

IRENA PYKA,^a ALEKSANDRA NOCŃ^b

GREEN LENDING POLICY FROM THE PERSPECTIVE OF A HOLISTIC APPROACH TO BANK RISK

POLITYKA ZIELONEGO KREDYTOWANIA Z PERSPEKTYWY HOLISTYCZNEGO PODEJŚCIA DO RYZYKA BANKOWEGO

Sustainable development, as a new political and economic doctrine of the global economy, has been manifesting for a long time in the energy transformation of the EU Member States. In July 2021, the European Commission renewed its sustainable finance strategy, pointing out that in the current decade, Europe will need additional investments to achieve its climate targets, expecting, in connection with their implementation, an increase in private sector expenditure. Financial institutions, including banks, joined this process. The article presents the results of a questionnaire survey conducted among representatives of the largest commercial banks in Poland, aimed at identifying the importance of greening their loan portfolios. The main aim of the paper is the exegesis of bank risk, taking into account the escalation due to factors that have destabilized banks' lending activity in recent years, including the growing ESG (Environmental, Social and Governance) risk. The following research methods were used: survey research, a literature review, observation method, synthesis method and cause-and-effect analysis – all of which enabled the adoption of the main research hypothesis (H1), which assumes that the constantly growing interest and involvement of domestic banks in green loans increases the regulatory mix of bank risk, becoming a serious challenge for the banking compliance function. The research results presented in the article indicate that banking institutions in Poland are increasing their involvement in the implementation of sustainable finance assumptions, and green investments have better chances of financing in commercial banks in Poland. However, despite the ongoing process of greening the credit portfolios of commercial banks in Poland, financing green investments does not change their approach to bank risk management.

Keywords: sustainable finance; green investments; greening loan portfolio; new prudential regulations; bank risk management

Zrównoważony rozwój, stając się nową doktryną polityczno-ekonomiczną gospodarki globalnej w Unii Europejskiej, od dłuższego okresu uzewnętrznia się w transformacji energetycznej państw członkowskich. W lipcu 2021 r. Komisja Europejska odnowiła strategię zrównoważonego finansowania, wskazując, że w bieżącym dziesięcioleciu Europa będzie potrzebować dodat-

^a University of Economics in Katowice, Poland / Uniwersytet Ekonomiczny w Katowicach, Polska
irena.pyka@ue.katowice.pl, <https://orcid.org/0000-0001-5524-3550>

^b University of Economics in Katowice, Poland / Uniwersytet Ekonomiczny w Katowicach, Polska
aleksandra.nocn@ue.katowice.pl, <https://orcid.org/0000-0003-3250-2382>

kowych inwestycji na osiągnięcie celów klimatycznych, oczekując w związku z ich realizacją zwiększenia nakładów sektora prywatnego. Instytucje finansowe, w tym banki, włączyły się w ten proces. W artykule przedstawione zostały wyniki badań kwestionariuszowych przeprowadzonych wśród przedstawicieli największych banków komercyjnych w Polsce skierowane na identyfikację znaczenia zazielenienia ich portfela kredytowego. Celem badawczym publikacji jest egzegeza ryzyka bankowego uwzględniająca jego eskalację spowodowaną czynnikami destabilizującymi działalność kredytową banków w ostatnich latach, w tym również narastającym ryzykiem ESG (E – środowiska, S – społecznej odpowiedzialności i G – ładu korporacyjnego). Realizacja tego celu oparta została na następujących metodach badawczych: badaniach ankietowych, studiach literatury przedmiotu, metodzie obserwacji, metodzie syntezy oraz wnioskowaniu przyczynowo-skutkowym, umożliwiając przyjęcie głównej hipotezy badawczej publikacji (H1) zakładającej, że stale wzrastające zainteresowanie i zaangażowanie banków krajowych zielonymi kredytami zwiększa mix regulacyjny ryzyka bankowego i staje się poważnym wyzwaniem dla bankowej funkcji *compliance*. Prezentowane w publikacji wyniki badań wskazują, iż instytucje bankowe w Polsce zwiększają swoje zaangażowanie w implementację założeń zrównoważonego finansowania, a zielone inwestycje mają w bankach komercyjnych w Polsce większe szanse na finansowanie. Pomimo dokonującego się procesu zazielenienia portfela kredytowego banków komercyjnych w Polsce, finansowanie zielonych inwestycji nie zmienia jednak ich podejścia do zarządzania ryzykiem bankowym.

