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Digital loans and buy now pay later from LendTech versus bank loans in the era of ‘black swans’: Complementarity in the area of consumer financing

JEL Classification: *D14; G23; K36*

Keywords: *FinTech; LendTech; buy now pay later (BNPL); black swan; consumer finance; digitalisation*

Abstract

Research background: People who take non-banking loans are primarily perceived as excluded from accessing bank services. The growth of e-commerce and the increasing digitalisation of customer interactions with banks was particularly accelerated by the COVID-19 pandemic (the first ‘black swan’). These processes have also influenced the rapid growth of the LendTech (LT) sector within FinTech with its digital loans and buy-now-pay-later (BNPL) services. The war in Ukraine (the second ‘black swan’) has led to an energy crisis, increased inflation, interest rates and credit costs, and reduced credit accessibility. In this context, the following research questions are addressed: Are the LT and banking sectors complementary or substitutive in the area of consumer financing? Does complementarity apply to all customer segments and loan amounts? How does the extent of complementarity or substitutability of the LT sector depend on, and to what extent do changes in the regulatory and macroeconomic environment affect, the interaction between the banking and LT sectors?

Purpose of the article: The aim of the article is to identify trends in the LT sector within FinTech in the context of assessing the scale and determinants of current and future complementarity of the non-bank sector and the banking sector in the area of consumer credit in time of black swans. An additional purpose of the article is to estimate revenues from the basic operating activities of companies from the on-line channel.

Methods: The research process was multi-stage and the research procedure was structured. Due to the lack of a uniform source of data on LT products and services, the study used many data sources — data from the Credit Information Bureau, a primary nationwide survey on LT users a primary survey of people representing LT’s managerial staff. The selection of LTs was carried out according to the concept of the monetary sampling unit. The Horvitz-Thompson estimator with Sen-Yates-Grundy variance form was used to estimate net operating income for LT from the online channel in 2021.

Findings & value added: The LT companies surveyed state that black swans (the COVID-19 pandemic and the war in Ukraine) and the current macroeconomic situation have not signifi-

cantly affected demand for non-banking loans. The reduction in the opportunities for the LT sector as a result of anti-usury regulations will only lead to a shift in consumer demand to the pawnshop sector and the shadow economy, which will be detrimental to consumers. Complementarity between LT and the banking sector is revealed especially in crisis situations, thus limiting the effects of market shock (limited supply of loans offered by banks). In periods of stabilisation, a rather clear division of preferences is noticeable – in the case of seniors and loans for higher amounts, banks dominate, while in the case of lower amounts and in younger age groups, non-bank institutions are more popular. The mechanism by which shrinking banking services are replaced by LT in short-term crises confirms the importance of LT in balancing the Consumer Finance market in the face of unstable periods. From a medium- and long-term perspective, it should be noted that inflation and rising interest rates will increase the scale of credit exclusion in commercial banks, shifting part of the demand to the non-bank sector. These phenomena have an international dimension. Similar observations were made already in 2012 by the CFPB in the USA and the British FTA, when analysing the consumer finance market immediately after the subprime crisis, emphasising the effects of limiting access to bank consumer loans and the resulting growth of the LT market (Gębski, 2013).

Introduction

4 March 2024 marks four years from when the first case of COVID-19 was diagnosed in Poland. In Europe, the pandemic officially began several days earlier – i.e., on 21 February 2020, when SARS-Cov-2 was confirmed in a resident of Lombardy in Italy. In many countries, a total lockdown was decreed for a period of two years, or even more, and restrictions on movement were introduced. This resulted in a significant chunk of economic activity moving online.

Exactly two years later, the Russian Federation attacked Ukraine, thus sparking the most serious military crisis in Europe since the end of the war in Yugoslavia (1992–1995). Shortly after the invasion, European currencies declined against the U.S. dollar and most of the European stock indices, especially in Central and Eastern Europe, fell sharply. At the same time, the prices of commodities produced by Russia and Ukraine, like crude oil, natural gas and wheat, soared (Fiszeder & Małecka, 2022). From a political and economic perspective, the war in Ukraine caused a shockwave that had a direct impact on the economies of countries that sourced their energy supplies from Russia. The risk of shortages of gas, crude oil and coal, high inflation and rising credit costs have highlighted the real risk of a global economic crisis.

Black swans¹ shook the markets, causing serious economic disruption on many levels. They also led to major changes in competition on the consumer finance market. Commercial banks became decidedly more active in the online distribution channel, so far dominated by LendTech (LT) being a segment of FinTech (FT). At the same time, the traditional division into banking clients and customers of non-banking credit institutions blurred. According to the Credit Information Bureau (BIK 2020; 2022), most customers in the loan sector were bank customers who, due to the burgeoning demands made by banks, were forced to seek financing from non-bank financial institutions (NBFIs). The dominant age groups of customers in the LT sector as NBFIs are 25–34 (35%) and 35–44 (27%).

Because of the outbreak of the pandemic, the European consumer finance market experienced its first deep breakdown. A Eurofinas study (2020) shows that lending fell in all major market segments. In the first 6 months of 2020, an 18.4% drop in the value of lending was recorded in Europe and the number of consumer loans granted decreased by over 21%. Similar observations were made during research conducted by Choi (2020), Jorda *et al.* (2020), who observed a short-lived but significant drop in production and lending due to COVID-19. Maliszewska *et al.* (2020) also noted a reduction in consumption and investment.

BIK confirmed that the data observed on the Polish market largely complies with pan-European trends. In Poland, however, instalment loans experienced a positive dynamic (+34%). This may have resulted from the low costs of such loans and the fact that consumers perceived a real risk of getting sick and decided to ‘panic buying’. In times of crisis, epidemic or war, consumer behaviour seems to indicate that people try to regain a sense of control through excessive purchasing – more information is provided by research made by Loxton *et al.* (2020). ‘Panic buy’ as a natural behavior observed in the banking sector and in the market generally in time of crisis can be exemplified through the asset bubble mechanism (Aliber *et al.*, 2023).

A comparison of the situation in 2020 and 2022 shows that the supply and demand shock caused by the pandemic was short-lived. After a sharp decline in the volume of lending and the rapid adaptation of financial institutions to the new market reality, there was a rebound and another period of rapid market development began, lasting uninterrupted until February

¹ A ‘Black Swan’ is a phenomenon that is considered so improbable as to be practically impossible, but it does occur from time to time and has a colossal impact on the reality that surrounds us (Taleb, 2007).

2022. Uncertainty caused by the outbreak of war in Ukraine and the accompanying increase in loan costs caused a deep and much more prolonged collapse in the dynamics of the credit market. According to BIK data, even an almost 31.4% increase in the value of loans granted by NBFİ was not able to compensate for the decrease in the volume of loans financed by banks.

The aim of the article is to identify trends in the LT sector within FinTech in the context of assessing the scale and determinants of current and future complementarity of the non-bank sector and the banking sector in the area of consumer credit in time of black swans. An additional purpose of the article is to estimate revenues from the basic operating activities of companies from the on-line channel. We would like to analyse the impact of 'black swans' on the consumer finance market – in particular, the activity of non-bank financial institutions and their reactions in terms of adapting business models to new market circumstances. Here, LT and Buy Now Pay Later (BNPL) services have started to supplement banking products. Many LTs have entered market sectors previously controlled by commercial banks – financing instalment purchases, offering credit cards, while also creating their own credit products such as deferred payments. The tightening of bank lending policy created favourable conditions for bank loans to be replaced by enterprises from the loan sector for customers who found themselves in a worse financial situation.

