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The functioning of the credit market in the European Union and the consequences of legal regulations regarding the cost of credit on the example of Poland

Abstract. The purpose of this work is to determine the level of financial obligations the borrower assumes when obtaining a loan in Poland, depending on the conditions under a credit agreement, circumstances related to getting and repayment of the loan.

It is found that from to January 2008 to January 2021 in emerging market economies the level of credit to the non-financial sector in the percentage of GDP is increasing to 240%, in Member states of the Euro area - about 292%. The study found that in countries in the emerging market group, the level of financing increases much quickly than in Euro area. Thus, in January 2021 compared to January 2008, the level of financing (credit to non-financial sector from all sectors at market value) in emerging market economies has tripled, while in Euro area member countries this ratio increased on 33%. In Poland, the level of financing during mentioned period increased to 141.1% and as of January 2021 amounted to USD 881.8 bln. The development of bank lending is only possible if there is a transparent relationship between the banks and the borrowers that helps to minimize credit risk.

The analysis of credit legislation in the EU countries made it possible to find that there is a problem with presentation of information on the calculation of the credit costs in a transparent and understandable way. It was established that the credit costs in Poland, taking into account its maximum level, can have a significant impact on the borrower's creditworthiness and obtaining information on the «real» credit costs is necessary to make good decisions by a potential debtor.

According to the results of the study, algorithms for calculating the credit cost were proposed, that make it possible to present all components of the costs and its level depending on the conditions for granting a loan. The results of the research can be used by potential borrowers before deciding to take a loan in a Poland bank to determine all the costs related to the loan. The research is in line with an idea of «economisation of law» or «financialisation of law».

Keywords: Bank; Loan Fees; Consumer Credit; Borrower; APR; LTV; Lending Legislation; Euro Area; EU; Poland; Emerging Market Economies

JEL Classification: G240

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**Функціонування кредитного ринку в Європейському Союзі
та наслідки правового регулювання в сфері вартості кредиту на прикладі Польщі**

Анотація. Метою дослідження є визначення рівня фінансових зобов'язань, які позичальник бере на себе при отриманні позики в Польщі, залежно від умов, передбачених договором позики, й обставин, пов'язаних із отриманням та поверненням позики.

Встановлено, що протягом січня 2008 року – січня 2021 року в країнах із ринковою економікою, які розвиваються, рівень кредитування нефінансового сектору значно зріс і становив на початок 2021 року 240% від ВВП, проте в країнах єврозони цей показник становить близько 292%. Дослідження показало, що в країнах з ринковою економікою, які розвиваються, темп зростання рівня кредитування економіки є значно вищим, ніж у країнах єврозони. Так, у січні 2021 року порівняно з січнем 2008 року рівень фінансування в країнах з ринковою економікою, які розвиваються, потроївся (надання кредитів нефінансому сектору з усіх секторів за ринковою вартістю), тоді як у країнах – членах єврозони цей показник збільшився на 33%. У Польщі рівень кредитування нефінансового сектору протягом зазначеного періоду збільшився на 141,1% і станом на січень 2021 року становив 881,78 млрд дол. США.

Розвиток банківського кредитування можливий лише за наявності прозорих відносин між банками та позичальниками, що допомагає мінімізувати кредитний ризик.

Аналіз законодавства в сфері регулювання кредитних відносин у країнах ЄС дав можливість виявити, що існує проблема представлення інформації розрахунку коштів кредиту в спосіб прозорий і зрозумілий для боржника. У процесі проведеного дослідження встановлено, що вартість кредиту в Польщі з огляду на її максимальний розмір може мати суттєвий вплив на кредитоспроможність позичальника. Отримання інформації щодо «реальної» вартості кредиту є необхідною для прийняття правильного рішення потенційним боржником.

За результатами дослідження було запропоновано алгоритми розрахунку вартості кредитних ресурсів, що дають можливість представити всі складові витрат і їх розмір у залежності від умов надання та повернення кредиту.

Результати дослідження можуть бути використані потенційними позичальниками під час визначення всіх витрат, пов'язаних із позикою, з метою прийняття рішення щодо отримання позики в польському банку. Проведене дослідження відповідає ідеї «економіалізації права», або «фінансіалізації права».

Ключові слова: банк; споживчий кредит; плата за позику; позичальник; APR; LTV; правове регулювання щодо кредитування; єврозона; ЄС; Польща.

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**Функционирование кредитного рынка в Европейском Союзе
и последствия правового регулирования в сфере стоимости кредита на примере Польши**

Аннотация. Целью исследования является определение уровня финансовых обязательств, которые заемщик берет на себя при получении займа в Польше, в зависимости от условий, предусмотренных договором займа, а также обстоятельств, связанных с получением и возвратом займа.

Установлено, что с января 2008 года по январь 2021 года в развивающихся странах с рыночной экономикой уровень кредитования нефинансового сектора значительно вырос и составил на начало 2021 года 240% от ВВП, в то время как в государствах – членах еврозоны этот показатель составляет около 292%. В январе 2021 года по сравнению с январем 2008 года стоимость предоставленных кредитов развивающимся странам с рыночной экономикой увеличилась втрое (кредитование нефинансового сектора всеми секторами по рыночной стоимости), в то время как в странах-членах еврозоны этот показатель увеличился на 33%.

В Польше уровень кредитования в течение указанного периода увеличился до 141,1% и в январе 2021 года составил 881,78 млрд. долл. США.

Развитие банковского кредитования возможно только при наличии прозрачных отношений между банками и заемщиками, что значительно помогает минимизировать кредитный риск.

Анализ законодательства в сфере регулирования кредитных отношений в странах ЕС позволил выявить, что существует проблема прозрачного и понятного представления информации расчета стоимости кредита заемщику. В процессе проведенного анализа установлено, что стоимость кредита в Польше может иметь существенное влияние на кредитоспособность заемщика. Получение информации о реальной стоимости кредита является необходимым для принятия правильного решения потенциальным должником.

По результатам исследования были предложены алгоритмы расчета стоимости кредитных ресурсов, что дает возможность представить все составляющие расходов и их размер в зависимости от условий предоставления и возврата кредита.

Результаты исследования могут быть использованы потенциальными заемщиками при определении всех расходов, связанных с займом, с целью принятия решения о получении займа в польском банке. Проведенное исследование соответствует идее «экономиализации права», или «финансиализации права».

Ключевые слова: банк; потребительский кредит; плата за кредит; заемщик; APR; LTV; правовое регулирование по кредитованию; еврозона; ЕС; Польша.

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Funkcjonowanie rynku kredytowego w Unii Europejskiej
oraz konsekwencje regulacji prawnych w zakresie kosztu kredytu na przykładzie Polski

Streszczenie. Celem opracowania jest określenie poziomu zobowiązań finansowych kredytobiorców, którzy zaciągają kredyt w Polsce, w zależności od warunków wynikających z umowy kredytowej oraz okoliczności związanych z otrzymaniem i spłatą kredytu.
Ustalono, że w okresie od stycznia 2008 r. do stycznia 2021 r. poziom kredytowania gospodarek rynków wschodzących (sektor niefinansowy) znacznie wzrósł i na początku 2021 r. wyniósł 240% w stosunku do PKB, natomiast w krajach strefy euro relacja ta wynosiła około 292%. Na rynkach wschodzących dynamika wzrostu kredytowania gospodarki była znacznie wyższa, niż w państwach strefy euro. W styczniu 2021 r. w porównaniu ze styczniem 2008 r. poziom finansowania gospodarek rynków wschodzących wzrósł trzykrotnie (pożyczki dla sektora niefinansowego ze wszystkich sektorów według wartości rynkowej), podczas gdy wskaźnik ten w przypadku gospodarek strefy euro zwiększył się do 33%. W Polsce poziom finansowania w tym okresie wzrósł do 141,1% i według stanu na styczeń 2021 r. wynosił 881,78 mld USD.
Rozwój kredytowania możliwy jest tylko wtedy, gdy istnieje przejrzysta relacja między bankami a kredytobiorcami, która pomaga zminimalizować ryzyko kredytowe.
Na podstawie analizy przepisów dotyczących kredytowania w krajach UE stwierdzono, że występuje problem przedstawienia informacji o obliczaniu kosztów kredytu w sposób przejrzysty i zrozumiały dla dłużnika. Ustalono, że środki pożyczkowe w Polsce, biorąc pod uwagę ich maksymalną wielkość, mogą mieć istotny wpływ na zdolność kredytową dłużnika a uzyskanie informacji o rzeczywistym koszcie kredytu jest niezbędne do podjęcia właściwej decyzji przez potencjalnego dłużnika.
Zaproponowano algorytmy obliczania opłat kredytowych, które dają możliwość przedstawienia wszystkich składników kosztów kredytu oraz ich wielkości, w zależności od warunków otrzymania i spłaty kredytu.
Wyniki badań mogą być wykorzystane przez potencjalnych kredytobiorców, przy określaniu wszystkich kosztów związanych z kredytem, w celu podjęcia decyzji o zaciągnięciu kredytu w polskim banku. Opracowanie koresponduje z ideą «ekonomizacji prawa», lub «finansjalizacji prawa».
Słowa kluczowe: bank; kredyt; opłaty kredytowe; kredytobiorca; APR; LTV; uregulowania prawne kredytów; strefa Euro; EU; Polska; państwa rozwijające się.