Słowa kluczowe: zrównoważone finanse; zielone inwestycje; zazielenienie portfela kredytowego; nowe regulacje ostrożnościowe; zarządzanie ryzykiem bankowym

I. INTRODUCTION

On 1 November 2021, at the 26th UN Climate Change Conference (COP26), the world summit of leaders adopted new initiatives, according to the statement of Charles Michel, the President of the European Council, and Ursula von der Leyen, speaking on behalf of the EU, recognizing that humanity must act immediately to stop global warming.¹ At the same time, they confirmed legitimacy of the target adopted by the European Commission, namely that the level of carbon dioxide emissions in the European Union should drop by 50–55% by 2030, compared to the level from 1990, and the target of a net zero-emission economy should be achieved by 2050.² The COP26 findings also positively verify the European Commission proposal to implement a legally binding target of achieving net zero greenhouse gas emissions by 2050, and the energy transition makes the fundamental platform for the implementation of the EU concept of sustainable development.³ The European Green Deal and its action plan from July

¹ European Council, UN climate change conference (COP 26). World Leaders Summit, Glasgow, UK, 1 November 2021, <https://www.consilium.europa.eu/en/meetings/international-summit/2021/11/01/>.

² European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions: 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality, COM(2021) 550 final, Brussels, 14 July 2021.

³ European Council, Latest EU policy actions on climate change, 2022, <https://www.consilium.europa.eu/pl/policies/climate-change/eu-climate-action/>.

2021 have undoubtedly had a significant impact on accelerating energy transformation in the European Union.⁴ This initiative involves the mobilization of both public and private funds to finance sustainable investments in Europe, with the aim of achieving a climate-neutral, green and competitive economy, as well as providing protection against social exclusion.⁵ The trend towards the financing of sustainable development can be observed in Europe and around the whole world.⁶ Global initiatives for sustainable finance, including the 2030 Climate and Energy Framework,⁷ the Paris Agreement⁸ and the 2030 Agenda,⁹ have shed new light on climate issues and environmental goals.¹⁰ Due to the sustainable finance strategy, which was published in July 2021, over the next decade Europe will need an additional source of funding for investments aimed at achieving climate and environmental targets. However, their scale goes beyond the possibilities of the public sector. That is why the role of banks in supporting 'green investments' is extremely important.¹¹

The article presents the results of a questionnaire survey conducted among representatives of the largest commercial banks in Poland, aimed at identifying the importance of greening loan portfolios. While in the Polish banking sector there are more and more declarations on and beliefs regarding the need for financing green investments, the state of knowledge regarding this process remains low. In addition, banks undertaking green lending are exposed to high ESG (Environmental, Social and Governance) risk. The main aim of the paper is the exegesis of bank risk, taking into account its escalation, which has been caused by factors destabilizing banks' lending activity in recent years, including the growing ESG risk. In the Polish banking sector, as in all EU Member States, after the global financial crisis bank risk is under special supervision, leading directly to a change in the model of bank risk capital management. Meanwhile, recommendations appearing in the international environment regarding the special treatment of green loans for regulatory purposes, or recommendations for EU authorities to amend regulations relating to capital requirements for financial institutions, complicate risk management procedures in banks. Banks, which are also interested in financing green investments, increasingly expect transparent regulations in

⁴ European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions: 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality, COM(2021) 550 final, Brussels, 14 July 2021.

⁵ Ibid.

⁶ Ministry of Economic Development and Technology, *Zrównoważone finansowanie* [Sustainable financing], 2022, <https://www.gov.pl/web/rozwoj-technologie/zrownowazone-finansowanie>.

⁷ European Commission, 2030 climate & energy framework, 2022, https://ec.europa.eu/clima/eu-action/climate-strategies-targets/2030-climate-energy-framework_en.

⁸ UNFCCC (2015); European Council, Paris Agreement on Climate Change, 2022, <https://www.consilium.europa.eu/en/policies/climate-change/paris-agreement/>.