We identified a research gap in the perception of the complementarity of digital loans and payment deferral services offered by lending companies during the period of market shock caused by the Covid-19 pandemic and Russia's aggression against Ukraine, and in research on non-bank products replacing bank loans conducted from both the point of view of customers and loan companies. Taking into account this gap in particular, as well as the previously cited arguments in favour of the topicality of this issue, we saw a need to identify the scale and scope of adjustment reactions in the LT sector and the impact of black swans, in order to finally determine customer segments and the scale and determinants of the sector's complementarity non-bank and banking in the area of consumer credit. We understand complementarity as a situation in which the services offered by LT can complement the offer of banks during periods of crisis (market shocks), which, due to the appraisal of the situation and supervisory recommendations, make adjustments to the credit risk assessment of their clients. During this period, economically weaker borrowers can obtain fi-

nancing from LTs, which remain more open to risk. As a consequence, the crisis situation on the financial market does not have the same strong effects on consumers — who would otherwise be excluded from the financial market — with all the consequences of this fact such as financial and social exclusion (Ozili, 2020). This approach is consistent with the approach proposed by Deeg (2005) based on assumption that the core idea of complementarity is that the coexistence (within a given system) of two or more institutions mutually enhances the performance contribution of each individual institution — in essence, that the whole is more than the sum of its parts.

The study included a critical analysis of the literature and secondary BIK data, formulating conclusions from a survey conducted among a representative group of NBFI taking into account the value of the loan granted. The Horvitz-Thompson estimator with the Sen-Yates-Grundy variance form was used to estimate net operating income for the entire LT sector from the online channel.

The first part of the article focuses on an analysis of the literature, followed by the results of the survey and an analysis of BIK secondary data characterizing the activity of NBFI on the Polish consumer credit market. The article ends with a discussion and conclusions drawn from the analyses.

Literature review

The FT characteristics, taxonomy and market development drivers

The term FT emerged in economic literature in the 1990s, and since then has been widely explored (Jalal *et al.*, 2024). In the broad sense, FT should be understood as the use of innovative technology to improve processes or to offer new financial products, and in the narrow sense, ‘the financial services sector created by entities that are not traditional providers of financial services, using innovative technologies to more effectively provide existing financial services and creating new ones’ (Harasim & Mitreġa-Niestrój, 2018, p. 173). FT is sometimes equated with BigTech (BT), but the distinction between FT and BT is that the essence of BT is to offer digital services, not necessarily financial ones, although BT is increasingly involved in offering digital financial services via its databases, thereby becoming a *de facto*

FT (Feyen *et al.*, 2021). FT functions in various business models, described, *inter alia*, by Tanda and Schena (2020) and Fischer (2021), while Temelkov (2020) compares the business models of traditional banks, neobanks and FT. One of the conclusions of the above research is that business models overlap in certain strategic areas, and in the case of small banks in particular, the level of individualisation of digitisation strategies and the degree of differentiation from the u-profile is relatively low. A review of research on FT conducted by Takeda and Ito (2021) allows for a general division of FT companies into existing enterprises or start-ups and (based on the criterion of value obtained from innovation) into entities offering new products or improving process efficiency. Nevertheless, the dissection of the FT market carried out by KPMG (2021) distinguishes 12 segments: LT, middle & back office, neobanking, payments, blockchain and cryptocurrencies, regtech, crowdfunding, insurtech, data and analysis, personal finance management, capital markets and wealthtech. Focusing on one of the above-mentioned segments, such as LT, the sector may be defined as one that specialises in offering digital loans – i.e., financing obtained via electronic channels, without the need to go to the lender’s facility (Agarwal & Chua, 2020).

The development of FT should be associated with demand, supply and regulatory factors (Harasim & Mitreęa-Niestrój, 2018). Demand determinants result from the expectations of customers (especially the Y and Z generations) that financial products will be simpler to use, with faster processes, at lower costs. The expectations in these diverse areas cannot be met by the banking sector. The development of technology is, in turn, a supply aspect supporting FT. New technologies in finance have fundamentally changed the image of competition on the loan market, which was previously limited to the banking sector (Kowalewski & Pisany, 2022). Business models regarding payments are shifting from banks being able to charge for payments or bundle them with other financial products, to payments being bundled with other non-financial services and offered for free. Such a change creates a niche for FT and provides an incentive for banks to reorient their business models towards reducing the dependence of performance on payment revenues (World Bank, 2022). When analysing the reasons why FT developed, it should be noted that the focus of digitisation has recently shifted from streamlining traditional tasks to introducing new financial services and products. Focusing on the factors underlying FT development, one might recall the findings obtained by Haddad and Hornuf (2019), who point out that countries with a well-developed economy and

easily available venture capital tend to have relatively more FT. The development of this market is also positively influenced by the number of Internet servers, mobile telephony subscriptions and workforce qualifications. In addition, the more difficult it is to access credit, the greater the saturation of the LT economy. Equally, an active and LT-friendly regulatory policy affects the development of this sector (Tapanainen, 2020). Imam *et al.* (2022), using data from the World Bank, reach the conclusion that FT institutions have relatively better development prospects in countries with a positive attitude towards entrepreneurship and foreign capital investment. In turn, Didier *et al.* (2022) argue that FT companies shape the financial sector in terms of products, business models and industrial organisation mainly in emerging markets and developing economies. These authors also document that FT activity is positively related to information and communication technologies (ICT) and financial infrastructure. The above leads to the conclusion that the role of FT (including LT) in the economy and its relationship with the banking sector, is largely determined by external factors related to the regulatory and legal environment as well as by attitude to financial innovation.

Interactions between LT and banking sector. The complementarity hypothesis.

One of the key issues remains to determine whether the LT competes with the banking sector or fills a niche that is not and will not be exploited by banks. Di Maggio and Yao (2021) state that initially digital lenders target customers with lower creditworthiness who have experienced debt arrears. This would support the complementarity hypothesis however the authors add that only after obtaining a certain market share LT businesses tighten their lending criteria and start to compete with banks. Chrzanowski and Dąbrowski (2021) concentrate on the evolution of the market structure under the influence of the development of the LT sector and conclude that traditional banks and LT do not change the spectrum of financial products and services they offer. This finding supports the concept of competition between LT and the banking sector. One ought to point out that the scope and intensity of competition between LT and banks depends on the structure of the banking sector on the local market and conditions regarding the development of the FT sector. Kowalewski and Pisany (2022), analysing data from 72 countries between 2013 and 2018, reveal that domestic and private banks face increasing and negative competition from technological

financial companies than from foreign banks. Hodula (2022), based on data from 78 countries, proves that the market model in which banks and LTs complement each other prevails in countries where banking sectors are dispersed and more stable. In markets with a highly concentrated banking sector, LT loans substitute bank credit. The competition between LT and banking sectors may result in weakening of the financial stability. Yeo and Jun (2020) analyse the impact of the non-bank loan market on the risk of insolvency and liquidity of banks. They compare a market without the participation of the LT sector with a variant in which loan companies operate only in the low creditworthiness segment, while banks operate in each segment. Supplementing the credit market with loan companies means that the risk of bank insolvency increases due to the liberalisation of the rules for granting loans determined by competition from loan companies. Finally, it may also be that only in certain client segments there is competition, while in others the activities are complementary. Eça *et al.* (2022), based on data from the Peer-to-Business platform, show that LT can service SMEs with high creditworthiness that already have access to bank loans. Companies with low liquid assets and own capital use loan companies to obtain long-term unsecured loans and reduce their debt to banks. Companies using LT enhance their leverage and replace long-term bank debt with non-bank debt. Tang (2019) concludes that non-bank loans are a substitute for bank loans in terms of servicing borrowers with a low level of creditworthiness but complement bank products in the case of small loans.

