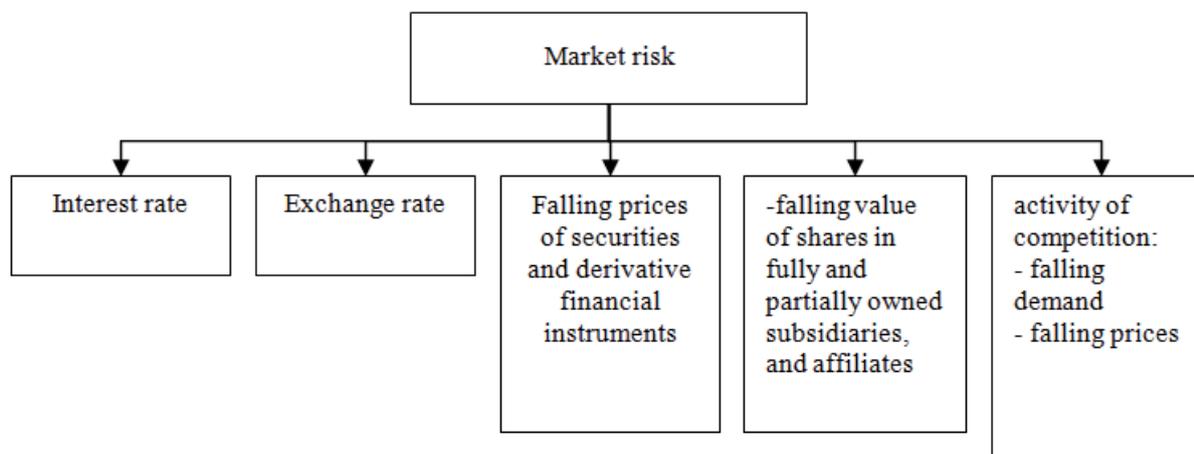
1) higher variability of exchange rates,

2) higher mismatch between the currency receivables and liabilities in a bank's balance sheet.

The process of managing this type of risk includes its identification, quantification, monitoring, reporting and control. The main tools for currency risk management include:

1) internal procedures for managing this type of risk,

2) models and measurements of currency risk,

3) limits and threshold values concerning currency risk,

4) limits for acceptable currency transactions and for the exchange rates applied during those transactions.

The main task of currency risk management conducted by any bank is to limit the impact of variability of market factors upon the potential changes in the bank's profit. The bank's board defines the currency risk profile, which must be in line with the prevailing overall strategy

Figure 1: Segmentation of banking risk

Source: Own research

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and targets, and within the predefined level of acceptable risk. The objective of such an early warning system is to shape the currency structure of the balance sheet and off-balance sheet items in such a way that it remains within the external and internal limits. Those limits constitute a cap for the maximum level of gross open currency positions, and determine the acceptable thresholds disaggregated for individual currencies in the defined areas (bank portfolio – trading portfolio, currencies). The limits are monitored at the end of, as well as during, the working day. Risk limits are periodically reviewed to match the prevailing macro- and microeconomic situation.

The bank systematically evaluates the influence of unfavourable changes of currency exchange rates upon its long-term profits. The influence can result from unfavourable rates of currency conversion of the bank's future incomes and costs in other currencies. A bank's exposure to currency risk is measured with the use of the Value at Risk (VaR) model. The method measures the largest expected loss that the institution can suffer in a given period, assuming normal market conditions and a set level of confidence (Choudhry, 2013, p. 30). Calculating risk according to Value at Risk means calculating the value of the asset portfolio exposed to risk with a given probability, within a given time horizon. Usually banks calculate daily loss, which can occur with probability not higher than 1%. The value of VaR is calculated by historical simulation, on the basis of several years of observation of the dynamics of market risk factors, or by the variance/covariance method. Estimating the influence of changes of the market factors upon the current value of a particular portfolio is carried out by full revaluation (comparing departure of real return rates from the value of those expected, forecasted on the basis parameters of a historically estimated trend).

Stress testing analysis is used as a supplementary and verifying method of estimating the Value at Risk. The method evaluates the influence of unexpected fluctuations of market conditions upon the bank's profit (VaR is not recommended in those cases). The scenarios assume rapid and significant changes of risk factors, leading to extreme conditions – currency shocks.

Another way of limiting currency risk is the practice of closing every major currency position with an opposite transaction on the market (Hull, 2014, p. 542). During the duration of hedging, the bank measures the effectiveness of the hedging methods applied. The change of the fair value of hedging instruments is entered in the "capital from revaluation", as the amount to which the hedging is effective. The ineffective part of the hedging is entered into the profit and loss account in the part "profit from financial instruments at fair value through profit or loss". The effective part, collected in the capital from revaluation, is subject to gradual reclassification (depreciation) according to the timetable developed by the bank, into the profit and loss account, until the original portfolio expires (Chance & Brooks, 2015, p. 566).