1. Introduction

After the world felt the effects of the global financial crisis, part of the research focused on the macro level - increasing the liquidity of financial institutions, ensuring the stability of national currencies, reducing inflation, government support for financial institutions, promoting the development of the real estate market necessary for the development of mortgage lending and other prerequisites. The second part, which can be attributed to the microlevel, is to increase the credit requirements of a potential borrower, to improve the quality of credit security as well as an adequate level of LTV. That is, most research is about creating a supportive environment for financial institutions. However, it should be remembered that lending is the involvement of two parties - the lender and the borrower. And only when the debtor is also «protected» it will be possible to talk about the development of lending. In our research, we consider protection as knowledge and skills. First and foremost, this is an awareness of the legal and financial aspects related to credit, as well as the ability to objectively evaluate capabilities and financial obligations by the borrower.

Some of the important EU directives and guidelines related to consumer credit are: Directive 2008/48/EC on credit agreements for consumers, issued 23 April 2008; Directive 2002/65/EC concerning distance marketing of consumer financial services; and Guidelines on the application of the Consumer Credit Directive in relation to costs and the Annual Percentage Rate of Charge, issued 8 May 2012.

Changes in the legislation, preparation of a credit agreement by banks on special legal language is not always clear to the borrower, and complex financial calculations with «hidden» costs, which are not always transparent and clearly written in a credit agreement, all of it makes a lot of problems for the borrower to objectively assess his/her financial capabilities.

The definition of credit, which was set out by The Polish Financial Supervision Authority, is putting at the disposal of the borrower, for a specified period of time, money for a specified purpose (Radziszewski, 2015). The borrower is obliged to use the money under the terms of the credit agreement with the bank, to repay the amount of the credit used, together with interest on the indicated repayment dates, and to pay a commission on the credit granted (Kępczyńska, 2017).

In accordance with The Directive 2008/48/EC on credit agreements for consumers (amended in 2011, 2014, 2016 and 2019), - established a harmonised EU framework for consumer credit and provide a high level of consumer protection - «...total cost of the credit to the consumer means all the costs, including interest, commissions, taxes and any other kind of fees which the consumer is required to pay in connection with the credit agreement or crowdfunding credit services and which are known to the creditor, in the case of credit agreements, or to the crowdfunding credit services provider, in the case of crowdfunding credit services, except for notarial costs; costs in respect of ancillary services relating to the credit agreement or crowdfunding credit services are also included in the total cost of the credit to the consumer where, in addition, the conclusion of a contract regarding such ancillary services is compulsory in order to obtain the credit or to obtain it on the terms and conditions marketed».

Materials prepared by the National Bank of Poland under the project «Entrepreneurship in practice» in Poland state that the cost of credit is not an obvious matter and its calculation may raise various doubts. Particularly important in this respect is the issue of the APR, i.e. the annual percentage rate of charge for the credit. The Directive 2008/48/EC (Consumer Credit Directive) provides a way of calculating the APR in all member countries of the European Union. But it should be noted that the annual interest rate should not be identified with the borrowing rate. It is worth noting that the bank may use different methods of calculating interest charges in accordance with applicable national laws and regulations. Since the Consumer Credit Directive does not regulate the method for calculating interest charges, banks in member countries of the European Union can determine the method for calculating these charges.

However, a discussion of this indicator should be preceded by a characterisation of the elements that make up the total cost of credit. Thus, they are the following variables: commissions and fees, interest, security costs, In addition, the costs of credit also include additional costs, i.e. fees for annexes to the agreement, certificates, statements, reminders and/or commissions on early repayment of the credit, changes in the amount of the credit, the credit currency or the duration of the credit (NBP, 2015).

An important contribution to the discussion on the APR was also made by Kazbieruk, who addressed the issue of the relationship between nominal interest rates and the APR in an article entitled «Differences between nominal interest rates and the APR». The expert stated that «Consumer who wants to contract a credit should know from the start exactly what the difference between the APR and the nominal interest rate is» (Kazbieruk, 2014).

Analysing the above mentioned, it can be stated that there is a serious problem related to the debtor's calculation of its credit obligations. Thus, an important element is the need to calculate the credit agreement. The calculations are carried out by two parties, i.e. the banks and the borrowers. While banks, as professional institutions, have perfectly mastered the techniques of calculating the profitability of their loans, the other side is in a much worse situation. In order to partially help to the potential borrowers to make rational decisions in obtaining credits, our research was conducted.

2. Brief Literature Review

The sources of income of the bank are the income received from various activities, namely, providing credits, securities transactions, servicing the accounts of bank clients, settling and providing other traditional and non-traditional banking services. Albertazzi and Gambacorta (2009) investigated issues related to the profitability of banking institutions. Research by DeGryse, Kim and Ongena (2009) provided a clear and comprehensive interpretation of all key theoretical understandings of banking theory. Analysing the bank's sources of income in different countries, it was found that «...Overall it seems that only European banks extract rents from their relationship borrowers (i.e., those with long relationships and few banks) through higher loan rates, while U.S. banks actually charge lower rates...» (DeGryse et al., 2009, p. 98). According to the research, loan tends to decrease when the interest rates increase; while it increases when the interest rates decrease.

Busch and Memmel (2016) in their work shown that a net interest margin of around 47% is needed to cover operating costs of bank for providing liquidity and payment services. Speaking of credit, the main source of income is an interest rate and credit fees. These directions were explored in works of Alessandri and Nelson (2015). However, banks operate in a competitive environment and cannot afford to raise rates and loan fees much. Jeon and Kyu Lim (2013) found that

the relationship between banking competition and financial stability changes depending on the characteristics of banks. In works of Freixas and Rochet (2008) were investigated problems related to «non-price competition» and its effect on the competition-stability trade off and the entry of new banks. The studies related to the assessment of the creditworthiness of the potential borrower (including his credit history) and the impact of such assessment on the level of credit rates (Wasilewska and Davydenko, 2017).

Claessens, Coleman and Donnelly (2017) investigated issues related to bank competition and probability. Thus they found that «…a one percentage point interest rate drop implies an 8 basis points lower net interest margin, with this effect greater (20 basis points) at low rates. Low rates also adversely affect bank profitability, but with more variation» (Claessens et. al., 2018, p. 1).

A bank is considered to operate beneficially for its customers when it charges lower interest rate markups and offers more stable interest rates compared with its competitors. Issues related to bank profitability including during recessions are discovered by Bolt, Haan, Hoeberichts, Oordt and Swank (2012). It was noted that long-term interest rates are important determinants of bank profit in times of high economic growth (Bolt et. al., 2012). Research by Iyer, Jensen, Johannesen and Sheridan (2017) found that «…non-systemic banks lose almost half of their uninsured deposits during a crisis while the losses suffered by systemic banks are much smaller, presumably because of depositor beliefs that these banks are more likely to be bailed out in case of failure» (Iyer, Puri, & Ryan, 2016, p. 23).

Banks shield their customers from sudden market movements and provide smooth interest rate adjustments (Fuertes and Heffernan, 2009). Furthermore, banking regulators should be aware of the speed and extent to which changes in funding costs are passed on to bank's customers (Wang and Lee, 2009). Research related to bank relationship and borrowers was undertaken by Ongena and Smith (1998) and Udell (2008). Issues related to the bank's cooperation with debtors were explored in research works of Bhatta (2015); Berg, Saunders and Steffen (2015); Berg, Manju and Rocholl (2013); Bharath, Sandeep, Saunders and Srinivasan (2011). It should be noted that the more insecure side of such relations is the debtor as he is not always able to properly assess the financial obligations associated with obtaining and servicing the credit before signing the credit agreement. Wasilewska, Wasilewski and Zabolotnyy (2018) found the impact of the potential borrower's financial situation on the level of loan repayment, as well as the level of the interest rate.