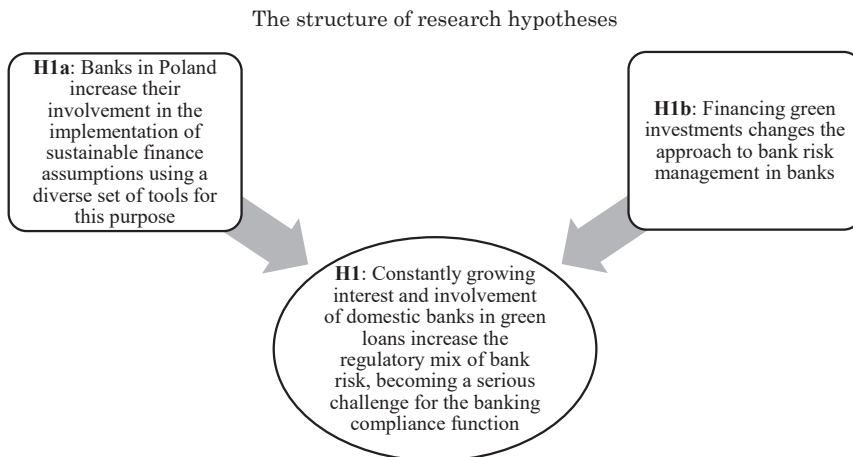
⁹ United Nations (2015).

¹⁰ Ziolo (2017).

¹¹ European Parliament, EU defines green investments to boost sustainable finance, 2020, <https://www.europarl.europa.eu/news/en/headlines/economy/20200604STO80509/eu-defines-green-investments-to-boost-sustainable-finance>; Ziolo (2020); Wrochna (2018); Korenik (2013).

ESG risk management, making the development of green lending to business entities dependent on the scale of their progress. The conducted surveys in selected commercial banks in Poland, as well as the literature studies, enabled the formulation of the main research hypothesis (H1), which assumes that the constantly growing interest and involvement of domestic banks in green loans increase the regulatory mix of bank risk, and thus pose a serious challenge for the banking compliance function. The verification of the H1 hypothesis was based on two detailed hypotheses (H1a and H1b) closely related to the conducted survey research (Chart 1). The H1a hypothesis posits that banks in Poland increase their involvement in the implementation of sustainable finance policies using a diverse set of tools for this purpose. In turn, the H1b hypothesis is based on the supposition that financing green investments changes the approach to bank risk management in banks. The H1a hypothesis was positively verified in the research. However, the H1b hypothesis has not been confirmed. Nevertheless, final conclusions from the conducted survey, supported by the literature review, allowed the main research hypothesis to be positively verified.

Chart 1



Source: the authors' own elaboration.

The article has theoretical and empirical components. The first section presents the results of an extensive review of international scholarly literature focused on the evolution of the sustainable development concept, also referring to the assumptions of sustainable finance and presenting documents and regulations implemented to specify socially responsible activities. Particular attention has been paid to ESG risk, indicating the need to include it in risk management systems in banking institutions. The green financing policy and banks' approach to financing initiatives that are a part of the ESG trend are also characterized. The second section describes the methodology

of the conducted empirical research, characterizing its scope, objectives and structure, as well as the research methods. The third section of the article is a presentation of the obtained research results, which are included in three sub-sections. The first one presents the role of new prudential regulations in the context of bank risk management. The second sub-section concerns the process of greening the credit portfolios of commercial banks in Poland. The third one presents the results of the analysis of financing green investments in relation to the approach to credit risk management in commercial banks in Poland. The article is rounded off with a 'Discussion and conclusions' section, which provides the main conclusions from the conducted theoretical and empirical studies, along with a reference to the adopted objectives and hypotheses, as well as indicating the basis for further in-depth research.

The research results presented in the article make a significant contribution to the development of the sustainable development concept. They are based on observations made in the Polish banking sector, which supplement the knowledge about green investments on European and international scales. The innovative nature of the conducted research is also manifested in its concentration on the green investment policy, which not only determines the escalation of the ESG risk of credit institutions, but also modifies and complicates their bank risk management. Moreover, the original questionnaire and statistical research presented in the article made it possible to fulfil an identified research gap by answering the question whether financing of green investments, and thus banks' exposure to ESG risk, changes their approach to bank risk management. Thus, the publication is the first such comprehensive study on the green financing policy of commercial banks in Poland and its impact on bank risk management. Therefore, it can be an important source of information for banking practitioners obliged by relevant regulations to improve bank risk management procedures and the banking compliance function. The publication makes a significant contribution to the literature in the field of economics and finance.

II. LITERATURE REVIEW

Green lending policy has become an inherent element of the sustainable development concept, which appeared in research and scientific publications in the second half of the twenty-first century.¹² Originally, sustainable development, as a new model of building modern civilization, was focused on searching for solutions that, on the one hand, would satisfy the needs of the present generations, but, on the other, would not hinder their implementation in the future.¹³ The report of the United Nations prepared by the World Commission on Environment and Development in 1987 was an important doc-

¹² Zabawa (2015); Dziawgo (2010).