Measuring currency risk is also necessary in order to calculate the currency risk-related capital requirement. According to the CRR directive, it can be calculated according to the basic method or the internal models method, providing the credit institution obtains approval from the appropriate organ (Koleśnik, 2014, p. 144).

Method of research and choice of sample

The conducted research utilised the market model involving determination of the parameters of the linear regression line for each of the analysed banks. The parameters reflected the relation between the rate of return on shares of a particular bank and the rate of return on the stock exchange index in the period preceding the official announcement of the information concerning the decision of the Swiss National Bank to introduce the floating exchange rate of the franc on January 15th, 2015. The method is based on a measurement of additional rate of return: the Cumulative Abnormal Returns (CAR).

Eugene F. Fama was the first to present the concept of event study in 1969. The model, also described as abnormal returns method, consists of comparing departure of real return rates from the value of those expected, forecasted on the basis parameters of a historically estimated trend (Fama, Fisher, Jensen & Roll, 1969). For the purpose of this paper it has been accepted that the term 'event' means the publishing of the official information by the Swiss National Bank.

The essence of event analysis is calculating additional rate of return of the company's shares, i.e. the difference between real and expected rate of return on bank assets, if the event did not occur:

$$AR_{it} = R_{it} - E(R_{it}) \qquad (1)$$

where:

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AR_{it} additional rate of return on shares of *i*-th company achieved on day *t*,

R_{it} real rate of return on shares of *i*-th company achieved on day *t* in case of information,

$E(R_{it})$ expected rate of return on shares of *i*-th company achieved on day *t* in case the information did not happen,

$i=1,2,..,N$ where *N* means the number of sampled companies.

Expected rate of return on shares of *i*-th company is based on the assumption of a constant and linear relation between individual asset returns and the return of a market index WIG-banks (the single index model):

$$E(R_{it}) = \alpha_i + \beta_i R_{M,t} + \varepsilon_{i,t} \qquad (2)$$

with

$$E\big[\varepsilon_{i,t}\big] = 0$$

and

$$VAR\big[\varepsilon_{i,t}\big] = \sigma^2_{ti}$$

where:

α, β the intercept and the slope of the regression of $E(R_{it})$ regressed against $R_{M,t}$ - rates of return on the market portfolio (WIG-banks index).

Measurements of additional rate of return used in research are Cumulative Abnormal Returns (CAR) and Buy-and-Hold-Abnormal Returns (BHAR). Abnormal Returns are the crucial measure to assess the impact of an event. The abnormal return of firm *i* and event date *t* is defined as the difference of the realized return and the expected return given the absence of the event. Cumulative Abnormal Returns CAR_{iT} is calculated as the sum of daily abnormal rates of return from successive session days in the analyzed period *T*:

$$CAR_{iT} = \sum_{t=1}^{T} AR_{it} \qquad (3)$$

where:

CAR_{it} cumulative abnormal returns on shares of *i*-th company on day *t*,

T period of observation, time frame measured in session days,

AR_{it} abnormal returns of *i*-th company shares on day *t*.

Recently, especially after Ikenberry's, Lakonishok's and Vermaelen's (1995) and Barber's and Lyon's (1997)

publications, buy-and-hold abnormal returns ($BHAR_{iT}$) have gained considerable importance. It is calculated as a difference between rate of return on investments in bank shares in period *T* and expected rate of return:

$$BHAR_{iT} = \prod_{t=1}^{T} (1+R_{it}) - \prod_{t=1}^{T} \big[1 + E(R_{it})\big] \qquad (4)$$

where:

$BHAR_{it}$ buy-and-hold abnormal returns on shares over the period *T*,

T period of observation, time frame measured in session days,

R_{it} real rate of return on shares of *i*-th company on day *t* if there was an information,

$E(R_{it})$ expected rate of return on shares of *i*-th company if there was no information.

The average of cumulative abnormal returns for the whole analyzed sample is calculated as an arithmetical mean of individual banks' cumulative rates of return:

$$ACAR_{NT} = \frac{1}{N} \sum_{i=1}^{N} CAR_{iT} \qquad (5)$$

where:

$ACAR_{NT}$ the average of cumulative abnormal returns on shares of banks *N* in period *T*,

N number of companies in the analyzed sample,

CAR_{iT} cumulative abnormal returns on shares of *i*-th company in period *T*.