Problems related to collaboration of banks and borrowers were investigated in the works of Bodenhorn (2003), Puri, Rocholl, and Steffen (2011, 2013).

What obligations does the client (a future debtor) have to the bank when signing the credit agreement?

The monthly payments are usually made up of interest and principal payments (Tiwari and Moriizumi, 2003) and, of course, loan fees. A loan fee is a fee associated with a loan but it does include the interest rate. Kolasinski, Reed and Ringgenberg (2013) examined how equity lending fees respond to demand shocks. There are many types of fees associated with borrowing money. De-Losso, Chague, Genaro and Giovannetti (2017) and Chague, De-Losso, Genaro, Giovannetti (2014) investigated issues related to costs of a loan and determined the factors that affect the level of loan fees. Some of the most common examples are application fees, processing fees, origination fees, closing annual fees, funding fees, late fees and prepayment fees.

It is evident from the literature review that many different aspects of lending have been explored, however, issues related to the analysis of legislation to determine the amount of costs related to obtaining and disbursing a loan in a way that is transparent and understandable to the potential borrower have not been sufficiently investigated.

3. Purpose

The main objective of the research is to determine the credit market in the European Union and the level of costs associated with credit on the basis of legal regulations in Poland.

4. Methods

The empirical part presents the development of the credit market in the European Union and the evolution of credit interest rates. The research period covered the years Jan 2008 - Jan 2021.

In addition, on the basis of the relevant articles of the Consumer Credit Act of Poland, Directive 2008/48/EC on credit agreements for consumers, and under its content, mapping has been carried out using empirical data. This paper is focused on Euro area and Emerging Market Economies (aggregate). Euro area is a monetary union of 19 member states of the European Union that have adopted the euro as their primary currency and sole legal tender. The Euro area consists of Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain (The office of the European Union, 2012). The EME dataset comprises 30 emerging market countries (EM30), including Bulgaria, Romania, Russia, Korea, Indonesia, Czech Republic, Turkey, Poland, Croatia, Colombia, Thailand, Saudi, Arabia, Philippines, Peru, Mexico, Malaysia, Hungary, Hong, Kong, SAR, Chinese, Taipei, Brazil, Argentina, India, Singapore, Israel, South Africa, China.

It is worth noting, that there is a problem with conflict the legal terms and accurate mathematical apparatus. The study also presents a calculation of the credit costs. Proposed symbols in this paper are used in financial mathematics as well as in actuarial mathematics. The rationale for writing this paper in this section was to raise awareness among potential borrower of the possible financial consequences of taking out credit including relevant financial obligations before signing a credit agreement.

5. Results and Discussion

Regardless of type of country's economy (emerging market economy or Euro area), loans play an extremely important role. From a macro prudential perspective, the ratio of private sector credit to GDP has become an increasingly popular benchmark of the sustainable levels of credit (Kelly et al., 2011). Most recently, the Basel Committee on Banking Supervision «has issued a proposal to incorporate this approach into the regulatory system by using the deviation from long-run trend of the PSC/GDP ratio (the «credit gap») to calibrate a counter-cyclical capital buffer. In the first instance, this method uses the ratio of credit to GDP, thus allowing credit to grow naturally in line with overall economic activity» (Kelly, McQuinn, & Stuart, 2013).

Figure 1 shows the ratio of credit to non-financial sector from all sectors at market value to GDP (percentage of GDP) in emerging market economies and Euro area member countries. Analysing
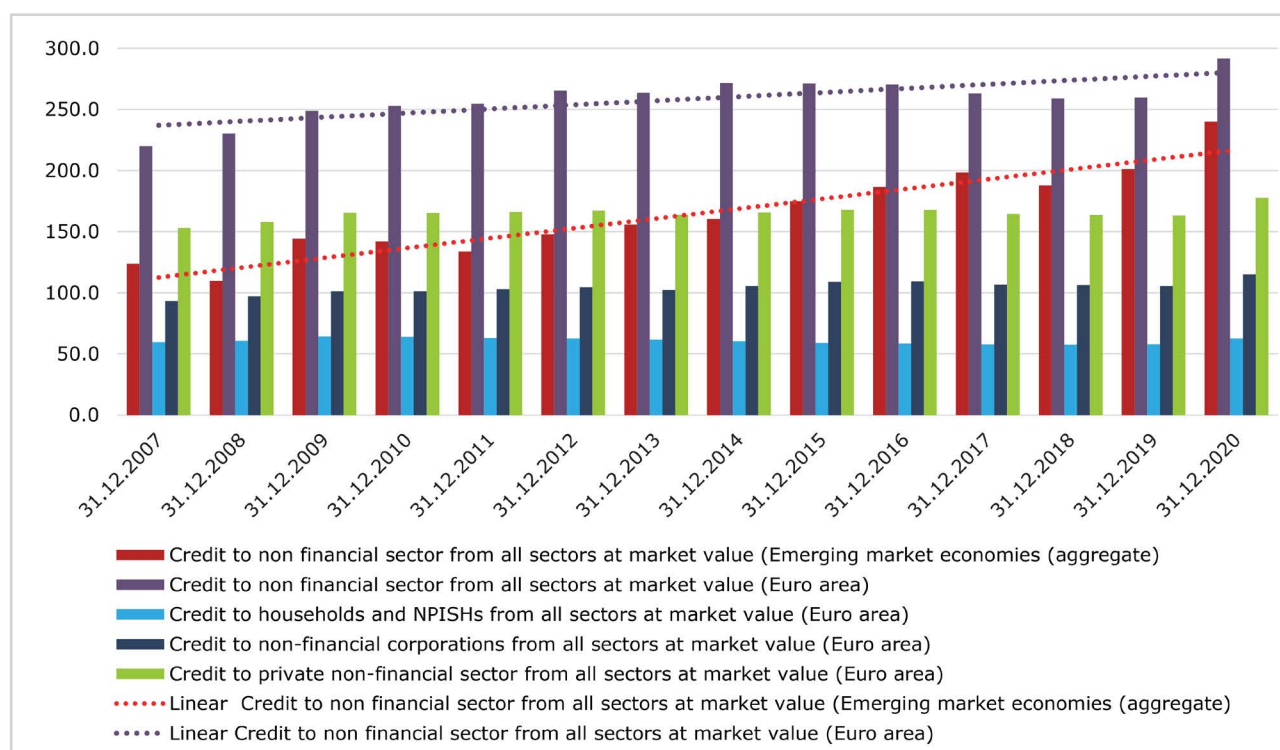

Figure 1:
Credit to GDP ratio in Emerging market economies and Euro area, %
Source: Own compilation based on data by the Bank for International Settlements (BIS, 2021)

the Jan 2008 - Jan 2020 it can be noted that, regardless of the level of Euro area member countries, credit to GDP ratio is increasing.

Considering lending to the economy as an additional opportunity and impetus for growth, it is necessary to expand on the other side associated with lending - risk. Dell'Ariccia and Marquez (2006) warn that episodes of future defaults are more likely after periods of strong credit expansion. Segoviano Basurto et al. (2006) show that credit to GDP is a good predictor of future defaults.