Taking into account the different principles of creditworthiness assessment, pricing, as well as a number of other factors (e.g., the speed and ease of obtaining financing), there is a growing dominance in the literature of studies pointing to the complementary nature of the banking and LT sectors. A kind of confirmation of the complementarity hypothesis can be found in the significant degree of separation of the banks' and LT's customer and products sets as well as distinct characteristics of bank and LT portfolios.

The difference in the approaches of LT and banks in terms of assessing creditworthiness – thanks to new algorithms created by LT, based on different criteria – naturally drives loan companies to search for customers among people who have been refused funding by banks (Di Maggio *et al.*, 2022; Branzoli & Supino, 2020). This is one of the reasons for the development of the LT sector. In this context, Hau *et al.* (2019) demonstrate that LT loan products are relatively more attractive to borrowers with low credit

scoring who do not meet the criteria set by banks. de Roure *et al.* (2019), when investigating the German consumer credit market, indicate that loans granted by loan companies are riskier, while their cost (adjusted for risk) is lower than those involved in bank loans. How LT is positioned in relation to the banking sector is largely dictated by the regulations imposed on banks. Additional capital and liquidity requirements, introduced as a response to the global financial crisis, usually result in banks tightening their lending policy, thereby opening up the playing field for LT enterprises (Thakor, 2020), which do not have to comply with the strict supervisory regulations specific to the banking sector (Nguyen *et al.*, 2021). Buchak *et al.* (2018), analysing the American mortgage market in 2007–2015, estimate that the increased regulatory burdens faced by traditional banks and the development of financial technologies may be responsible for approximately 70% and 30% of the growth of the shadow banking market, respectively. However, the spectrum of areas where LT businesses do not compete with banks is narrowing along with the tightening of supervisory regulations regarding the LT sector, including the reduction of the maximum level of the interest rate (Waliszewski, 2020). In turn, Moro-Visconti *et al.* (2020) indicate the scalability of LT operations, which means that certain customer segments will not be covered by banking services because the market value is too low. Tamara *et al.* (2021), based on data from the Indonesian market, conclude before the COVID-19 pandemic, the P2P lending sector did not affect the lending activity of small banks and its clientele consisted mainly of unbanked people. In turn, during the pandemic, the share of customers using bank loans and non-bank loans both increased significantly. So, both types of institutions have grown more complementary. LT enterprises, filling the void created by the banking sector, become complementary to banks, helping to satisfy consumers' financial needs better, ostensibly in the relatively poorly developed low-income credit markets (Bazarbash *et al.*, 2020), while at the same time causing an increase in total household debt (Li *et al.*, 2022). This complementarity applies to selected segments of customers or products, as pointed out by Jakubowska-Branicka *et al.* (2020), analysing the differences between the average value of a bank cash loan and the equivalents of this product on the non-banking market. LTs are expanding where there is underdevelopment of banking services. The findings obtained by Erel and Liebersohn (2020) also support the complementarity hypothesis. These authors suggest that non-bank internet loans granted to small enterprises (including the self-employed) are mainly taken

out in areas inhabited by people with relatively lower incomes, with fewer banking outlets and in industries where small businesses tend not to attract much financing. Jagtiani and Lemieux (2018) analysing loans granted to individuals prove that the LT sector develops in regions with a relatively weaker level of economic development, with a low density of bank branches.

In the case of FT not focused on granting loans, it is more a case of cooperation rather than competition with the banking sector. The synergy created by cooperation between banks and FT is noted by PwC (2017). This is also confirmed by Fischer (2021), while Folwarski (2020) states that the competition for banks is primarily BT and not FT. FT can support the banking sector, helping to increase its efficiency, reduce risk and information asymmetry, and ultimately improve competitiveness. Lăzăroiu *et al.* (2023) point to the above benefits in the context of FT's use of artificial intelligence algorithms. A similar position, emphasising the gains from the symbiosis of FT and the banking sector, is represented by Andronie *et al.* (2023). They claim that thanks to FT there is an optimisation of processes in the banking sector, which at the same time creates opportunities to expand the availability of banking products and services.

Finally, the literature review conducted by Elsaid (2023) indicates that it is not expected that FT substitute banks. However, banks have to accelerate the adoption of innovations and advanced technology to compete with FT. The strategic partnerships and cooperation between FT and banks shall bring benefits for both sides.

The black swans influence on the LT sector

The outbreak of the COVID-19 pandemic caused a significant increase in uncertainty in the financial sector. Banks focused on reviewing their loan portfolios and assessing their own resilience to the crisis (Korzeb & Niedziółka, 2020). By the time state support for borrowers was implemented and supervisory regulations were modified, their lending policies had tightened, and the LT sector had prevented the financial exclusion of many existing bank customers (Waliszewski *et al.*, 2023).

Ozili *et al.* (2024), claiming that the lockdown restrictions contributed to higher interest in FT and digital finance solutions, also highlight the role of shadow banking in the financial inclusion process. These results are consistent with the findings of Bao and Huang (2021), who additionally docu-

ment that during the COVID-19 pandemic LT companies were more likely to extend credit to new and financially constrained customers. However, this led to a significant increase in the share of NPLs. The deterioration in the quality of LT companies' portfolios was largely because customers using both bank and non-bank loans, having limited debt service capacity, chose to repay bank loan instalments. The rapid growth of non-bank lending during the pandemic is also pointed out by Tamara *et al.* (2021), but they did not find a corresponding slowdown in bank lending.

Pandemic contributed to FT growth not only in lending, but also in payments and settlement. Tut (2023), referring to the case of Kenya, proves that COVID-19 accelerated consumers' adoption of FT and digital onboarding. Also Fu and Mishra (2022) conclude that lockdowns resulted in an essential growth of finance app downloads. Guang-Wen and Siddik (2023) suggest that FT adoption during COVID-19 significantly influenced green finance, green innovation and environmental performance. When analysing consumer attitudes toward the FT sector during the pandemic, one should recall the findings of Adamek and Solarz (2023) who demonstrated that consumers' adoption of digital lending services was determined by perceived attitude, trust, risk, usefulness and financial health, while perceived ease of use and innovation did not turn out to be the statistically significant variables. Singh and Singh (2023) also found that during the COVID-19 pandemic attitude had a considerable impact on usage of FT apps.

Russia's armed aggression against Ukraine, the second black swan, is an example of the materialisation of geopolitical risks with a significant negative impact on financial stability and the performance of financial institutions resulting in growth of uncertainty in financial markets (Caldara & Iacoviello, 2022). The channels of the war's influence on the banking sector and indirectly on banks' lending and investment policies are presented by Bernardelli *et al.* (2023), while Vu *et al.* (2023) compared the impact of three extraordinary events, namely Brexit, COVID-19 and the outbreak of war in Ukraine, on the performance of European banks and their stability. These authors suggest that Brexit had the least relative impact, which is probably explained by the greater predictability of its consequences. The conclusions of the above studies (mainly the increase in uncertainty reducing the risk appetite of banks) indirectly apply to LT as a complementary sector. Based on them, and due to a decline in purchasing power (Lin *et al.*, 2023), demand for non-bank loans is expected to increase. However, this financing

will serve more as a necessary supplement to the household budget, and less as a source of financing for additional, standard of living-enhancing purchases.

