Bezpieczny Bank
3(60)/2015

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STRUCTURE OF THE COST OF DEPOSITS IN SELECTED EU COUNTRIES

version: *April 2015*

INTRODUCTION

The financial crisis in the years 2007–2009 was one of the factors of structural changes in the financial market whose consequences we feel to date. One of the changes is the permanent growth of relative financing costs of the banking sector. For the purpose of this article, a relative cost is measured on the basis of the deviation of actual deposit prices from money market benchmarks, because money market benchmarks are not important reference points only, but they are mainly used as a basis for the valuation of various financial products. For example, a three-month USD LIBOR is an index that determines the amount of flows in derivative instruments of USD 100 trillion in total[1], while WIBOR (for all terms) is used as an index for approximately PLN 6 trillion of interest derivatives and over PLN 400 billion of loans[2].

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1 Amount equal to 10^{14}, see: Duffie D., Stein J., Reforming LIBOR and Other Financial Market Benchmarks, Working Paper no 3170, Stanford University, September 19, 2014, p. 18.

2 Own calculations of IBnGR based on NBP data and annual reports of domestic banks.

The purpose of this article is to examine the impact of the crisis on relative cost of deposits in selected EU countries both in and outside the Eurozone. Empirical data relates to deposit prices in the retail and corporate segment in two countries from the Eurozone: the country of least risk (Germany) and the country of the most serious risk (Greece) and in two countries from outside the Eurozone: a mature country (Sweden) and an emerging country (Poland). The analysis is based on evidence for material structural changes in these markets and the separation of key differences between particular countries and types of instruments. The purpose of the analysis is to verify whether the crisis contributed to the change of actual deposit prices in relation to money market benchmarks as the literature shows that the present money market benchmarks have stopped reflecting the marginal price of money.

The article is a part of the ongoing discussion on the reform of money market benchmarks. The process of changes was initiated by the Wheatley commission's report (2012)[3], which was followed by a document prepared by a task force at the Bank for International Settlements (2013)[4], recommendations by EBA/ESMA (2013)[5] and IOSCO (2013)[6]. The European Parliament prepared a proposal for a "Regulation on indices used as benchmarks in financial instruments" (2013)[7], and the Financial Stability Board published a comprehensive report (2014)[8] based on the work of the Market Participants Group[9] and IOSCO[10].

Financial market participants attempted to reform the benchmarks for two purposes. The first goal was to make them more resistant to manipulation, which distorted LIBOR and EURIBOR many times in the past. The other goal was to make the rate more representative and adequate so that the benchmark could be commonly applied in relation to balance-sheet and off-balance-sheet products. The reformers agreed that a change in the nature of the benchmark from declarative to transactional, i.e. based on actual deposit prices, was a remedy for both of the potential weaknesses of the benchmarks.

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3 The Wheatley Review of LIBOR: final report, HM Treasury, September 2012.
4 Towards Better Reference Rates Practices: A Central Bank Perspective, BIS, March 2013.
5 ESMA-EBA Principles for Benchmark-Setting Processes in the EU, ESMA/2013/659, June 6, 2013.
6 Principles for Financial Benchmarks Final Report, OICU-IOSCO, FR 07/13, July 2013.
7 Proposal for a Regulation of the European Parliament and of the Council on indices used as benchmarks in financial instruments and financial contracts, Brussels, 18.9.2013.
8 Reforming Major Interest Rate Benchmarks, Financial Stability Board report, 22.07.2014.
9 Market Participants Group on Reforming Interest Rate Benchmarks, MPG Final Report, March 2014.
10 Review of the Implementation of IOSCO's Principles for Financial Benchmarks by Administrators of Euribor, Libor and Tibor, International Organization of Securities Commissions report, July 2014.

As proven by Brousseau, Chailloux and Durré (2013)[11], banks have created a significant risk of discrepancies between the published LIBOR rate and the real cost of financing, which makes the management of assets and liabilities ineffective. The divergence between the reference rate and the actual cost of balance-sheet and off-balance-sheet instruments generates an economic risk, which increases the uncertainty of the future value of assets and net interest income.

This analysis reflects the scope and time volatility of the divergence, as well as the diversity of the scale of the divergence in particular countries.