Figure 2 shows the level of credit to government, non-financial sector and household in emerging market economies. It is worth noting that during the last 13 years (Jan 2008 - Jan 2021) there is a significant development of lending in 30 emerging market countries in comparison with the Euro area member countries (Figure 3).
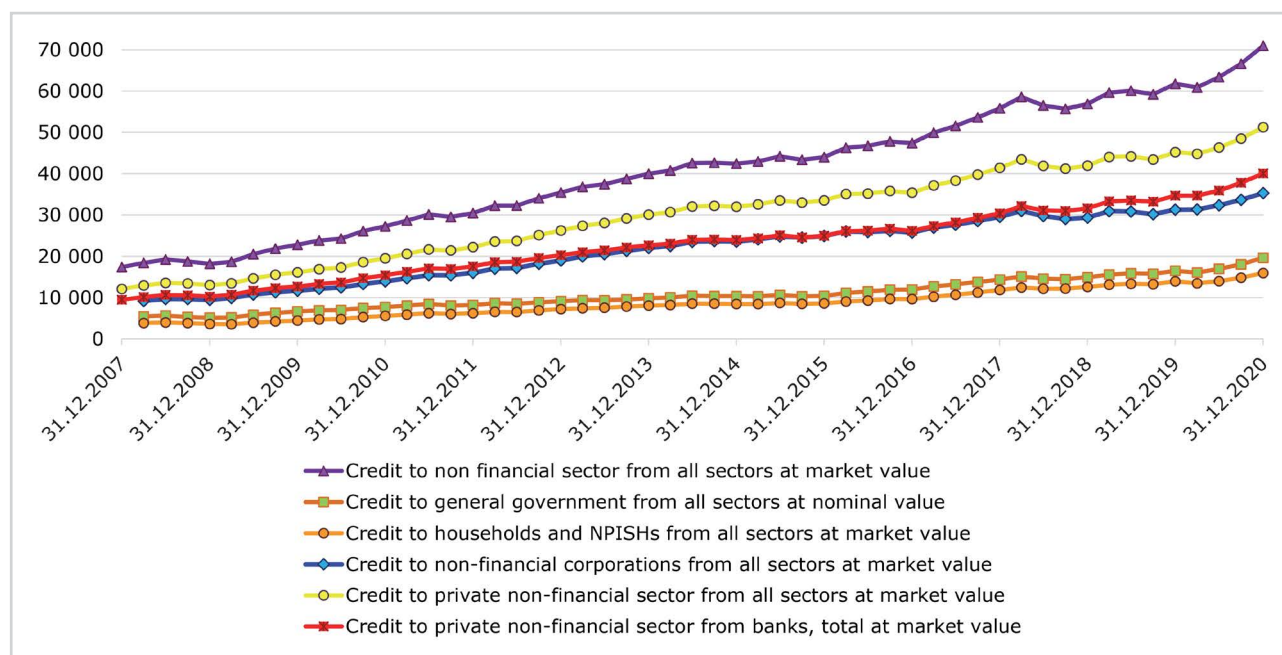

Figure 2:
Credit from all sectors at market value in the Emerging market economies (aggregate),
US dollar (billions)
Source: Own compilation based on data by the Bank for International Settlements (BIS, 2021)
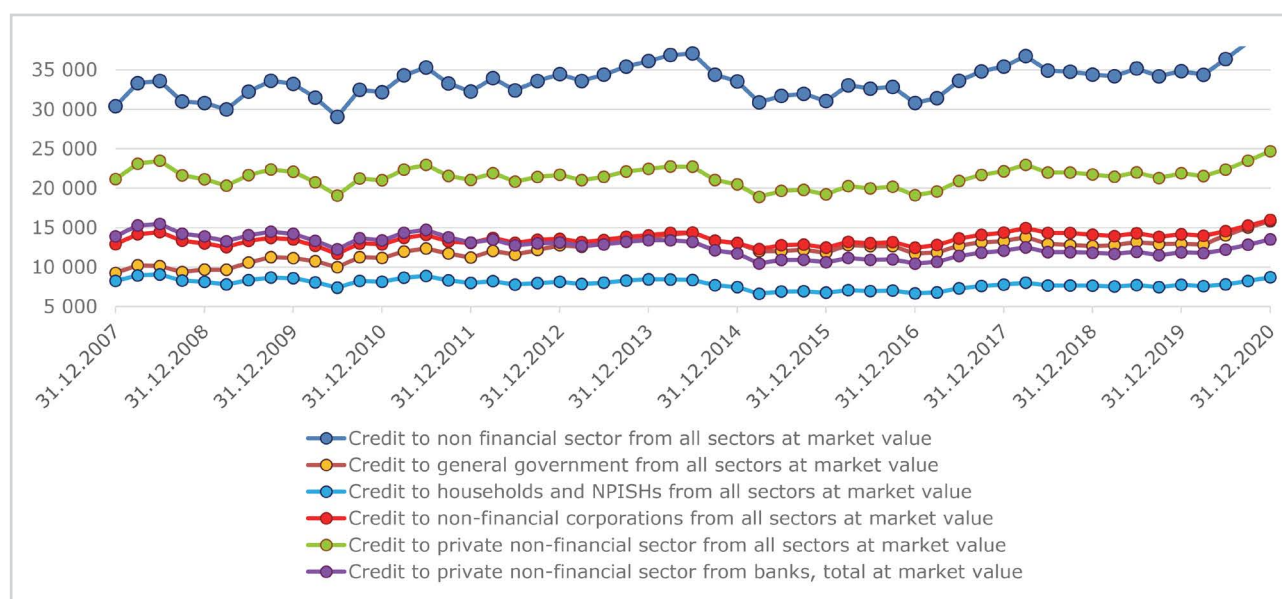

Figure 3:
Credit from all sectors at market value in the Euro area, US dollar (billions)
Source: Own compilation based on data by the Bank for International Settlements (BIS, 2021)

The situation with emerging market economies is really dynamic - level of lending (credit to non-financial sector from all sectors at market value) is increased by more than quadruple from USD 17 382 billion to USD 70 967 billion (Jan 2008 - Jan 2021). The ratio of credit to GDP is also growing rapidly. So in 2008 this figure was in the range of about 124%, and in 2020 it was more than 240%. This situation can be explained by the fact that in the process of rapid economic development there is an increased need to attract financial resources.

Thus, over the last 13 years, the level of lending in Euro area countries has increased from 30 402 billion USD to 40 508 billion USD, and the ratio of credit to GDP is about 292%. This indicates that the economies of such countries are already saturated with credit, and credit is an important component of the financial resources involved in the country's economy.

The financial crisis, which began in 2007, was immediately reflected in the macro indicators of many countries in the world (Figure 4). Since 2008, it is possible to restore the growth of bank lending rates in the countries of the European Union. In 2012, the EU countries had the highest long term interest rates (a maturity of ten years) which are Maastricht criterion bond yields (mcby) - long-term interest rates, used as a convergence criterion for the European Monetary Union, based on the Maastricht Treaty. The legal basis is the Article 121 of the Treaty establishing the European Community and Protocol on the convergence criteria.

It should be noted that these interest rates are used to define the Maastricht criterion on long-term interest rates, which is one of the criteria for determining whether or not an EU member state is eligible to join the European Monetary Union (Eurostat, 2020). This indicator is extremely important and to some extent characterizes the state of the financial system, including the risks associated with investing.

However, when it comes to risks, it should be understood that in the lending process, the risks are inherent both for one party - the bank - and for the other - the borrower. It is extremely important for the borrower to calculate all the costs associated with the credit. This will allow the potential borrower to properly calculate his financial capacity and to pay the loan on time and in full.

Main conditions for granting consumer credit in the EU countries (Table 1)

In accordance with Guidelines on the application of the Directive 2008/48/EC (Consumer Credit Directive) in relation to costs and the Annual Percentage Rate of Charge (APR) the key role of
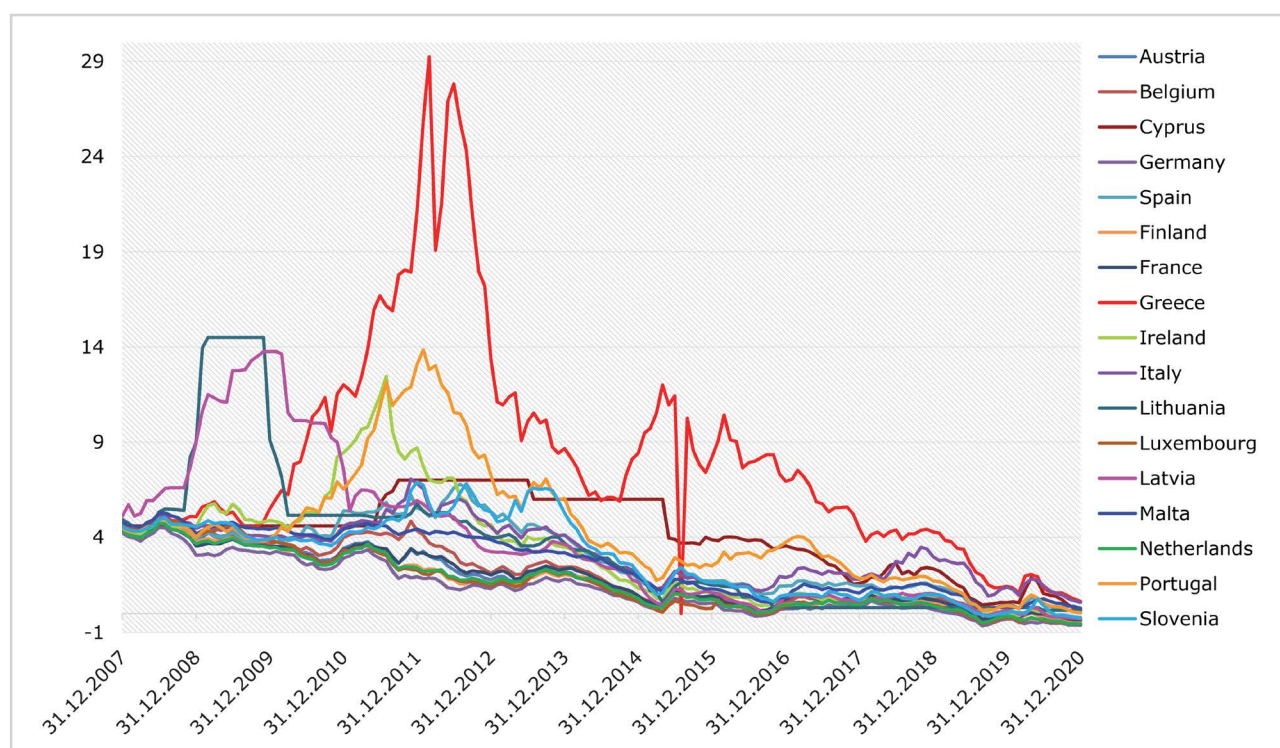