So far, research on the impact of the outbreak of war in Ukraine on the FT has been focused on analysing changes in the stock prices of FT companies and their justification. Abbassi *et al.* (2023) conclude that the war in Ukraine proves the sensitivity of stock returns of listed companies to geopolitical risk, especially companies whose performance is affected by changes in trade organisation. Hasan *et al.* (2023) indicate that FT stock markets are relatively less sensitive than traditional stock markets to an increase in geopolitical risk. This may confirm the belief that the value of FT companies depends less on their tangible assets, the aforementioned turbulence in the trade area, and the expectation that the conflict and its associated risks will generate demand for new services provided by the FT. Indeed, it should be emphasised that technology start-ups typically do not have significant fixed assets. The entrepreneurial idea, the founder's skills, knowledge, and ability to execute this idea affect their valuations (Balcerzak *et al.*, 2023). However, it cannot be said that the outbreak of war in Ukraine has had an impact on FT stock prices. Abakah *et al.* (2023) prove that the Economic Sanctions Sentiment Index has positive (or negative) effect on the returns of FT stocks in a bullish (or bearish) market.

The outbreak of war in Ukraine has caused a significant increase in inflation, with the inflation rate in food prices exceeding the CPI. This has not been followed by wage growth, which altogether contributes to a significant decline in the purchasing power of households (Grunert *et al.*, 2023). The above phenomenon raises the question of the quality of LT and bank portfolios, and how much, due to the deterioration of customers' creditworthiness, the demand for LT loans will increase.

Research methods

This paper features a pioneering survey of leading LT companies in Poland.

Therefore, the research process was multi-stage and the research procedure was structured. Due to the lack of a uniform source of data on LT products and services, the study used many data sources to determine whether it is complementary to banking products. This allowed not only to

achieve the assumed goal, but also to give a broad picture of the role of LT in creating the lending sector in Poland. The first source of data was the Credit Information Bureau, from which information was obtained on the characteristics of LT customers and the dynamics of demand for their offer. The second source of data was the primary study conducted in September 2022, a nationwide study was conducted using the CAWI technique on LT users whose socio-demographic characteristics were consistent with the distribution of customers of loan institutions provided by the Credit Information Bureau (table 1). The sample included 200 households that had at some point used LT products. An extensive discussion of the research procedure and sample characteristics is contained in the article (Waliszewski *et al.*, 2023). The third source of data was a primary survey of people representing LT's managerial staff. The selection of LTs was carried out according to the concept of the monetary sampling unit, which was justified by the structure of the LT sector, which is dominated by a few institutions. The use of monetary sampling allowed to ensure that the sample included significant institutions of the LT sector. The Horvitz-Thompson estimator with Sen-Yates-Grundy variance form was used to estimate net operating income for LT from the online channel in 2021. The detailed methodology of the survey among LT lending institutions is presented in the next subsection.

The following research hypotheses were formulated:

Main hypothesis

MH. *LT products (digital loans and BNPL) are complementary to bank loans in times of shock (e.g. black swans) when banks limit their risk exposure, tighten their lending policy leading to a reduction in the availability of bank credit.*

Detailed (auxiliary) hypotheses:

HP1. *During market stability, banks and LT operate independently due to differences in the product (amount, length of financing) and customer profile (borrower's age, average income, risk level).*

HP2. *The crisis affects consumer behaviour in such a way that despite having access to loan products offered by banks after the crisis, they remain LT customers.*

The use of multiple data sources and multi-stage research procedures allowed for the verification of hypotheses in a way that combined inductive and deductive reasoning. The first step was to present the structure of the LT sector and the recognition of individual LTs, as well as to discuss the role of the online channel in the distribution of LT products, because, as research shows, it constitutes the basis of LT activity and is one of the factors distinguishing the distribution strategy from the banking offer. The profit from the online channel was estimated. The next stage was to profile LT customers and identify similarities and differences with people indebted to banks. Moreover, it was determined how LTs are perceived by customers and how they are positioned in relation to banks. The impact of black swans on the LT sector was then assessed.

Sampling frame

Information from the Financial Ombudsman, who published a list of enterprises operating in the loan sector in 2021, was chosen as the sampling frame. It *met all* the criteria of being complete, up-to-date and identifiable (Jensen, 1926). In addition, it offers additional information on the market share of a particular enterprise, calculated by the proportion of the amount a given enterprise owes the Financial Ombudsman relative to the entire sum owed throughout the entire loan institution sector. Loan institutions are obliged to pay a contribution to the Financial Ombudsman based on their amount of total assets (0.02%).

The purpose of this part of the study was to determine the value of income from loans granted by the entire LT sector via the online channel in 2021. The difficulty of obtaining filled-in questionnaires made it necessary to use a small sample size, as well as small-area estimation methods. In addition, there are many LTs on the market with a low market share. Therefore, a monetary sampling plan was used, also taking into account market share as an additional feature — i.e., the larger the company's market share, the greater the likelihood of this company being selected for the sample.

Monetary sample

The probability of first-order inclusion takes the following form (Tillé, 2006, p. 18):

$$\pi_i = \frac{n_i x_i}{\sum_{i=1}^N x_i} \tag{1}$$

It should be noted that if the values of the additional feature clearly differ in plus from the average, then there may be a case where the individual probabilities of first-order inclusions will be greater than one ($\pi_i > 0$). Then, according to the algorithm for the variable with the highest π_i , the values ($\pi_i = 1$) are assumed, which means the deliberate placement of the element in the sample. Then, the first-order inclusion probabilities for the remaining objects are re-estimated. These steps are repeated until $\pi_i \in [0,1]$ for each i .

Global value estimation

One of the basic approaches to estimating the global value in a population when the sample size is small is to use the Horvitz-Thompson estimator (Horvitz & Thompson, 1952):

$$\hat{y}^{HT} = \sum_{i \in S} \frac{y_i}{\pi_i}. \tag{2}$$

If $\pi_{ij} > 0$, the variance estimator is given by:

$$\hat{D}^2 \left(\hat{y}^{HT} \right) = \sum_{i \in S} \left(\frac{y_i}{\pi_i} \right)^2 (1 - \pi_i) + \sum_{i \in S} \sum_{j \in S, i \neq j} \frac{y_i y_j}{\pi_i \pi_j} \frac{\pi_{ij} - \pi_i \pi_j}{\pi_{ij}}. \tag{3}$$

Note that this estimator can have negative values. If $\pi_{ij} - \pi_i \pi_j \geq 0$ (for $i=1, \dots, N; j=1, \dots, N, i \neq j$) then the Sen (1953) and Yates-Grudny (Yates & Grudny, 1953) estimator will accept only non-negative values:

$$\hat{D}_{SYG}^2 \left(\hat{y}^{HT} \right) = \sum_{i \in S} \sum_{j \in S, i \neq j} \left(\frac{y_i}{\pi_i} - \frac{y_j}{\pi_j} \right)^2 \frac{\pi_{ij} - \pi_i \pi_j}{\pi_{ij}}. \tag{4}$$

Execution

The R language was used with *sampling* and *samplingbook* libraries. In order to estimate the probabilities of first-order inclusions, the *inclu-*

*sionprobabilities*² function (formula 1) was used, while the *Uptillepi2* function was used to calculate the probability of second-order inclusions. Selection according to the assumptions of the monetary sample was performed using the *Uptille* function³.