ANALYSIS OF EMPIRICAL DATA

We collected data related to an average monthly notional-weighted interest rate of bank fixed-rate term deposits in the retail and corporate segment (so called customer data, hereinafter referred to as B2C)[12]. The data comes from reports of central banks: the National Bank of Poland[13] for PLN, Riksbank[14] for SEK, Bundesbank[15] for EUR in Germany and Ethniki Trapeza Ellados[16] for EUR in Greece. Time series were supplemented with data concerning local IBOR-like benchmarks[17] and OIS contracts[18] published by Thomson Reuters and Bloomberg. The analysis covers the years 2005–2014[19].

For the Polish deposit market, the data of IBnGR is also used[20]. It refers to prices of negotiable deposits based on transactional data which is sent every day by domestic banks to the Money Market Monitoring System (SMRP). This data covers the period from November 2012, i.e. the first full month of the system's operation. Contrary to other data related to the B2C market, these are rates based

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11 Brousseau V., Chailloux, A., Durré, A., Fixing the Fixings: What Road to a More Representative Money Market Benchmark?, IMF Working Paper No. 13/131, May 29, 2013, p. 7–8.

12 For interest rates for which a yield curve was available, we presented the rates as an average of key 3M and 6M terms. For the B2C market, we used an average price in the corporate and retail market.

13 http://www.nbp.pl

14 http://www.riksbank.se/en

15 http://www.bundesbank.de

16 https://www.nbg.gr

17 IBOR – Inter Bank Offered Rate, a benchmark related to the cost of interbank loans which is calculated on the basis of declarations made by key banks in the financial centres (e.g. WIBOR for the PLN market, STIBOR for the SEK market).

18 OIS – Overnight Index Swap, a derivative which reflects an average expected cost of overnight loans during the term of the contract.

19 Data on Sweden come from the years 2006–2014.

20 www.smrp.pl

on actual transactions[21]. Therefore, time series for PLN include some data coming from the SMRP.

The data is presented from different points of view. Firstly, we present the course of the volatility of average interest rates with regard to three different classes of risk:

1. B2C customer deposits, which determine the actual cost of financing banks' balance-sheets in the short run;
2. IBOR-like benchmark theoretically related to the prices of interbank deposits on the assumption that unsecured short-term funds are lent to banking institutions with the highest credit rating in a given market;
3. Prices of OIS contracts representing an average expected ONIA-like overnight rate[22] during the term of the contract in which liquidity risk and credit risk are at a minimum.

Secondly, we converted the above time series related to variable levels to show the volatility of a spread between deposit rates and OIS contract prices and the base IBOR benchmark. The analysed curves are presented in Charts 1–8 in Appendix 1.

The volatility analysis of the above variables indicates that the analysed period was characterised by price shocks, which contributed to a change in the structure of prices in the money market. The first price shock occurred in 2007, when the first symptoms of the subprime crisis appeared, including the bankruptcy of funds operated by Bear Stearns and the withdrawal of BNP from securitisation funds. Earlier, IBOR rates were very close to OIS prices and the cost of customer deposits was below IBOR. Therefore, the OIS-IBOR spread was close to zero, while the B2C-IBOR spread was negative. What did such a price relationship reflect? It meant that the money market before the middle of 2007 perceived liquidity and credit risks as very limited. At the same time, IBOR was the marginal cost of funds and banks generated interest margins on deposits kept for non-financial entities.

The situation changed radically after the outbreak of the global financial crisis. The crisis had several phases, which resulted in different volatilities of asset prices because of various reasons for price instability. In the first phase preceding the fall of Lehman Brothers (from August 2007 to September 2008), the OIS-IBOR

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[21] The Money Market Monitoring System (SMRP) is used by most domestic banks to verify their price policy in the deposit market and estimate the financing cost of the banking sector. The SMRP collects data of the daily distribution of interest rates of negotiable term deposits for 7 maturities and 5 customer segments. The data comes from banks whose balance-sheet total constitutes 93% of the local banking sector. In the first quarter of 2015, an average daily volume of transactions recorded by the SMRP was PLN 23 billion and 7,500 transactions.

[22] ONIA – Overnight Index Average, a benchmark applicable to the cost of overnight loans, calculated on the basis of transactions in the interbank market (e.g. POLONIA for the PLN market, EONIA for the EUR market).

spread was strongly negative, while the B2C-IBOR spread did not change. This proved that banks noticed the growth of liquidity and credit risk (which is proven by increasing divergence between OIS and IBOR rates), but they did not report any liquidity problems (thus they did not overpay the customers to collect stable deposits).