Figure 4:
**Long-term interest rate for convergence purposes - 10 years maturity
for convergence purposes, %**
Source: Own illustration based on ECB Statistical Data Warehouse (2021)

Table 1:
Main conditions for granting consumer credit in the EU countries

Formula	Explanation
$$\sum_{k=1}^{m} C_k (1 + X)^{-t_k} = \sum_{l=1}^{m'} D_1 (1 + X)^{-S^1},$$ (1)	
where: X is the APR; m is the number of the last drawdown; k is the number of a drawdown, thus $1 \le k \le m$; C_k is the amount of drawdown k; t_k is the interval, expressed in years and fractions of a year, between the date of the first drawdown and the date of each subsequent drawdown, thus $t_1 = 0$; m' is the number of the last repayment or payment of charges; l is the number of a repayment or payment of charges; Dl is the amount of a repayment or payment of charges; S^1 is the interval, expressed in years and fractions of a year, between the date of the first drawdown and the date of each repayment or payment of charges.	

Example	Calculation method
Credit agreement is for a total amount of credit of 300,000 EUR, 240 equal monthly instalments. The total amount of the credit is drawn down immediately and in full at the conclusion of the agreement. The borrowing rate is 6%. Single sum cost of 3% of the total amount of credit and a payment protection insurance costs of 1.5% of the total amount of credit per year spread over the repayments.	The monthly instalment which provides full repayment of the credit is 2,149.3 EUR. The monthly instalment which provides full repayment of the credit and insurance costs becomes: $I_c = 2,149.3 + (1.5\% \times 300,000) / 12 = 2,524.3$ EUR, than $300,000 = 9,000 + 2,524.3 \times 1 / (1 + X)^{1/12} + 2,524.3 \times 1 / (1 + X)^{2/12} + ... + 2,524.3 \times 1 / (1 + X)^{240/12}$, or $$300,000 = 9,000 + 2,524.3 \frac{1 - \frac{1}{(1+X)^{20}}}{(1+X)^{1/12} - 1}$$ $X = APR = 8.83\%$

Source: Compiled by the author

the APR is «…To ensure the fullest possible transparency and comparability of offers, such information should, in particular, include the annual percentage rate of charge applicable to the credit, determined in the same way throughout the Community …».

Annex IV of the Consumer Credit Directive represents the basic equation, which establishes the annual percentage rate of charge (APR), equates, on an annual basis, the total present value of drawdowns on the one hand and the total present value of repayments and payments of charges on the other hand (European Commission, 2021).

In the next part of this study, the specifics of Polish lending legislation and calculating the total cost of the credit to the consumer are presented.

General conditions for granting consumer credit in the Republic of Poland (Table 2)

Pursuant to the Notice of the Speaker of the Sejm (the Parliament) of the Republic of Poland of 16 May 2019 on the announcement of the consolidated text of the Consumer Credit Act (Journal of Law of the Republic of Poland, 2019) specifies:
1) rules and procedures for the conclusion of consumer credit agreements;
2) obligations of the creditor and credit intermediary and of the consumer in respect of pre-contractual consumer credit agreements;
3) the consequences of breaching the duties of lender and borrower;
4) activities of lending institutions and register of lending institutions.

By a consumer credit agreement is meant a credit up to the amount designated by the Consumer Credit Act, a credit unsecured by a mortgage intended for the renovation of a house, premises or flat.

A consumer credit agreement shall also be understood as a credit, credit under banking law, deferred payment agreement, revolving credit and credit to third parties.

Article 3.1. A consumer credit agreement shall mean an agreement on credit in an amount not exceeding PLN 255,550 (approximately EUR 60,000) or the equivalent in a currency other than the Polish currency which the creditor, in the course of his free activities, grants or promises to grant to the consumer.

The creditor or credit intermediary shall be required to provide the consumer with the following information before the conclusion of the mortgage-secured credit agreement:

1) the total amount of credit; in the case of credits indexed in a currency other than the Polish currency, the amount of credit in that currency as calculated on the day the information is given;
2) information about changes in the exchange rate and interest rate will affect the total amount of the credit and the amount of the capital and interest instalments;
3) information on the conditions for converting the total amount of credit into another currency;
4) information about the required own contribution;
5) information on the possibility and the conditions under which the creditor grants a credit repayment grace period;
6) information concerning the obligation to take out an ancillary contract, in particular an insurance contract;
7) the total amount payable by the consumer.

The Act refers to the annual borrowing rate. If the credit will be repaid in instalments, the method of converting this rate to monthly or quarterly periods should be indicated, i.e. using the so-called nominal interest rate $i^{(m)}$.

Every credit, regardless of the purpose for which it is used, has an interest rate amount, a repayment period. Other parameters result from the calculations. Based on these concepts, we give the formula for calculating the credit instalment (Table 2).

Table 2:
General conditions for granting consumer credit in the Republic of Poland

Formulas	Explanations
at $$Ra_{\overline{n}|i} = K \Rightarrow R = \frac{K}{a_{\overline{n}|i}},$$ $$a_{\overline{n}|i} = \frac{1-v^n}{i}$$ and $$v = \frac{1}{1+i} \qquad (2)$$	where: K is the amount, i is the interest rate; n is the repayment period; R is the instalment; $a_{\overline{n}|i}$ is the present value of the n-year instalment with payments of the currency unit every year in arrears at the annual interest rate i.
$$B_t^r = K(1+i)^t - RS_{\overline{t}|i} \qquad (3)$$	where: B_t^r is the amount of liabilities according to the retrospective approach.
$$B_t^p = Ra_{\overline{n-k}|i}$$ (4)	where: B_t^p is the amount of liabilities according to the prospective approach.
$$R' = \frac{K}{a_{\overline{n \cdot m}|i^{(m)}}} = \frac{K}{\dfrac{1-\left(\dfrac{1}{1+\dfrac{i^{(m)}}{m}}\right)^{m \cdot n}}{\dfrac{i^{(m)}}{m}}}$$ it shows that $$1+i = \left(1+\frac{i^{(m)}}{m}\right)^m$$ that is why $$i^{(m)} = m\left[(1+i)^{\frac{1}{m}} - 1\right] \qquad (5)$$	where: $i^{(m)}$ is nominal annual interest rate but m times compounded annually, m - number of instalments.
Example The credit of 1,000 EUR with interest $i^{(12)} = 0.036$ will be repaid over 5 years in monthly instalments in arrears	**Calculation method** $$\text{Monthly instalment} = \frac{1000}{\dfrac{1-\left(\dfrac{1}{1+\dfrac{i^{(12)}}{12}}\right)^{12 \cdot 5}}{\dfrac{i^{(12)}}{12}}} = \frac{1000}{a_{\overline{5 \cdot 12}|i^{(12)}}} = \frac{1000}{\dfrac{1-\left(\dfrac{1}{1.003}\right)^{60}}{0.03}}$$

Source: Own calculation based on the Polish Consumer Credit Act

Art. 5 item 10 of the Polish Consumer Credit Act. Borrowing rate - the interest rate expressed as a fixed or variable rate applied to the total amount of credit per annum. The legislator does not specify conditions justifying the use of a variable interest rate. Art. 5 item 11. Fixed borrowing rate - the interest rate which is specified exclusively in the credit agreement using a specific percentage expressed for the whole duration of the agreement or for given periods of the agreement.