Then, a questionnaire was sent to representatives of the randomly selected enterprises. Information on the online share in revenue was collected. For each company audited, financial statements were used to obtain information on total revenue from basic operating activities in 2021. After multiplying the online share and the total revenue from basic operating activities, the amount of revenue from the online channel was estimated (expressed in PLN), having previously defined first- and second-order inclusion probabilities to estimate the global value using the HT estimator (formula 2) and two estimators of its variance (Formula 3 and 4).

Results

The LT market

LT is not a single market as companies operate in many segments. The LT companies surveyed do not focus on just one type of loans but try to diversify their activities. It is worth emphasizing, however, that none of the LT enterprises studies offers insurance.

LT institutions actively seek new areas of operation. Among the respondents, 25% operate on the BNPL market. The main channel of LT activity is the Internet. Among the indicated sales channels, as many as 25 out of 32 happen online. Other forms should be treated as complementary or attempts to diversify sales channels. This is confirmed by the 8 out of 11 of LT companies for which the online channel accounted for over 70% of profit, including e-commerce platforms, while as many as 5 are exclusively online (100% of profit).

All respondents (LT clients and non-LT clients) were asked about brand awareness of individual LT companies that make up the Polish non-bank

² Due to the large market share for PROVIDENT, according to the selected sampling scheme, the probability of first-order inclusion for this company is 1.

³ *Set.seed(446850)* is set to ensure the replicability of the results. This value is random – each member of the research team in turn gave the number without knowing the number given by the previous person.

loan market. Only in the case of three LTs did more people know the company than did not (cf. Fig. 3). In Poland, the most recognisable LT enterprise is Provident (80% of responses), Wonga (76% of responses), and Vivus.pl (67% of responses). According to the data from the Financial Ombudsman for 2021, Provident has the largest share in the LT market, followed by Smartney, Everest Finance, Profi Credit Polska, while Wonga and Vivus have 5 and 6 shares, respectively. Comparing the recognition of LT brands with market share, it should be stated that among the 6 most popular, there are 5 with the largest market share.

Estimated income from loans obtained online

It was estimated that in 2021, online loans generated a revenue of PLN 1,601,052,453 for the entire LT sector. However, it is estimated that these values deviate on average by 17.85% — i.e., PLN 285,795,354 — from the value of the estimator (formula 4). Considering data from the Central Statistical Office on revenue from the basic operating activities of the entire loan sector in 2021, which amounted to PLN 2,767,731,000 (Central Statistical Office, 2022), revenue from the sale of loans via the online channel amounted to approx. 60%.

LT clients

The demand on the loan market in Poland largely consists of people who have loans and credit (BIK, 2020, p. 20). As many as 71.7% of those in debt have both, with 19.6% who used to have credit but now have loans, and 8.7% with loans who have never had credit. In addition, in the case of low amounts — i.e., up to PLN 1,000 — as much as 90.2% consists of loans, while the remaining 9.8% is cash credit (BIK, 2021, p. 15). The larger the debt, the greater the share of cash credit. In the case of amounts of PLN 9–10,000. PLN, cash credit accounts for as much as 52.8%, while loans are 47.2% (BIK, 2021, p. 16). The complementarity of loans and credit is also due to the fact that holders of cash credit take out loans — in 2022 this was 8.4%, and with the increase in the amount of cash credit, the percentage of those taking out loans at the same time increased — for debt amounting to over PLN 50,000, it is as much as 12.4% (BIK, 2022, p. 11). What differentiates bank customers taking out cash loans and customers of loan institutions taking out non-bank loans is the scoring profile — in the case of banks

in the period between 2019 and October 2022, it was stable at 516–517 points, while for loans in the same period it increased from 458 points to 482 points (BIK, 2022, p. 22). Consequently, the quality of the portfolio of cash loans is higher than that of non-bank loans (DPD 91+ for cash loans in October 2022 was 11.1%, and 21.5% for non-bank loans). However, what is noticeable is that the quality of cash loans remains stable — since 2022, the overdue loan ratio has decreased by 1.7 percentage points, and the quality of non-bank loans has significantly improved by 12.4 percentage points. This proves the increasing professionalisation of the loan sector in terms of loan risk management methods (BIK, 2022, p. 20). This process is confirmed by the decreasing approval rate for non-bank loans from nearly 60% in the first half of 2018 to over 30% in the first half of 2022 (ZPF 2023).

A study of LT sector enterprises shows that non-bank loan customers in Poland tend to be people up to 59 years of age. Respondents indicated that people over 60 do not take advantage of their services. All surveyed entities indicated that the share of their customers aged 60+ is 0%. Among the reasons, one may notice that such people are digitally excluded or do not trust the online channel. Respondents indicate that the distribution of education of clients is quite even.

It is not possible to point to one main factor that might cause LT debt, but it is worth emphasising that customers also use LT loans to repay other credit. LT loan-takers tend to be regularly customers. One should also note that LT loan repayments generally run smoothly. This conclusion is also confirmed by the results of our household survey. Nevertheless, under-25-year-olds (12 out of 12 indications) as well as first-time LT customers (10 out of 12 indications) are the worst payers. The most common method used to solve repayment arrears (10 out of 12 indications) is to offer a longer repayment period, which results in lowering the monthly instalment.

LT companies are perceived by 68% of clients as modern institutions and by 56.5% of clients as trustworthy. Their services are, according to 68% of respondents, easier to access than banks, and convenient to use according to 66.5%. According to only 38.5% of respondents, LT offers better financial conditions than banks, while 33.5% disagree. According to the majority (53%), LT institutions are rather safe. A detailed summary is presented in Fig. 1.

The perception of LT as offering more accessible services is also confirmed in the sense that the main determinant of customer use is better service than banks, expressed as faster processing of loans (see Fig. 1). It

should be noted that only 22.5% of respondents resort to LT as an alternative after being rejected by a bank.

LT competes on the loan market by offering fast, low-cost loans that are easy to apply for, as well as relatively high amounts that can be borrowed (see Fig. 2).

Black swans from the perspective of the LT market in Poland

The first black swan to be considered is the COVID-19 pandemic. Restrictions introduced and lockdown at a critical moment led to the digitisation of many markets and transferred demand to the Internet (Hadasik & Kubiczek, 2022). Therefore, more people naturally began to use LT services. Among the LT companies surveyed, only one tried to take advantage of the opportunity by expanding their product range, while the rest did not seek development opportunities, instead merely focusing on their current operations — the number of products on offer did not change.

In addition, the restrictions introduced should not have affected the demand up until that point, as LT institutions mainly focus on the online channel. It should be noted that at the beginning of the COVID-19 pandemic in Poland — April 2020 — the total number of non-bank loan applications dropped by as much as 63.8% compared to the previous year (BIK, 2020, p. 4). This was associated with society's general restraint on the credit and loan market — in the same period, the number of applications for cash loans decreased by 44.4%, instalment loans by 30.9%, and mortgages by 25.3% (BIK, 2020, p. 4). However, representatives of the LT companies studied claim that, in general, the pandemic did not affect the demand for the products they offer (9 out of 12 responses), and the legal solutions brought in during the COVID-19 pandemic only significantly affected the operations of one entity surveyed. Other companies mainly changed the structure of their products — e.g., by reducing the emphasis on instalment loans in the pandemic, because of their low profitability. Digital loans supplemented bank products, but during the COVID-19 pandemic, this was limited by anti-usury regulations coming into force that limited zero interest costs of consumer credit, which had been applicable until June 2021. After this period, the loan sector is observed to have developed rapidly. The BNPL sector was spurred by the growth in e-commerce, especially in the pandemic and post-pandemic period (Fig. 4).