The following most severe phase of the crisis was initiated by the bankruptcy of Lehman Brothers. The effect of that was a significant drop in the credibility of the banking sector and liquidity deterioration caused by the disappearance of the interbank term deposit market[23] and the abrupt growth of financing costs. In consequence, we observed record negative OIS-IBOR spreads and the cost of customer deposits exceeded IBOR rates for the first time in most markets. Credit and liquidity risks were perceived as very high. Facing the loss of stable sources of funding, banks started a price war in order to acquire funds from non-financial customers.

That situation lasted several months, but with the improvement of sentiment the spreads were slowly decreasing and the cost of customer deposits slowly returned below the IBOR reference rate, while OIS prices approached the quotations of interbank deposits.

From 2010, a different type of uncertainty which was not connected with the private sector, but with the public sector, increased. Greece and other peripheral economies of the European Union were on the verge of bankruptcy as a result of the increasing and non-financeable public debt. The unrest reached its peak in December 2011, when the OIS-IBOR spread widened again and customer deposit prices exceeded the reference rate.

In March 2012, Greece was declared insolvent[24], which, given fiscal instability in the EU countries, strengthened the above phenomenon. At present, IBOR is between the average prices of customer deposits and the OIS contract prices for all the countries in question. This may be connected with structural changes in the money market, which may have serious implications for the future IBOR benchmark.

The following table summarises an average spread for the four periods which are discussed above by country and market segment.

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[23] The disappearance of interbank deposits applies to transactions exceeding 1 week and results from mutual limitation of credit limits to market participants in unsecured loans.

[24] On 9 March 2012, ISDA formally announced a credit event connected with the restructuring of Greece's debt.

Table 1. Deviation of B2C[25] prices and OIS from IBOR in percentage points

Period	Germany B2C	Greece B2C	Poland B2C	Sweden B2C	EUR OIS	PLN OIS	SEK OIS
Before AUG07	–0.38	–0.23	–0.79	–0.66	–0.05	–0.16	–0,01
AUG07-AUG08	–0.52	–0.25	–0.98	–0.79	–0.51	–0.31	–0.33
SEP08-DEC11	–0.24	1.60	0.28	0.07	–0.51	–1.06	–0.36
After DEC11	0.14	3.09	0.37	0.51	–0.20	–0.43	–0.31

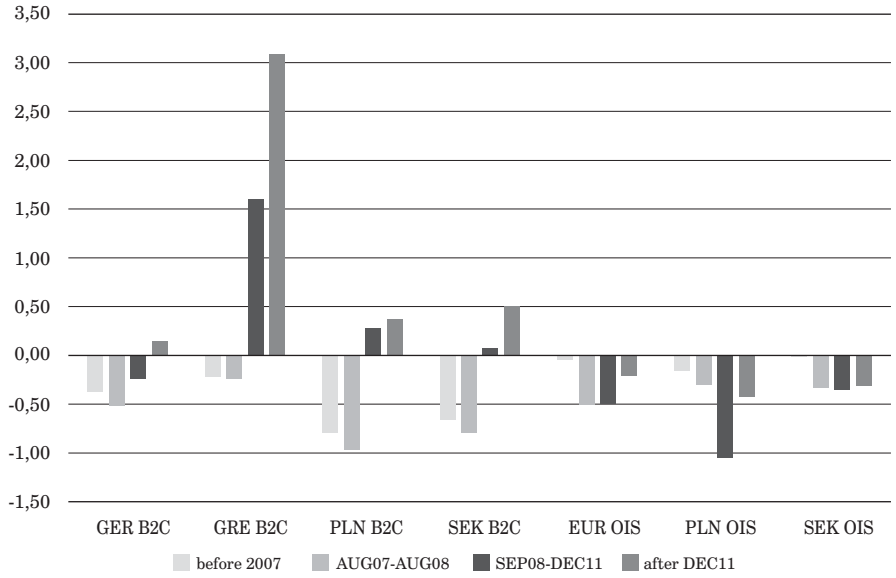
Source: own calculations based on data from Thomson Reuters, IBnGR and central banks.

The deviations of market rates from the benchmark may be analysed on the basis of two criteria:

1. the change in spreads for a given instrument in particular periods;
2. the change in spreads in a given period for various underlying instruments.