¹³ Borys, Czaja (2009): 51–58; Borys (2012): 477–479.

ument in the process of concretizing the idea of sustainable development.¹⁴ It combined sustainable development with environmental protection. Over the subsequent years, the real economic policy of individual countries and regions was also assessed with reference to the environmental criteria negotiated at regular international climate conferences, the so-called UN Climate Change Conference of the Parties (COP). However, implementation of the sustainable development idea on a global scale remained unsatisfactory. Significant progress in environmental protection took place in 2015, due to implementation of the 2030 Agenda for Sustainable Development¹⁵ and the Paris Agreement,¹⁶ setting out actions to shift the world economy onto a sustainable path by the middle of the century.

The European Union authorities constantly and intensively promote various projects for natural environment protection. Their main activity in implementing the sustainable development policy is focused on harmonizing national regulations on environmental protection and increasing market integrity among the European community. However, after the global financial crisis, they undertook a number of activities aimed at achieving sustainable development, treating the natural environment more and more as an intrinsic value that requires protection against threats of dynamic economic growth and social progress. Undoubtedly from this perspective, the criteria adopted in the EU for qualifying economic activity as 'sustainable', commonly referred to as 'ESG' (Environmental, Social and Governance), are of great importance. Thus, according to this framework, in order for an economic activity to be considered as sustainable, it should meet the criteria specified under the EU Taxonomy.¹⁷ Meanwhile, they concern not only the protection of the natural environment, but also oblige companies to comply with the principles of social responsibility and corporate governance. In March 2018, the European Commission adopted the Action Plan: Financing Sustainable Growth.¹⁸ The plan was aimed at achieving targets concerning the orientation of capital flows towards sustainable investments and financial risk management.¹⁹

On 14 January 2020, the European Commission presented the European Green Deal Investment Plan.²⁰ Its direct goal is to mobilize both public and private funds to finance sustainable investments in Europe aimed at achiev-

¹⁴ UN (1987).

¹⁵ UN (2015).

¹⁶ UNFCCC (2015).

¹⁷ European Commission, EU Taxonomy for sustainable activities, 2023, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en.

¹⁸ Communication from the Commission to the European Parliament, the European Council, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the regions: Action Plan: Financing Sustainable Growth, COM(2018) 97 final, Brussels, 8 March 2018.

¹⁹ Ibid.

²⁰ European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions: Sustainable Europe Investment Plan, COM(2020) 21 final, Brussels, 14 January 2020.

ing a climate-neutral, green, competitive economy and providing protection against social exclusion. On 18 June 2020, the European Parliament and the Council adopted the Regulation on taxonomy – ‘the green list’ for sustainable economic activities.²¹ The taxonomy is a pan-European classification system defining a uniform and harmonized way of determining what economic activities can be considered as sustainable.²² The European Parliament and the Council also reached an agreement on the final content of the CSRD Directive.²³ It implements corporate sustainability reporting obligations for large companies, capital groups and listed companies from 2024. The new directive replaces the existing EU regulations on the disclosure of non-financial information and expands the catalogue of entities obliged to report. The initiatives undertaken in the European Union to implement the concept of sustainable development increasingly determine the activities of economic entities in the Member States. It is also widely observed that interest in green investments and their financing is growing intensively.²⁴ To some extent, this is a result of the renewal by the European Commission the EU Sustainable Finance Strategy in July 2021, which emphasizes that over the current decade, Europe will need EUR350 bln per year for additional investment and EUR130 bln to meet other environmental targets.²⁵ This means that the scale of sustainable investments exceeds the capacity of the public sector, and therefore the financial commitment of the private sector will be necessary. Thus, the financial mix of green investments in the European Union turned out to be a self-fulfilling prophecy. Originally, the financing of green investments was anchored in public resources with marginal admission of selected private institutions (e.g. investment funds) to financial transactions. However, these were mainly banks, which saw green investments as an opportunity for further dynamic development. They quickly declared their readiness to finance sustainable investments in the modern economy, becoming forerunners. The conducted research confirms that in Poland banks’ involvement in the so-called green lending is increasing. A similar trend can be observed in all EU Member States. This is due not only to high expenditures on green investments requiring the financial consolidation of various public and private sector partners, but also to the

²¹ European Commission, Sustainable Finance: Commission welcomes the adoption by the European Parliament of the Taxonomy Regulation, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1112, 18 June 2020.

²² Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088, Official Journal of the European Union, L198/13, 20 June 2020; European Commission, Taxonomy: Final report of the Technical Expert Group on Sustainable Finance, March 2020.