In 2021–2022, the dynamics of non-bank loans and deferred payments significantly exceeded the dynamics of bank loans in each category, which presented stagnation (instalment loans) or even declines (credit cards) replaced by deferred payments (Table 2).

The financial situation of customers did not change. This is confirmed by the lack of an observable shift in the number of bad debtors. Only LT enterprises noted a deterioration in current loan repayments. After the pandemic, interest in LT grew — only 3 out of 12 did not notice an increase in interest. This is confirmed by BIK data (2021, p. 11), which show that the demand for non-banking loans is growing. Since the outbreak of the pandemic, both the number and value of loans granted have been on the rise. In October 2022, compared to the previous year, the number of loans grew by as much as 26.4% and their value rose by 31.4%. It can, therefore, be concluded that the rapid development of the non-bank loan market in Poland before the pandemic was put on hold during it, while the growth rate returned after the most intense wave of the COVID-19 pandemic had passed.

The second black swan to be considered is the outbreak of war in Ukraine with its harmful impact on the market. The overlapping energy crisis and the increasing rate of inflation caused surge in interest rates, which according to more than half LT companies has affected their business more than the COVID-19 pandemic.

According to LT entities, in the short term, further interest rate hikes will have a positive impact on LT and BNPL sector growth (11 out of 12 responses). However, in the longer term, continued rising inflation and soaring interest rates, as well as the related deterioration of the economic situation on the LT market, will cause a shock throughout the non-bank loan market in Poland. This is due to the expected worsening of customers' living circumstances, which will result in a greater number of rejected applications (11 out of 12), as well as worse repayment of current debt, which will result in a reduction in LT lending activity (12 out of 12) (Fig. 5).

LT companies have pointed out the ongoing work on the anti-usury act finally passed by the Sejm on 6 October 2022, which tightened the maximum zero-interest cost of consumer credit (MPKK). According to them, legislation will usher in more formalities (9 out of 12 responses), which will make it harder for LT companies to lend money. So, investors will lose interest in the non-bank loan market (12 out of 12 responses). The tightening of anti-usury regulations will result in more applications being rejected

by LT institutions (12 out of 12 responses). Consequently, the scale of financial exclusion in Poland will increase (12 out of 12 indications). Pawnshops will become an alternative to borrowing money on the LT market (11 out of 12 responses) (Fig. 6).

Discussion

The study confirmed the main hypothesis and showed that LT products (digital loans and BNPL) are complementary to bank loans in times of shock (e.g. black swans) when banks limit their risk exposure, tighten their lending policy leading to a reduction in the availability of bank credit. The auxiliary hypotheses were also confirmed. During market stability, banks and LT operate independently due to differences in the product (amount, length of financing) and customer profile (borrower's age, average income, risk level). The crisis affects consumer behaviour in such a way that despite having access to loan products offered by banks after the crisis, they remain LT customers.

Furthermore, the study has showed that the services of loan companies are used by a relatively high percentage of people who are also customers of banks. The above conclusion corresponds to the results of Tamara *et al.* (2021), who recognised the COVID-19 pandemic as a factor that helped boost the percentage of customers using both banks and loan companies in the portfolios of each type of institutions. The pandemic accelerated the shift online and thanks to this, the restrictions related to the pandemic did not significantly affect the functioning of the market. This tendency is also confirmed by Waliszewski (2020). The survey conducted among LT enterprises shows that, in the opinion of these companies, the increase in interest rates caused by the war in Ukraine, the energy crisis and inflation will positively affect LT results in the short term, but in the long run more non-performing loans can be expected. However, the predicted scenario may not come true because, as demonstrated by Aldasoro *et al.* (2022), during a crisis, loan companies tighten their lending policies more than banks.

Our research has also shown that a significant percentage of LT customers are people who have been refused financing by banks, which also proves the complementarity of banks and loan companies. This conclusion is in line with those formulated by di Maggio *et al.* (2022) and Branzoli and Supino (2020). The Polish loan company and bank market is characterised by low concentration (compared to highly developed countries) and the

complementarity of both types of institutions shown in the article confirms the conclusions offered by Hodul (2022). An argument for complementarity is also the fact that, considering the populations of LT customers and bank customers, the financial standing of the former group is worse, and LT customers are more indebted than those who only use banking services. This observation is confirmed by de Roure *et al.* (2019) and di Maggio and Yao (2021). However, it should not be concluded from the above that LT enterprises do not use creditworthiness assessment tools and do not reject loan applications. However, their acceptance criteria are different than what banks require, which is one of the reasons for the far-reaching divide between clients of both types of institutions (Ikigai Innovation Initiative, 2021).

LT clients are relatively young, and for the youngest group of clients, taking out a loan for the first time, the quality of the portfolio is the lowest. The above conclusion is consistent with the findings of Jakubowska-Branicka *et al.* (2020), who see a disproportion between the share of young customers in the portfolios of loan companies and banks (banks are less willing to lend to young people).

We also prove that the LT sector competes with banks in terms of speed of decision-making and friendly procedures and applications. At this level, one might mention the substitutability and compliance of the obtained results with the findings of Jagtiani and Lemieux (2018), who conclude that a convenient form of obtaining financing causes interest in non-bank loans from people who could just as easily borrow from a bank. The low level of LT market regulation is an element of its competitive advantage, which is gradually eroding along with the introduction of new requirements for loan companies, which is also confirmed by and Nguyen *et al.* (2021). FTs and LTs are more likely to use or develop automation tools such as business analytics software, chatbots, customer relationship management software, and to make use of cloud computing systems (Kutzbach & Pobach, 2022). What remains discussable for the conclusions formulated are the impact of macroeconomic circumstances, the difficulty in predicting the long-term consequences of macroeconomic and regulatory changes on the LendTech sector. Undoubtedly, the Covid-19 pandemic outbreak has had a positive effect on the market for digital lending platforms and the LendTech market is growing as a result of shifting customer expectations and behaviour owing to the numerous advantages provided by the digitalisation of banking and financial services (LendTech Market Research,

2021). Perceived usefulness, perceived ease of use, and perceived security influence are positively associated with the adoption of digital lending (Yadav & Shanmugam, 2024). This result allows us to conclude that the interest in LendTech's offerings was not just incidental, created by a specific social and economic situation, but will become a permanent feature of the global consumer finance market. A prospective direction of LT development in the future will be the use of algorithms, data science (DS), artificial intelligence (AI) and machine learning (ML), which will constitute an interesting areas of research (Cao *et al.*, 2021).

Our research of households – LT users may be limited by the sample size (200 respondents) due to the cost of the CAWI research. In the future, a research could be conducted on a larger sample of LT users. Limitations also include the geographical scope of the research. Focusing on the Polish market may not reflect global trends in the financial sector. Nevertheless, this limitation also represents an opportunity and sets directions for desirable research covering other regions of the world, for, as the literature review shows, there are very few analyses devoted to this topic to date.