Both criteria are presented in the charts below[26]:

Chart 1. Average spread of deposits and OIS vs IBOR in the periods

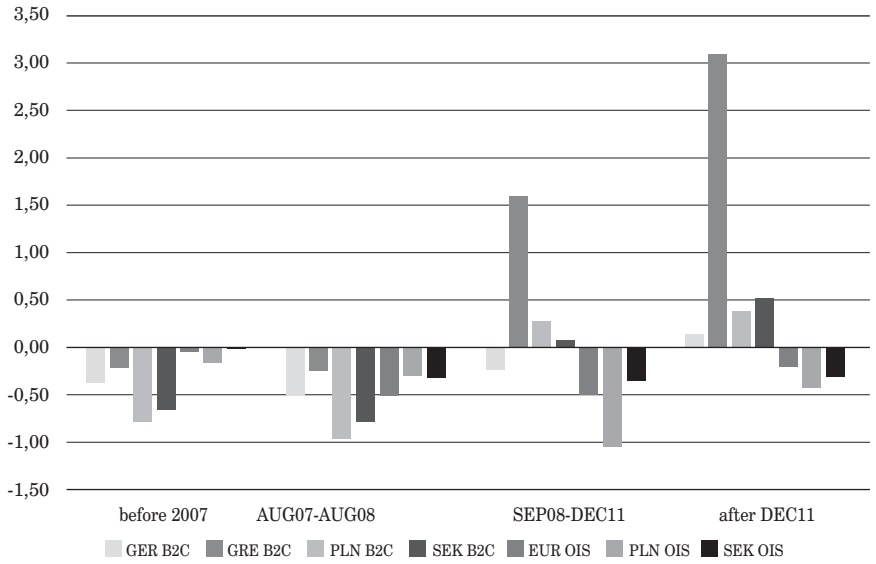


Source: own study based on data from Thomson Reuters, IBnGR and central banks.

[25] B2C (bank-to-client) – the market of customer deposits including corporate and retail segments.

[26] In the analysis of EUR rates in the EU countries, the following abbreviations are used: GER – Germany, GRE – Greece.

Chart 2. Average spread of deposits and OIS vs IBOR by country/product



Source: own study based on data from Thomson Reuters, IBnGR and central banks.

Based on the analysis of the above charts, we may draw the following conclusions:

- In the first two periods (i.e. from September 2008), customer rates were below IBOR, which meant that the rate constituted the banks' actual funding cost and the banks recorded a positive interest margin on their customer deposit portfolio. It is worth pointing out that the relative cost of deposits was smaller for countries from outside the Eurozone, which may indicate that the competitiveness of those markets in that period was lower.
- After the collapse of Lehman Brothers, customer deposits in all countries were more expensive than IBOR, except for Germany, where the barrier of the IBOR rate was exceeded only after the liquidity crisis in December 2011. A change in banks' relative funding cost meant that IBOR stopped constituting the marginal cost of funds and banks recorded interest losses on customer transactions in comparison to the IBOR benchmark. That effect was visible in particular in Greece, where the financing cost of banks from the non-financial sector grew up to 300 basis points over EURIBOR (it is obviously connected with the low creditworthiness and related liquidity problems of Greece).
- From August 2007 OIS rates were much below IBOR, but in Poland we observed a strong widening of the spread after the collapse of Lehman Brothers, which could be connected with global risk aversion felt in particular in the emerging

economies. The spread was relatively smallest for the Eurozone after the announcement of the insolvency of Greece, which was connected with loosening of monetary policy by the ECB, which decreased liquidity tensions in the money market.

Let us also note the scope of the monthly instability of rates representing various asset classes. This is depicted in the following table.

Table 2. Standard deviation of monthly differences in B2C, OIS, IBOR in percentage points

Period	EURIBOR	EUR OIS	Germany B2C	Greece B2C	WIBOR	PLN OIS	Poland B2C	STIBOR	SEK OIS	Sweden B2C
Before AUG07	0.06	0.05	0.06	0.07	0.18	0.18	0.15	0.05	0.09	0.15
AUG07-AUG08	0.19	0.06	0.09	0.11	0.13	0.11	0.11	0.13	0.07	0.08
SEP08-DEC11	0.27	0.25	0.23	0.29	0.23	0.33	0.23	0.36	0.32	0.24
After DEC11	0.07	0.05	0.05	0.12	0.14	0.13	0.14	0.09	0.07	0.05

Source: own study based on data from Thomson Reuters, IBnGR and central banks.

At the beginning the unstable rates were created by market tensions. After 2008, the fluctuations were mainly caused by the monetary policy of central banks, which modified reference rates in response to the global economic situation. The biggest volatility of prices was observed in the period between the collapse of Lehman Brothers and the apogee of the crisis connected with the insolvency of peripheral economies of the Eurozone. The reduction of the volatility in 2012 proves that the analysed processes stabilised and suggests that relations between individual yield curves in the money market after the period of strong fluctuations are permanent and are connected with structural changes in the banking sector.