Example	*Calculation method*
The use case of a variable annual borrowing rate. The interest rate is 3% for the first 3 years and 2.5% for the following 2 years. Credit amount 37,500 EUR	$\text{Credit instalment} = \dfrac{37{,}500}{a_{\overline{3}\|\,0.03} + v^3 a_{\overline{2}\|\,0.025}}$ In the case of regular quarterly charges when paying credit instalments of A PLN, the present value of the costs is $A\,a_{\overline{4 \cdot m}\|\,i}{}^{(4)}$

Source: Own calculation based on the Polish Consumer Credit Act

The same formula applies to the premiums paid by credit insurers.

Art. 5 item 9 of the Polish Consumer Credit Act. Reference rate - interest rate used as a basis for determining the interest rate of a credit referring to the minimum interest rate for basic open market operations conducted by the National Bank of Poland set by the Monetary Policy Council and announced in the Official Journal of the National Bank of Poland. Article 21.1. In the case of a credit agreement providing for deferred payment (or grace) or a change in the method of payment where the consumer is in default on a debt arising from the credit agreement.

Example	*Calculation method*
Credit of 62,500 bearing interest $i = 0.03$	We have two cases here: A deferral of e.g. 2 years within the agreed repayment period is foreseen. The calculation of the credit instalment is as follows: $R = \dfrac{62{,}500}{v^2 a_{\overline{3}\|\,0.03}}$, where $v^2 = \left(\dfrac{1}{1+0.03}\right)^2$. When the repayment period is maintained but postponed by the deferral period. The calculation of the instalment is as follows: $R' = \dfrac{62{,}500}{v^2 a_{\overline{5}\|\,0.03}}$.

Source: Own calculation based on the Polish Consumer Credit Act

Credit cost calculations

Art. 5 item 6 of the Polish Consumer Credit Act. Total cost of the credit (most terms of the components of the total cost of credit are given in the bank's offers published widely in the content of contracts at the time of repayment of the credit and the costs associated with this, the cost of withdrawal of the customer from the credit agreement) means all the costs which the consumer is required to pay in connection with the credit agreement, in particular:
a) interest, fees, commissions, taxes and margins if known to the borrower;
b) the costs of ancillary services, in particular insurance, when these are necessary for obtaining it on the terms offered.

With credit costs defined in this way, we need to consider the timing of their incurrence. We can distinguish between two cost options:
1) at the time of signing the contract, e.g. commissions, processing of the credit application;
2) incurred regularly, e.g. when paying instalments at the post office, the bank, credit insurance premiums.

Charges are generally levied on the loan at the time the credit agreement is signed. This is the value of the commission charges incurred at the time of signing the contract. This fact does not give rise to calculation doubts.

Example	Calculation method
The consumer intends to modernise a detached house. The anticipated cost of the shell upgrade including the additional building plot is 62,500 EUR. A condition for granting a consumer credit is an own contribution of 10% of the construction cost. The lender agrees to provide a credit of 56,250 EUR on the following terms: annual interest rate of 3%, repayment period of 20 years, grace period of 2 years after the start of construction while maintaining the adopted repayment period	The credit is subject to the following costs: 1) insurance, annual premium in advance 11,25 EUR (is a condition for concluding the agreement); 2) processing of the application 50 EUR (at the time of concluding the agreement); 3) a commission of 0.1% of the credit amount; 4) annual transaction fee, i.e. upon repayment of each instalment 1.875 EUR transfer fee. The credit instalment is: $R = \dfrac{56{,}250}{v^2 a_{\overline{20}|\ 0.03}}$. The total cost of the credit is: $50 + 0.001 \cdot 56{,}250 + 11.25 a_{\overline{20}|\ 0.03} + 1.875\, v^2 a_{\overline{20}|\ 0.03} + 20R - 56{,}250.$ On the other hand, there may be a situation where the creditor offers the possibility to repay the consumer credit ahead of schedule, i.e. during $20-t$. Then, the credit instalment is: $R = \dfrac{62{,}500}{a_{\overline{20-t}|}}$, and the total cost of the credit is: $50 + (20 - t)\,R - 62{,}500 - v^2 11.25 a_{\overline{20-t}|\ 0.03} + 0.001 \cdot 62{,}500 + 1.875 v^2 a_{\overline{20-t}|}.$

Source: Own calculation based on the Polish Consumer Credit Act

Article 50.1 of the Polish Consumer Credit Act. The fee for early repayment of the credit may not exceed 1% of the loan amount repaid if the period between the repayment date and the loan repayment date exceeds 1 year.

Example	Calculation method
Credit of 500 EUR granted for 6 years at an interest rate of 2.5% per annum. Repayment of the loan after 5 years	Given these conditions, the maximum commission is: $\left[B^R = 500 \cdot (1.025)^5 - R\, s_{\overline{5}|\ 0.025} \right] \cdot 0.01$ but must be less than commission.

Source: Own calculation based on the Polish Consumer Credit Act

It should be noted, that the fee (Article 50(4)) may not be higher than the amount of interest the consumer would be required to pay during the period between the early repayment of the credit and the agreed date of termination of the agreement, and may not be higher than the creditor's direct costs relating to that repayment.

Example	Calculation method
Credit of 500 EUR, interest rate is $i = 0.03$, granted for 10 years, repayment before maturity $t < 10$	The amount of interest charged by the bank can be calculated using the formula: $\left[t \cdot \left(\dfrac{500}{a_{\overline{t}|\ 0.03}} \right) - 500 \right]$ but must be less than interest charged For regular payments, e.g. for bank transfers or payments at post offices $\quad a_{\overline{t}|\ i} < a_{\overline{n}|\ i} \quad$ for t.

Source: Own calculation based on the Polish Consumer Credit Act

Taking into account the highlighted above, it can be concluded, that:
1) the bank may charge less than the interest rate;
2) charging a commission increases the direct cost of the credit by its amount;
3) the later the moment of early repayment, the higher the commission for the bank.

Art. 28.1.1 of the Polish Consumer Credit Act. The credit intermediary shall provide the consumer with information on the costs, if any, involved in the preparation and offering of the conclusion or performance of the credit agreement.

Example	Calculation method
According to Article 49.1, any total costs should be reduced: 1) in proportion to the time of the last repayment of the credit, i.e. $\dfrac{t}{n}$; 2) in proportion to the balance $\left(1-\dfrac{B_t^r}{K}\right)$ when the balance is calculated for any moment of time $B_t^r < K$	Reductions in de facto and de jure costs in proportion to the repayment period can be calculated using the formula: $\left[\dfrac{50}{20}\right](20-t) + (20-t)R - v^2 11.25 a_{\overline{20-t|}\,0,03} + \left[\dfrac{(0.001)(62,500)}{20}\right] + 1.875v^2 11.25 a_{\overline{20-t|}}.$

Source: Own calculation based on the Polish Consumer Credit Act

Other cases

Art. 30.2 of the Polish Consumer Credit Act. Where, in accordance with a credit agreement, payments made by the consumer do not give rise immediately to repayment of the total amount of credit, but are used to constitute capital during periods and under conditions laid down in the credit agreement or in an ancillary agreement; the agreement shall include a clear and concise statement that it does not provide for repayment of the total amount of credit drawn down under the agreement.

Example	Calculation method
A credit of 1,250 EUR bearing interest at 4% per annum repayable in equal instalments each year in arrears over 8 years. The instalments are used to build up capital and bear interest at 2.5% per annum	Taking into account the terms of the contract, the arrears at the end of year 8 are: $R = \dfrac{1,250}{a_{\overline{8|}\,0.04}}$ $1,250(1.04)^8 = R\, s_{\overline{7|}0.025}\,(1.025) + x$ at $x = 1,250(1.04)^8 - R\, s_{\overline{7|}0.025}\,(1.025),$ where x is the amount outstanding at the end of the repayment year.

Source: Own calculation based on the Polish Consumer Credit Act

Article 49(1) of the Polish Consumer Credit Act «In the event of repayment of the credit in full before the deadline specified in the agreement, the total cost of the credit shall be reduced by those costs relating to the period by which the duration of the agreement has been reduced, even if the consumer has already incurred them before the repayment».

With a condition formulated in this way, we can conclude that any shortening of the loan repayment period reduces the interest rate obtained for the bank. We can then propose the following interest calculation scheme: $Rn - K$ = earned interest over the full regular payment period for $T < n$ we have $Tn - K < Rn - K$.