It may also be extremely important to examine the broader background of consumers' motives when choosing an entity financing their consumption needs. What is the impact of behavioural factors and cognitive errors on the fact that customers with creditworthiness in the banking sector decide to take out often more expensive and short-term consumer loans from NBFIs. The phenomena we are talking about have an international dimension. Similar observations were made by the CFPB in the USA in 2012, when analysing the loan market immediately after the subprime crisis, paying attention to the effects of limiting access to consumer bank loans and the resulting growth of the LT market (CFPB, 2012).

Conclusions

The study of the LT sector and its clients positively verified the research hypotheses – both main and auxiliary – and conclusions may be drawn from the analysis of how black swans have impacted the LT and BNPL loan sector in crisis situations and in long periods of market equilibrium.

In the Consumer Finance sector, during long periods of stabilisation, products offered by lending institutions are offered independently of bank loans and are mostly chosen by a different target group of borrowers. Their

scale of operations often remains marginal compared to the banks' loan portfolio. Compared to banks, NBFIs focus on financing consumers with lower creditworthiness, borrowing smaller amounts and for a shorter period, as well as those for whom quick decisions and maximum simplification of credit procedures determine the choice of a credit institution.

In crisis situations, the phenomenon of complementarity between LT and banks emerges, because the decline in the supply of bank loans is supplemented with non-bank products. A survey addressed to the heads of bank credit committees shows that during crisis periods, including the Covid-19 pandemic and the war in Ukraine, banks tightened the criteria for granting loans, limiting the appetite for credit risk (NBP 2023). The lack of necessity to comply with the prudential recommendations of banking supervision and a greater appetite for risk mean that even significant market shocks do not significantly affect LT's business models and lending criteria, ensuring consumers constant access to financing.

Experience from the analysis of the last two black swan events indicates the importance of the lending sector for the consumer credit market. The conclusions from this study have important practical implications for both lending companies and banks. The LT offer has a significant social and macroeconomic impact on the negative effects of market shocks. Weaker borrowers can still access financing without generating increased risk in the banking sector. Due to the limited scale of LT's operations and the temporary nature of crisis situations, there is no phenomenon of substitution in the consumer credit market. In the long term banks remain the main financiers of households' financial needs, and non-bank financial institutions focus on operations in their market niche.

The study shows market segments in which the above-mentioned institutions complement each other in crisis situations. It should be remembered that as many as 71% of LT customers have debts in commercial banks, which means — if potential borrowers have an acceptable financial situation in both types of institutions and that their products are similar. The study in question therefore indicates potential directions for the development of products and services and areas in which we can expect LT's actions aimed at a more sustainable market share — gaining procedural and technological competitive advantages. In crisis situations, non-bank financial institutions can effectively replace banking services, ensuring continuous availability of financing to a wide range of consumers. Therefore, awareness of the important social function that lending companies can

perform justifies reflection on the pace and justification for further tightening of the state's regulatory policy in this area.

The loan sector caters particularly well to low-value loans for people with a worse financial standing and those who expect simplified loan procedures. LT prevails online, which is their main distribution channel, and banks offline.

The research results presented in this article are of a pioneering nature, so they can be used for comparisons carried out on this topic — the research has given rise to threads for further analysis and exploration, which, due to the objective set, go beyond the immediate scope of this article's considerations, but can certainly be continued by other researchers. The specifics of digital services are by no means limited by territory, but have a global dimension and should be explored by other researchers. It will be interesting and justified to continue research on how the lending sector, including LT, can help eliminate the effects of financial exclusion in the event of weakening consumers' creditworthiness or changes in the market situation resulting in a reduction in the supply of loans — e.g. as a result of an increase in interest rates and in the period of materialisation of market risk factors, such as the above-mentioned black swans.

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Annex

Table 1. Socio-demographic factors of the surveyed population in the LT client division (w %)

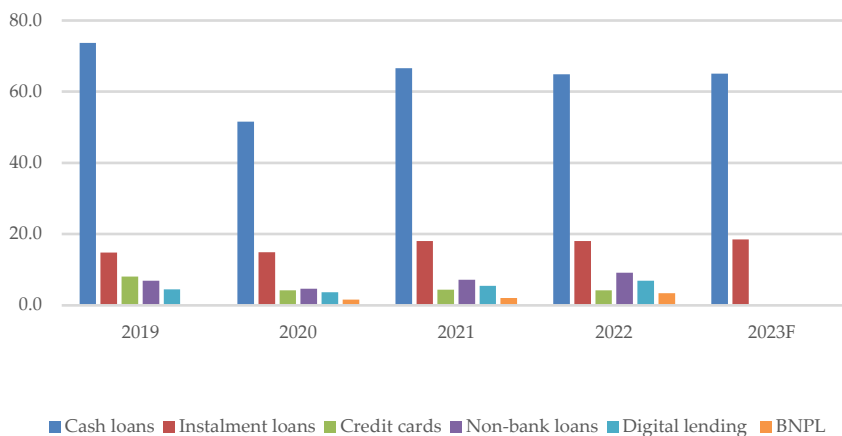
Variable	Client (n=200)
Women	47.5
Men	52.5
Age – 18-24	17.5
Age – 25-34	35.5
Age – 35-44	26
Age – 45-54	12.5
Age – 55-64	5.5
Age – 65 +	3.0
Education – secondary	5.5
Education – vocational	9
Education – high school	45
Education – university	40.5
Income per person – up to 2000 PLN	17.5
Income per person – 2001-4000 PLN	48.5
Income per person – 4001-6000 PLN	24
Income per person – over 6000 PLN	9.5
Income per person – no info given	0.5
Number of people in the household – 1	4.5
Number of people in the household – 2	14
Number of people in the household – 3	36.5
Number of people in the household – 4	29.5
Number of people in the household – 5 and more	15.5

Table 2. Sales dynamics of bank loans, non-bank loans and BNPL y/y (in %)

Category of financing	2020	2021	2022
Cash loans	-30.0%	29.1%	-2.6%
Instalment loans	0.8%	21.4%	-0.3%
Credit cards	-48.5%	5.7%	-4.5%
Non-bank loans	-33.0%	56.2%	27.0%
Digital lending	-17,7%	49,7%	26,2%
BNPL	nd	29.9%	67.5%

Source: own elaboration based on BIK data, PayPo data, Provident data.

Figure 1. Value of granted bank loans, non-bank loans and deferred payments in PLN billion (2019–2022, 2023 forecast)



Source: own elaboration based on BIK data, PayPo data, Provident data.