²³ Proposal for a Directive of the European Parliament and of the Council amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting, COM(2021)189 final, Brussels, 21 April 2021.

²⁴ Spinachi (2021); Cicirko (2022).

²⁵ European Commission, What is sustainable finance? 2023, https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en; Bevilacqua (2022): 172.

increasing pressure of EU authorities to accelerate the implementation of the sustainable development strategies aimed at climate protection. Meanwhile, parallel to the growing activity of financial institutions in the area of green investments, various types of questions, problems and controversies related to the implementation of climate goals are growing.²⁶ Many of them relate to the disclosure of the so-called ESG risk.²⁷ This risk is difficult to clearly define in the face of a number of problems related to climate change.²⁸ Undoubtedly because it remains unrecognized and the levels of ESG risk vary depending on the type of activities or sectors that are financed. The benefits from green investments are also heterogeneous. Therefore, it is difficult to make an unambiguous and final calculation of the effects of green financing. Although it can be assumed that if enterprises plan their operations well to identify ESG risk categories, then their green investments may turn out to be more stable in the long run, but in the context of rapid changes in sustainable finance, uncertainty and risk remain high.

Meanwhile, green finance policy is currently complicated by high economic and social uncertainty, both in the European Union and on a global scale. Moreover, in the banking environment this uncertainty has persisted and intensified as a result of the COVID-19 pandemic and the war in Ukraine. The effect of the pandemic lockdown turned out to be a strong slowdown in economic growth, resulting in an increase in banks' credit risk, both in relation to private and institutional clients. In a difficult economic situation, many banks have decided to postpone loan payments from their clients. Banks also tightened the terms of granting new loans. In February 2022, the war in Ukraine began, which is not only a huge cataclysm for European society but additionally complicated the economic situation in the whole global economy. The energy crisis became an unpredictable fact even at the beginning of 2022.²⁹ The unexpected and dynamic price increase of energy resources and food generated high inflation across the globe and a secondary effect in the form of monetary policy tightening, as well as an increase of main interest rates. Banks found themselves in a completely new situation in the short term. On the one hand, they are exposed to an increase of bank risk in its various areas, and their decreasing income is lowering the return on equity capital. On the other hand, they have become beneficiaries of rising interest rates.³⁰ In addition, in the conditions of unpredictable economic and geopolitical problems, banks have to face new technological challenges.³¹ The acceleration of digitization in banking, in line with the new development trends of the modern economy,

²⁶ Kotecki (2019); Kulińska-Sadłocha (2009).

²⁷ European Banking Authority (2021); Marcinkowska (2022); Zabawa (2019).

²⁸ Flak et al. (2020); Smoleńska, van't Klooster (2022).

²⁹ World Economic Forum, We are in the middle of the first global energy crisis. Here's how we can fix it, Davos, 23 May 2022. <https://www.weforum.org/agenda/2022/05/first-global-energy-crisis-how-to-fix-davos-2022/>.

³⁰ Deloitte (2022a), (2022b).

³¹ IMF (2022); Ha, Nguyen (2022): 103–114; Tok, Heng (2022): 1–32; Feyen, Natarajan, Saal (2022).

carries with it numerous threats, paradoxically revealed in increasing cyber-crime and other cyber incidents. The consequences of cyber risk can currently be observed in banks' financial and reputational costs.³² This situation makes bank risk management increasingly difficult, both at a level of the sector and individual entities operating in the financial market. The global financial crisis has increased regulatory pressure on bank risk management. In the world economy, a return to strong regulatory discipline has been observed in the banking sector. An important reason for the growing problems in the field of bank risk management is the increased pressure of regulators on financial security and stability after the global financial crisis. For credit institutions of the global economy, there has been a return to strong regulatory discipline.³³ At the same time, the post-crisis Basel recommendations increased the scope and changed the nature of micro-prudential regulations for banks, which significantly determines the level and quality of their bank capital (risk capital).³⁴ The existing prudential regulations for credit institutions, aimed at maintaining capital adequacy, understood as raising an appropriate amount of risk capital, have been significantly enriched and expanded.³⁵ Moreover, banks were obliged to comply with the new prudential standards in the form of financial leverage risk and financial liquidity risk.³⁶ On the other hand, new institutions appeared in the financial system – the Financial Stability Committees, responsible for macroprudential regulations aimed at reducing systemic risk.³⁷ In such difficult conditions, often spectacular in relation to EU Member States, banks must additionally secure the ESG risk. In 2021, the Loan Market Association – an international association – published recommendations for the green loan market in the form of the Green Loan Principles.³⁸ They constitute guidelines that are not acts of generally applicable law and do not constitute a source of rights or obligations for legal entities, but their impact on the market and financial institutions' behaviour is significant. They include conditions for recognizing a given loan as 'green', and thus for its preferential treatment and servicing. In the international environment, there are also recommendations regarding the special treatment of green loans for regulatory purposes. The European Banking Federation recommends that EU bodies amend regulations on capital requirements for financial institutions in the area of preferential treatment of green loans for the purpose of calculating