Whereas the average of cumulative buy-and-hold abnormal returns with *N* shares in period *T* is defined as:

$$ABHAR_{NT} = \frac{1}{N} \sum_{i=1}^{N} BHAR_{iT} \qquad (6)$$

where:

$ABHAR_{NT}$ the average of cumulative buy-and-hold rates of return on shares of banks *N* in period *T*,

N number of companies in the analyzed sample,

$BHAR_{iT}$ buy-and-hold abnormal returns on shares of *i*-th company in period *T*.

In the analysed cases behaviour of return rates on bank shares as a reaction to the decision of the Swiss National Bank to introduce the floating exchange rate for the franc on January 15th, 2015 in two periods: from day *t* = –5 to day *t* = +5 session days and from day *t* = -30 to day

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t = +30 session days. Accepting such time horizons enables verification of the direct influence of such information on quotations of bank shares. In the event of applying a wider range, mistakes resulting from the impact of other information on the price of share exchange rate might arise. Estimating linear regression parameters for shares of each bank was based on dependence of share return on stock exchange index return rate in the period from day t = -250 to day t = -61 session days (independent period). This period has been determined by two factors. On the one hand it cannot be too distant in time from the observation period (assumption of parameter invariability) and on the other, it should be so distant from the date of the decision to introduce the floating exchange rate of the franc that the impact of the event on quotations of bank shares would be only slight.

The WIG-banks subindex has been accepted as an activity factor. The abnormal return on a distinct day within the event window represents the difference between the actual stock return on that day and the normal return, which is predicted based on two inputs; the typical relationship between the bank's stock and its reference index (expressed by the α and β parameters), and the actual reference market's return (WIG=banks subindex). Closing prices of bank and index share quotations from given stock exchange sessions were used for calculations.

Research results

Due to the relatively small sample and its heterogeneity, the results of this research should be treated with some caution. The results of the conducted research are not unequivocal (Table 1).

As would be expected, the abnormal returns are negative. We interpret the abnormal return as a measure of the impact of the event on the value of banks. But the predicted loss of banks' market value proved less significant than may have been indicated by the reaction of market investors on the first day after the announcement of the Swiss National Bank's decision to introduce the floating exchange rate of the franc. However, let us note that not all commercial banks had the same proportion of Swiss franc credits and loans in their total credit portfolios. The share of credits in francs amounted to between 0,8% and 39,75% of the total sum of credits and loans in the analysed banks, according to the state at the end of 31/12/2015. Some of the banks had much earlier resorted to granting currency credits only to the clients who received earnings in the foreign currency at a level appropriate for the amount of the granted credit. Therefore, there was little surprise that the largest reductions affected the banks most prone to granting CHF credits. Neither was the reduction of the market value of those banks undisputable. The Pearson's product-moment correlation coefficient calculated for the average cumulative abnormal returns for the analysed sample and the share of credits denominated in Swiss francs in the total credit portfolio, amounted to -0,641. This means it is only possible to state a moderate correlation between the two variables.

The above is mainly a result of the investors deciding that the Polish banking sector is stable and resilient to external shocks. The portfolio of credits in Swiss francs is a consequence of the policy used by commercial banks in the years 2003-2008, when their main focus was selling mortgage loans denominated in the Swiss currency. It is estimated that at the end of 2014, the value of this portfolio in the entire banking sector amounted to almost PLN 131 billion, which constituted 37,2% of all housing loans, 22,4% of credits granted to households and 14,6% of the entire credit portfolio (Polish Financial Supervision Authority [KNF], 2015).

The weakening zloty meant that borrowers (and in particular the 563 thousand people who took housing loans) found themselves in a situation where the Polish zloty value of their outstanding credit rose significantly. Frequently the amount they owe, expressed in the local currency, is higher now than when it was granted (in spite

Table 1: Average cumulative abnormal returns and the average 'buy-and-hold' cumulative returns in the analyzed cases

Specification	ACAR		ABHAR	
	from -30 to +30	from -5 to +5	from -30 to +30	from -5 to +5
average	0,358%	-0,747%	0,123%	-0,413%
median	-0,903%	0,021%	-1,225%	-0,018%

Source: Own research

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of repaying over a dozen or several tens of capital and interest installments). This has been a typical influence of the currency risk. Please note that the chief problem for most of the borrowers is the level of indebtedness in relation to property value rather than the issue of their capability to keep up with repayments.