Another very interesting issue is the determination of the maximum amount of non-interest credit costs, which, according to the provisions of the Act (Article 36 a.1 of the Polish Consumer Credit Act), is calculated according to the formula:

$$MACC \leq \left(0.25 + 0.3\frac{n}{R}\right)K, \tag{6}$$

where:
K is the total amount of credit, n is the repayment period in days;
R is 365 or 366 days.

Analysis of this formula indicates that when $n = R$ the cost of credit cannot be greater than 55% of the total amount of credit granted. In the case of a two-year credit, non-interest credit costs are already 85% of the total credit amount. This means that this credit is extremely expensive. Although the formula has a weak inequality sign which would imply a possibility of negotiation between borrower and lender, the adopted coefficients of 0.25 and 0.3 represent a strong limited room for an agreement.

A concept of settlement of fees (commissions) over the duration of the credit agreement

As we said earlier, fees, commissions are calculated at the time the credit agreement is concluded. However, in practice there are cases of early termination of the credit agreement by the borrower due to, inter alia, early repayment of the balance of the credit contracted. Hence, the problem arises of the bank reimbursing part of the fees incurred by the borrower. In order to fairly calculate the return of part of the fees incurred at the beginning for the borrower, we will introduce the concept of so-called time-activated fees. By activated fees we mean the distribution of the fee amount over the duration of the credit agreement. Spreading means a gradual decrease in the amount of the fee over the duration of the credit agreement (Figure 5).
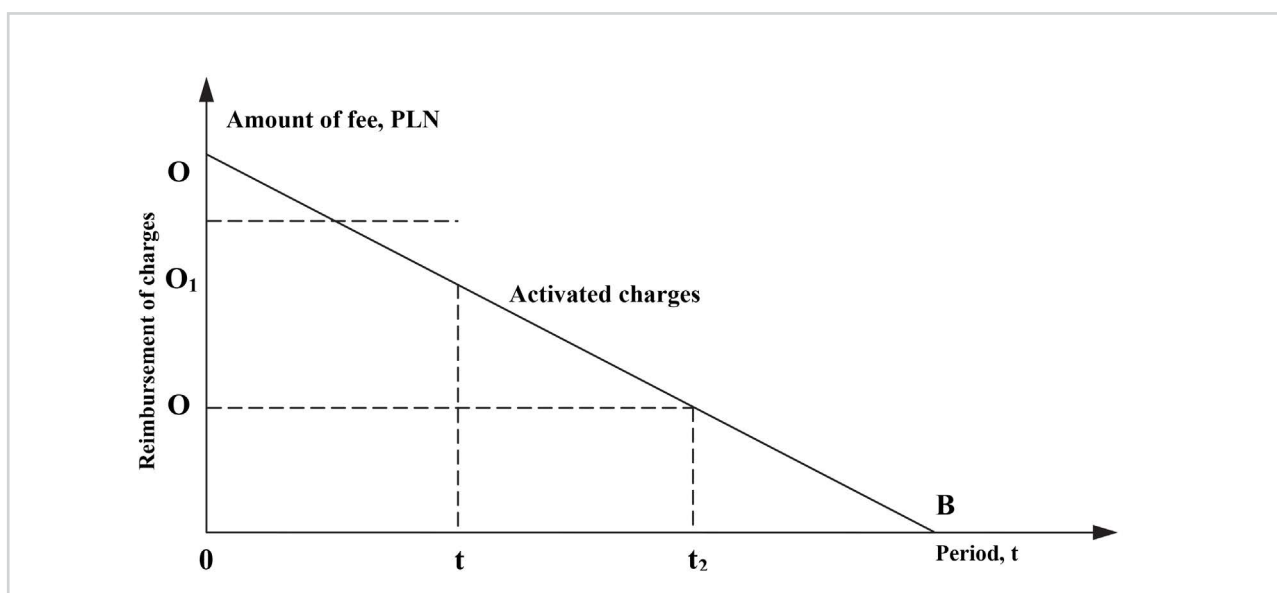

Figure 5:
A gradual decrease in amount of fees under a credit agreement
Source: Own elaboration

The idea behind this method is that the fees payable to the lender are highest at the beginning of the credit agreement and then fall proportionally over time. If the borrower terminated the contract at time t_1 then the bank would be obliged to reimburse part of the fees i.e. from O to O_1. If the borrower terminates the credit agreement at time t_2 then the bank should reimburse a proportion of the fees between O and O_2, etc. In other words, the later the borrower terminates the credit agreement the greater the proportion of fees that would accrue to the bank and the smaller the proportion to the borrower.

It is easy to see that the charges on the OB section decrease proportionally with the passage of time.

From the point of view of financial mathematics, we are dealing here with an annuity decreasing in arithmetic progression. In order to calculate the reimbursement of fees, its present value, i.e. at the time of the conclusion of the credit agreement, should be calculated using the interest rate contained in the credit agreement.

Example	*Calculation method*
Consumer credit of 25,000 EUR granted for 8 years at an interest rate of 2% per annum. The fee payable to the bank is 1% of the credit amount. The borrower terminates the credit due to the possibility of early repayment at the end of year 5.	Using formulas of the form (Kellison, 2009): $$charges = \left[1 - \frac{Da_{\bar{t}|i}}{Da_{\bar{n}|i}}\right] = \left[1 - \frac{\frac{t - a_{\bar{t}|i}}{i}}{\frac{n - a_{\bar{n}|i}}{i}}\right] = \left[1 - \frac{t - a_{\bar{t}|i}}{n - a_{\bar{n}|i}}\right]$$ $a_{\bar{5}|} = 4.7135$, $a_{\bar{8}|} = 7.3255$ $$Refund\ of\ fees\ 1000 = \left[1 - \frac{5 - 4,7135}{8 - 7,3255}\right] = 1000\left[1 - \frac{0,2865}{0,6745}\right] = 1000(1 - 0,4247) = 575,24\ .$$

Source: Own calculation based on the Polish Consumer Credit Act

Analysis of the legislation related to lending has made it possible to characterize and predict in the calculations all costs that may arise before getting a credit, in the process of its use and repayment. The proposed calculations in an understandable way for the potential borrower reveal the whole nature of the lending process despite the type of a bank.

6. Conclusions and Prospects for Further Research

The last 15 years for the world financial system have been quite difficult and dynamic. In 2006, at the beginning of 2007 it was peak loan period, but by the end of 2007, the world was experiencing the effects of the global financial crisis.

The analysis carried out within this study made it possible to determine how important the role of credit plays in the effective functioning of the economy of each country, despite the level of its development. The research found that in difficult times for the financial system, in that its participants - financial institutions have received significant support from the government. However, with the other party of the credit relationship - the borrowers - the situation is much worse.

Studies have found that despite the fact that the European Union has adopted the directives and the guidelines on consumer credit, as well as offer a single method to calculating the APR in member states of the European Union, the serious problem to determine all costs associated with the credit is still open. Complex mathematical formulas and different options for calculating the all costs (including interest, commissions, taxes and any other kind of fees) which the consumer is required to pay in connection with the credit agreement have led to the fact that the potential debtor is not able to independently determine the most useful option for themselves and minimize the credit costs. There is such situation in Poland. The average Polish potential borrower is unknown and not always able to estimate the size of their financial obligations to the bank.

Results of the research have improved that the content of the Act of 12 May 2011 on Consumer Credit of Poland (The Polish Parliament, 2011) shows that a number of terms are unclear for the correct calculation of charges in the light of financial mathematics. Any unclear wording leads to the stronger party, i.e. the lender, being able to use it for its own purposes. As it turns out, many parameters of a consumer credit can be reliably calculated.

Based on the results of the study, the algorithms for calculating all credit costs according to the regulations of consumer credit were proposed, including the annual percentage rate of charge (in accordance with Directive 2008/48/EC); the monthly credit instalment with fixed, variable and reference annual borrowing rate; the total cost of the credit (includes insurance, annual premium, a commission and annual transaction fee); the amount of interest charged with limits related to creditor's direct costs; reductions costs in proportion to the repayment period (in accordance with the Act of 12 May 2011 on Consumer Credit of Poland). It gives the possibilities to propose the mechanism of determine the credit costs which the consumer is required to pay in connection with the credit agreement (interest, fees, commissions, taxes and margins) and the costs of ancillary services. The calculation examples provided can and should raise the financial awareness of borrowers and financial advisers.