Figure 2. Customer perception of LT and their services

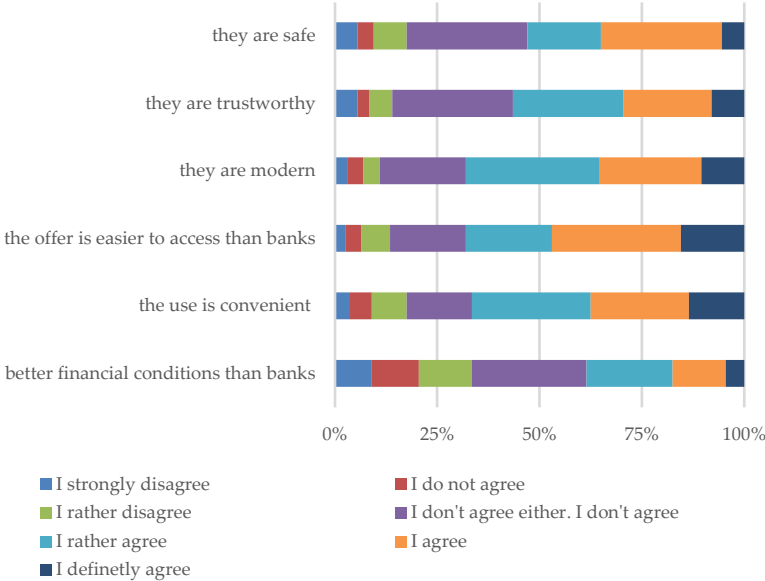


Figure 3. Main reasons for using LT

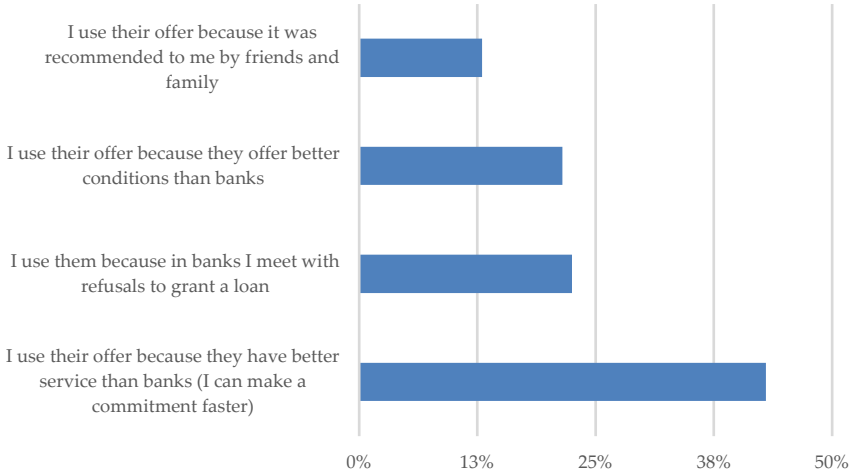


Figure 4. Brand recognition of individual LT enterprises on the Polish non-bank loan market

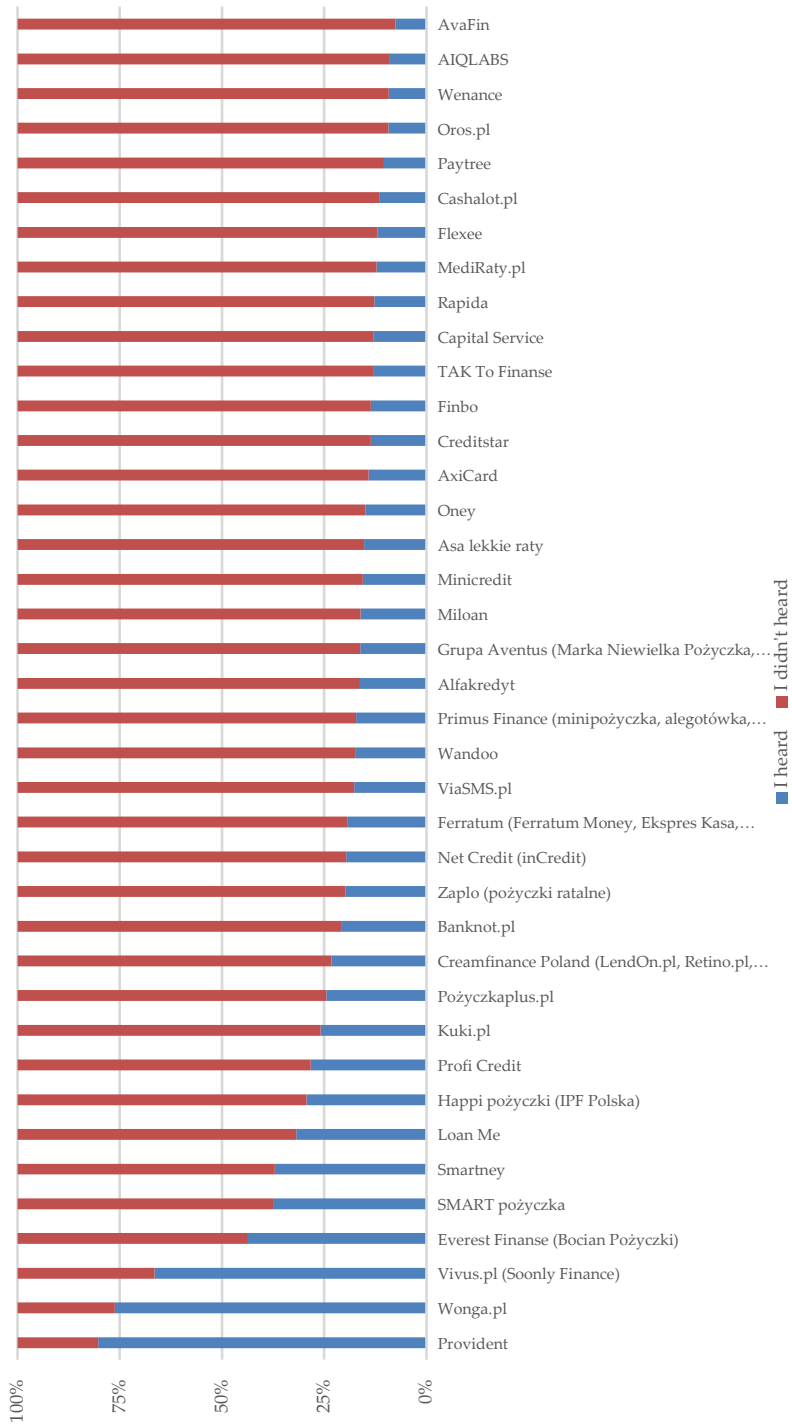


Figure 5. Assessment of the truthfulness of the statement “Inflation and rising interest rates will make it go up”

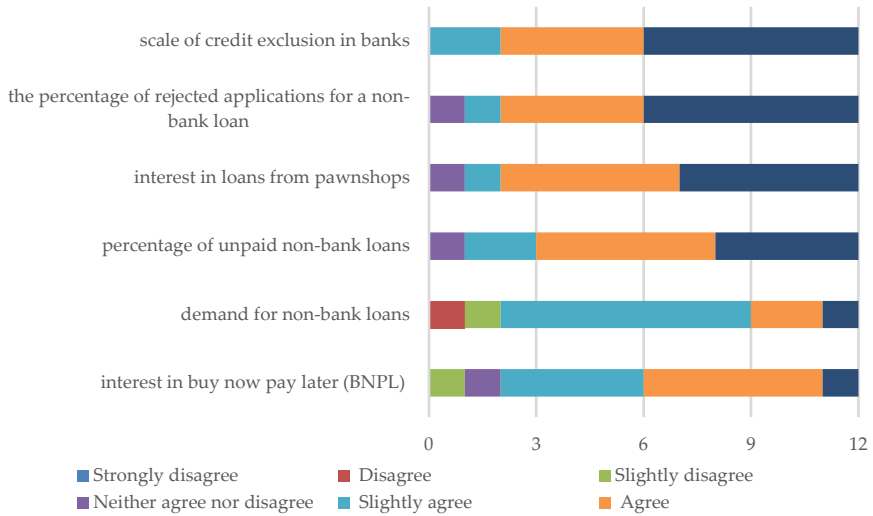


Figure 6. Influence of tighter criteria and new regulations on loan market