The nervous reaction of the investors lasted for just one day - too short a period to draw any long-term conclusions about the influence of the Swiss National Bank's decision upon the market value of banks operating in the Polish banking sector. Nobody tries to deny that the existing situation will contribute to reduced profits of commercial banks, which will be reflected in their share quotations. The Polish zloty's weakening in relation to the Swiss franc will contribute to less regular repayments of loans by the borrowers, whose monthly installments expressed in zlotys are now higher. This, in turn, will be reflected in the increased specific reserves created by banks, and consequently it will contribute to reductions of capital ratios, including the most important Common Equity Tier 1 (CET 1).

With the borrowers in mind, commercial banks introduced certain facilitations for their clients with credits indexed or denominated in the Swiss currency. Those facilitations included:

1) taking into account the negative LIBOR rates in the calculation of interest rates when determining the size of installments,

2) reducing the CHF/PLN exchange rates at which the amounts due in zlotys are calculated (foreign exchange spreads),

3) introducing simplified procedures for periods of grace in repayment of capital installments.

Since those actions proved insufficient, the propositions to regulate the problem were presented by the Parliament, the Commission for Banking Supervision, the main political parties, and the Polish Bank Association. The proposed solutions were very divergent in terms of the proposed methods of restructuring foreign currency housing loans, recipients of assistance and the conditions they must fulfill to receive it, as well as the parity of participation in financing the costs by the parties involved: the state treasury, the commercial banks and the borrowers. At times, announcements of the most radical manners of restructuring the credits and burdening the banking sector with its costs have contributed to reduction of bank share quotations, which were as profound as the

one resulting from the announcement of the decision by the Swiss National Bank.

Those in favour of burdening the banks with the costs of currency conversion emphasise the public aspect of the situation, in the context of perception of banks as institutions of public confidence and trust. The following are among the most important arguments for this type of solution:

1) the banks' staff in direct contact with customers were concentrating on their sales targets, connected with their system of motivation, and very often they did not provide their potential clients with full information about the existing currency risk,

2) a retail client is not capable of evaluating and hedging currency risk in the same manner as professional departments of banks and the experts they employ,

3) currency loans were offered as an alternative product when the borrower's creditworthiness in Polish zlotys proved insufficient (installments of CHF credit repayments were far smaller than in the case of analogical PLN credits),

4) banks granted credits, in which the ratio between the value of the credit and the value of its collateral (the purchased property) exceeded 100%,

5) banks ought to have been aware that the results of currency mismatch on the part of the borrower could eventually be borne by them,

6) the lack of earlier regulations and recommendations from the supervising authorities, concerning granting of currency credits and the required level of guarantees.

The opponents of the solution emphasise that:

1) the proposed methods of restructuring, which place the burden on one party, would lead to discrimination in favour of the chosen group of clients, who did, after all, sign legally binding contracts,

2) unequal treatment of the borrowers with credits in zlotys and in foreign currencies is unfair towards the clients who acted responsibly and made an informed decision to choose the zloty loan, which meant higher cost of repayment, but no currency risk,

3) this leads to a situation, where borrowers incurring higher risk benefit from favourable levels of exchange rates, but in the case of an unfavourable scenario they are protected by the state,

4) no proposition takes into account the earlier benefits enjoyed by the borrowers as a result of choosing the CHF loans; nor do they foresee a situation of possible

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rapid depreciation of the Swiss franc, which might take place in the future,

5) it is possible that the solution will be abused, and that the assistance received once will lead to repeated risky behaviour (particularly in case of the clients aware of the currency risk they incur),

6) the problem is exceedingly politicised, which may lead to loss of public confidence in the entire banking system,

7) the costs of restructuring borne by the banks would contribute to their lower profits, and consequently to lower income tax paid into the state treasury and lower dividends for shareholders (including from banks controlled by the state), and to lower market value of commercial banks,

8) the necessary funds can be assigned towards increasing the required equity capital, which, according to the new regulations on capital adequacy, must be increased systematically,

9) foreign strategic shareholders may take legal steps against the state treasury if they decide that restructuring of currency loans breaches the conditions of their investment protection contracts.

As in many cases of this type, there are no perfect solutions fair to all those involved. Once again it is confirmed that the most rational solution in case of financial and capital markets is the principle of applying only the necessary regulations, and leaving as much market freedom as possible.

Conclusions

Regardless of which solution is adopted, its consequences will be significant not only for the banks and borrowers, but for the entire economy. Ill-considered actions may destabilise the banking system and lead to economic and financial problems of the banks with a large proportion of currency credits in their credit portfolios. Undoubtedly, this would influence their market value. Therefore, arriving at a rational compromise constitutes a basic challenge facing not only banks and borrowers, but also the institutions of banking supervision and the bodies responsible for the financial stability of the state economy.

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