The results of the research show that the directives and the guidelines in relation to consumer credit, credit costs and the Annual Percentage Rate of Charge needs improvement to create more transparent methods for calculations all credit costs related to the receipt and repayment of the credit.

In the future, it is planned to conduct research to identifying the specifics of the legislation in the countries of the European Union in order to propose precise algorithms for the calculation of the «true» costs of credit.

References

1. Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability*, *5*(4), 393-409. https://doi.org/10.1016/j.jfs.2008.10.002
2. Alessandri, P., & Nelson, B. D. (2015). Simple banking: profitability and the yield curve. *Journal of Money, Credit and Banking*, *47*(1), 143-175. https://doi.org/10.1111/jmcb.12172
3. Bank for International Settlements. (2021). *Credit to the non-financial sector*. https://www.bis.org/statistics/totcredit.htm
4. Berg, T., Puri, M., & Rocholl, J. (2013). *Loan Officer Incentives and the Limits of Hard Information*. National Bureau of Economic Research. https://EconPapers.repec.org/RePEc:nbr:nberwo:19051
5. Berg, T., Saunders, A., & Steffen, S. (2015). The Total Costs of Corporate Borrowing in the Loan Market: Don't Ignore the Fees. *The Journal of Finance, 71*(3), 1357-1392. https://doi.org/10.1111/jofi.12281

6. Bharath, S. T., Dahiya, S., Saunders, A., & Srinivasan, A. (2011). Lending Relationships and Loan Contract Terms. *The Review of Financial Studies, 24*(4), 1141-1203. https://doi.org/10.1093/rfs/hhp064

7. Bodenhorn, H. (2003). Short-Term Loans and Long-Term Relationships: Relationship Lending in Early America. *Journal of Money, Credit, and Banking, 35*(4), 485-505. https://www.jstor.org/stable/3649898

8. Bolt, W., de Haan, L., Hoeberichts, M., van Oordt, M. R. C., & Swank, J. (2012). Bank profitability during recessions. *Journal of Banking & Finance*, *36*(9), 2552-2564. https://doi.org/10.1016/j.jbankfin.2012.05.011

9. Busch, R., & Memmel, C. (2016). Quantifying the components of the banks' net interest margin. *Financ Mark Portf Manag, 30,* 371-396. https://doi.org/10.1007/s11408-016-0279-3

10. Chague, F., De-Losso, R., De Genaro, A., & Giovannetti, B. (2014). Short-sellers: Informed but restricted. *Journal of International Money and Finance, 47*, 56-70. https://doi.org/10.2469/dig.v44.n10.20

11. Claessens, S., Coleman, N., & Donnely, M. (2017). *«Low-for-long» interest rates and banks' interest margins and profitability: cross-country evidence.* International Finance Discussion. https://doi.org/10.17016/IFDP.2017.1197

12. DeGryse, H., Kim, M., & Ongena, S. (2009). *Microeconometrics of Banking: Methods, Applications, and Results*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195340471.001.0001

13. Dell'ariccia, G., & Marquez, R. (2006). Lending Booms and Lending Standards. *Journal of Finance*, *61*(5), 2511-2546. https://doi.org/10.1111/j.1540-6261.2006.01065.x

14. De-Losso, R., Chague, F., Genaro, A., & Giovannetti, B. (2017). Well-Connected Short-Sellers Pay Lower Loan Fees: A Market-Wide Analysis. *Journal of Financial Economics, 123*(3), 646-670. https://doi.org/10.1016/j.jfineco.2016.12.011

15. Euro area statistic. (2021). *Bank interest rates - Loans*. https://www.euro-area-statistics.org/bank-interest-rates-loans?cr=eur&lg=en&page=0&template=1

16. European Central Bank (ECB). (2021). *ECB Statistical Data Warehouse.* https://sdw.ecb.europa.eu

17. European Commission. (2021). *Proposal for a Directive of the European Parliament and of the Council on Consumer Credits COM/2021/347 final.* https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2021:347:FIN

18. Freixas, X., & Rochet, J. C. (2008). *Microeconomics of Banking* (2nd ed.). MIT Press.

19. Iyer, R., Jensen, T., Johannesen, N., Sheridan, A. (2016). *The run for safety: Financial fragility and deposit insurance*. University of Copenhagen. https://ideas.repec.org/p/kud/epruwp/1602.html

20. Iyer, R., Puri, M., & Ryan, N. (2016). A Tale of Two Runs: Depositor Responses to Bank Solvency Risk. *The Journal of Finance, 71*(6), 2687-2726. https://doi.org/10.1111/jofi.12424

21. Jin, Q. J., Lim, K. K. (2013). Bank competition and financial stability: A comparison of commercial banks and mutual savings banks in Korea. *Pacific - Basin Finance Journal, 25*, 253-272. https://doi.org/10.1016/j.pacfin.2013.10.003

22. Kellison, G. (2008). *The theory of interest* (3rd ed.). McGraw-Hill/Irwin.

23. Kelly, R., McQuinn, K., & Stuart, R. (2011). Exploring the steady-state relationship between credit and GDP for a small open economy-the case of Ireland. *Economic & Social Review, 42*(4), 455-477. http://hdl.handle.net/2262/76762

24. Kelly, R., McQuinn, K., & Stuart, R. (2013). *Exploring the Steady-State relationship between credit and GDP for a Small Open Economy. The Case of Ireland*. European Central Bank. https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1531.pdf

25. Kępczyńska, M. (2017). Credits Offered by Selected Commercial Banks to Enterprises. *Studia Ekonomiczne Prawne i Administracyjne (*Legal and Administrative Studies*), 3,* 16-32. http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.ekon-element-000171525173 (in Pol.)

26. Kolasinski, A. C., Reed, A. V., & Ringgenberg, M. C. (2012). A Multiple Lender Approach to Understanding Supply and Search in the Equity Lending Market. *The Journal of Finance*, *68*(2), 559-595. https://doi.org/10.1111/jofi.12007

27. Ongena, S., & Smith, D. C. (1998). *Bank Relationships: A Review*. Cambridge University Press. https://pure.uvt.nl/ws/portalfiles/portal/320078/ongena.pdf

28. Puri, M., Rocholl, J., & Steffen, S. (2011). *On the Importance of Prior Relationships in Bank Loans to Retail Customers*. European Central Bank. https://www.ecb.europa.eu//pub/pdf/scpwps/ecbwp1395.pdf

29. Puri, M., Rocholl, J., & Steffen, S. (2013). *What Kinds of Bank-Client Relationships Matter in Reducing Loan Defaults and Why?* https://www.semanticscholar.org/paper/What-Kinds-of-Bank-Client-Relationships-Matter-in-Puri-Rocholl/690bfad850645a51de8dcdc36b163fdf708f8227

30. Radziszewski, E. (2015). *Credit - goal and importance in the economy and society taking into account practical aspects (contracts)*. CEDUR, Warszawa (in Pol.).

31. Segoviano, M. A. (2006). *Conditional probability of default methodology.* Financial Markets Group, London School of Economics and Political Science, London, UK. http://eprints.lse.ac.uk/24512

32. The office of the European Union. (2012). *Interinstitutional style guide 2011.* https://doi.org/10.2830/36616

33. The Polish Parliament. (2011). *Act of 12 May 2011 on Consumer Credit.* https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU20111260715/U/D20110715Lj.pdf (in Pol.)

34. Tiwari, P., & Moriizumi, Y. (2003). Efficiency in housing finance: a comparative study of mortgage instruments in Japan. *European Journal of Housing Policy, 3*(3), 267-288. https://doi.org/10.1080/14616710310001630721

35. Udell, G. F. (2008). What's In a Relationship? The Case of Commercial Lending. *Business Horizons*, *51*(2), 93-103. https://doi.org/10.1016/j.bushor.2007.10.005

36. Wang, K-M., & Lee, Y-M. (2009). Market volatility and retail interest rate pass-through. *Economic Modelling, 26*(6), 1270-1282. https://doi.org/10.1016/j.econmod.2009.06.002

37. Wasilewska, N., & Davydenko, N. (2017). Assessment of the credit history of enterprises. *The Scientific Journal European Policies, Finance and Marketing, 18*(67), 229-239. https://doi.org//10.22630/PEFIM.2017.18.67.36

38. Wasilewska, N., Wasilewski, M., & Zabolotnyy, S. (2018). The Enterprise's Financial Condition Assessment as a Component of its Creditworthiness. *Problems of World Agriculture*, *18(33)*(4), 493-503. https://doi.org/10.22630/PRS.2018.18.4.137