CONCLUSIONS

The authors collected interest rates for three classes of risk (customer deposits, IBOR-like benchmark and OIS contracts) and for four selected EU countries (Germany, Greece, Sweden and Poland). The analysis of the rates during the four phases of the development of the crisis (periods: to 2007, 2007–08, 2008–11 and after 2011) reflects permanent trends in relations between particular yield curves.

Before the financial crisis in the years 2007–2009, IBOR was the marginal cost of funds. The average financing cost of banks was smaller than the rate offered in the interbank market. The crisis of reliability contributed to the deterioration of liquidity in the financial market and the disappearance of the market of unsecured interbank deposits because of the mutual lack of credit limits. Therefore, the role of funding based on secured deposits and the retail (customer) market increased. In the other market, interest rates on term deposits from non-financial customers substantially exceeded IBOR. Thus, IBOR does not constitute a benchmark for the marginal cost of funds any more.

Banks fund their long-term assets with short-term liabilities. The mismatched time structure of both sides of the balance-sheet is one of the risks which banks are compensated for by their net margin (the other risk is the credit risk secured with a credit margin). The disparity between the profitability of assets and liabilities forms a systemic risk which may impact the bottom line.

Banks manage the price and liquidity risk of instruments indexed to IBOR (which represents the theoretical cost of interbank term deposits) and ONIA (which represents transactional prices of interbank overnight deposits). IBOR is used to define cash flows in loans and variable-rate bonds, while ONIA is used for OIS contracts, which at present form the main source for the valuation of interest-bearing derivatives[27].

Observations presented herein show that IBOR-like rates permanently deviated from prices representing actual money market transactions as a result of the subprime crisis in the years 2007–2009 and the PIGS crisis in the years 2010–12. We observe this phenomenon in the developed countries which form the core of the single monetary area (Germany), in the peripheral economies (Greece), in a developed country from outside the area (Sweden) and in an emerging economy which is converging with the Eurozone (Poland). Consequently, there appeared a permanent difference between the benchmark and the two series of prices representing balance-sheet and off-balance-sheet transactions. For the purpose of this article, to exemplify balance-sheet transactions, we chose (retail and corporate) customer term deposits, while off-balance-sheet transactions are exemplified by OIS contracts. The time series are based on actual transactions and reflect the actual relationship between demand and supply (opposite to IBOR, which is declarative in practice).

After the period of the high volatility of interest rates applicable to the aforementioned asset classes, the following price relationships were established:

- the rates of customer deposits used by banks to finance their activity from unsecured sources are above corresponding IBOR benchmarks; the spread between the cost of deposits and IBOR depends on liquidity and creditworthiness of a given country (it is the greatest in Greece, and the lowest in Germany);

[27] Whittall Ch., The Price is Wrong, Risk Magazine, March 2010.

- ❖ the prices of OIS contracts representing a rate close to a risk-free rate (i.e. deprived of material credit and liquidity components) are below corresponding IBOR benchmarks. The OIS spread to IBOR is determined by the ongoing liquidity situation of the banking sector.

Thus, IBOR, which theoretically reflects the cost of unsecured interbank loans, is located in a channel between customer deposit rates (as the top limit of the channel) and OIS contract rates (as the bottom limit of the channel). The limits of the channel are the prices of balance-sheet and off-balance-sheet transactions, while IBOR fluctuates at differing distances around actual transaction prices. For IBOR rates, it is a problem that there is no trading in interbank term deposits, which were practically completely replaced by secured deposits. Therefore, in practice, only the prices forming the limits of the channel are based on the actual transactional turnover.

The above phenomenon generates the following risks:

- ❖ if part of the assets are based on an IBOR-like variable interest rate, the interest income of the banking sector may differ from the interest cost of liabilities, which is generated mostly by customer deposits;
- ❖ the portfolio of derivatives indexed to IBOR is valuated on the basis of OIS curves, which results from the mass collateralisation of the presettlement risk, which is deepened by the enforcement of obligatory central clearing for certain types of transactions. In consequence, basis risks may have a material impact on the market risk and portfolio valuation[28].

As proven by Brousseau, Chailloux and Durré (2013), reference rates are less and less representative for banks' financing costs and are becoming more and more important for the valuation of derivative contracts[29]. This brings about particularly critical implications if the share of variable-rate assets based on an IBOR-like index or derivatives indexed to IBOR (including currency basis swaps) is substantial. Thus banks acquire liquidity, make investments and manage their liquidity gap without control over or the ability to secure the cost of those operations.

The Financial Stability Board postulates that two money market benchmarks should be selected for each currency[30]:

1. IBOR+ based on actual transactions made in the market of unsecured term deposits, which will be used to measure balance-sheet assets which are subject to credit risk;
2. RFR (Risk Free Rate) based on the expectations of market players as to the shape and location of the yield curve which is not burdened with a liquidity

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[28] See: Bianchetti, M., Two Curves, One Price: Pricing & Hedging Interest Rate Derivatives Decoupling Forwarding and Discounting Yield Curves, Risk Magazine, August 2010.

[29] Brousseau V. et al, op. cit., p. 6.

[30] Duffie D., Stein J., op. cit., p. 14–15.

risk or a capital credit risk, which will be used to measure off-balance-sheet instruments (derivatives).

The analysis of the possible solutions shows that IBOR+ would have to be based on transaction prices, while RFR would be based on interest rates arising from OIS contracts. Duffie and Stein (2014)[31] rightly notice that it will not be possible, however, without the regulators and supervisors' decision because the change is not easy and the market prefers segments with the greatest liquidity.

At present, the database of transaction prices is available for the Polish market under the Money Market Monitoring System (SMRP). If similar databases are developed in other countries, it would be possible to analyse the actual cost of liquidity coverage by unsecured deposits on an ongoing basis and could support the definition of new benchmarks of the money market in accordance with the assumptions of the draft Regulation of the European Parliament. The development of the transaction databases is one of IOSCO's guidelines aimed at the effective verification of IBOR-like rates[32].

Abstract

As a result of the crisis of confidence in the financial markets caused by events that took place in the years 2007-2008 and later fiscal problems in the peripheral countries of the European Union, banks lost their ability of refinancing based on unsecured interbank deposits. This contributed to the growth of the importance of deposits from non-financial customers whose cost started differing significantly from money market indices based on the interbank market. Moreover, strong divergence between the rate applicable to off-balance-sheet items (OIS) and the price of cash applicable to balance-sheet flows appeared. This article presents an analysis of changes in the structure of interest rates in various segments of the market in four selected countries of the EU: two countries from the Eurozone and two non-Eurozone countries. Observations from the money market indicate that it is economically justified to create separate benchmarks for balance-sheet and off-balance-sheet items.

Key words: money market, financial crisis, funding cost, deposit interest rate, financial market indices

[31] Ibidem, p. 27–28.

[32] Review of the Implementation of IOSCO's Principles for Financial Benchmarks, op. cit., p. 3–6.

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APPENDIX 1

Chart 1. Interest rates in Germany

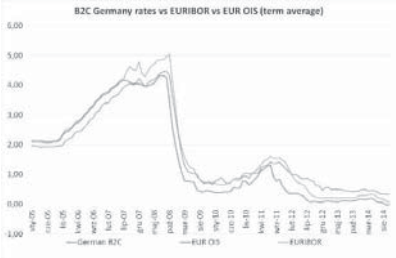

Chart 2. Interest rates in Greece

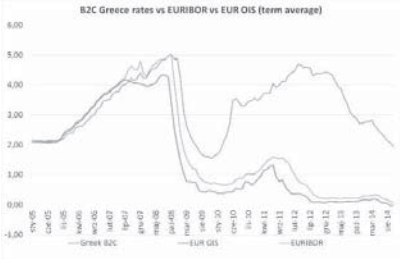

Chart 3. Interest rates in Poland

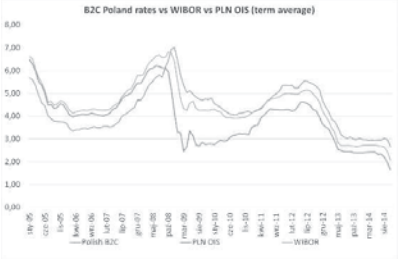

Chart 4. Interest rates in Sweden

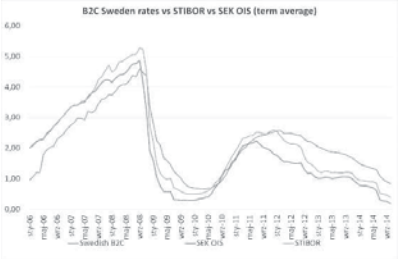

Chart 5. Spreads in Germany

Chart 6. Spreads in Greece

Chart 7. Spreads in Poland

Chart 8. Spreads in Sweden