³² Kopp, Kaffenberger, Wilson (2017): 1–35; Aldasoro et al. (2020); Brando et al. (2022).

³³ Van Greuning, Brajovic Bratanovic (2020).

³⁴ Basel Committee on Banking Supervision (2010); Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC, Official Journal of the European Union L 176: 338; Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, Official Journal of the European Union L 176/1.

³⁵ Ibid.

³⁶ Ibid.

³⁷ IMF (2011).

³⁸ Loan Market Association (2021).

capital requirements. All these regulatory and supervisory initiatives are to foster the development of the green loans market and make them cheaper and more accessible to borrowers.³⁹ The conducted research indicates that the financing of green investments in banks is increasing due to the greater transparency resulting from new EU regulations. However, it is difficult to clearly define their availability and capital intensity. Credit institutions notice problems related to ESG risk management, which increases in proportion to their involvement in green financing.⁴⁰ However, it should be noted that they do not treat ESG risk as a separate type of bank risk: they assume it is a cross-sectional risk that affects traditional bank risk to varying degrees and through various channels – including credit, operational, liquidity and market risk, but also reputational and compliance risk.⁴¹ From a regulatory perspective, ESG risk should be seen as a key risk identifiable in bank risk registers.⁴² Therefore, banks should integrate ESG risk into their risk management systems as soon as possible. However, while there is a widespread opinion that upcoming regulatory changes in the EU will force the development of comprehensive ESG risk management strategies, there is still no clear answer when and what costs will be incurred by banks in this process. In the conditions of an observed increase in investors' demand for green financing, ESG risk may therefore turn out to be important not only from the perspective of a single bank, but also for the security of the whole EU banking sector. Therefore, ESG risk management in banks is a kind of 'experiment' in which they have to adjust not only their business strategies and risk appetite, but also properly define division of tasks and responsibilities related to this risk.⁴³

Over the past few years, bank risk management has moved from a fragmented approach to an integrated risk management model – *Enterprise Risk Management* (ERM).⁴⁴ In this model, the holistic approach plays an important role.⁴⁵ This refers to situations where risk management is not one of many functions, but is located throughout an organization, in connection with all the processes in a bank. The essence of ERM is a new organizational culture, based on responsibility for risk at every workplace. Essentially, it should lead to an improvement in bank's financial performance and maintaining its financial stability.⁴⁶ Therefore, banks' responsibility for introducing ESG risk into bank risk management systems is high. A major challenge in ESG risk management is the additionally persistent regulatory uncertainty and the growing set of new ideas for sustainable development of the EU economy. In 2021, new rules (SFDR – *Sustainable Finance Disclosure Regulation*) on

³⁹ Marcinkowska (2022).

⁴⁰ Kulińska-Sadłocha (2022).

⁴¹ PKO BP (2022).

⁴² Szpojankowski, Kapica (2022); KPMG (2021a); (2021b); Olech, Flak (2021).

⁴³ Ryszawska, Zabawa (2018); Paluszak, Wiśniewska-Paluszak (2018).

⁴⁴ Wróblewski (2011).

⁴⁵ Holism (Greek: *holos*) is an approach in which all phenomena form complete systems, subject to spectacular regularities that cannot be determined on the basis of knowledge about regularities governing their components.

⁴⁶ Helbekkmo, Levy, White (2020).

disclosure of information related to sustainable development in the financial services sector were implemented.⁴⁷ This regulation aims to achieve greater transparency with regard to how sustainability risk is analysed in the activities conducted by financial market participants and financial advisers. The Regulation, implemented in several stages, primarily concerns the financial services sector, which is obliged to post additional disclosures of green finance on their websites. In contrast, EU regulators publish Regulatory Technical Standards (RTS) on the content, methodology and presentation of ESG disclosures. Banks are therefore facing another regulatory marathon in terms of adapting to sustainable financing of green investments. In the conditions of the observed increase in investors' demand for green financing, the ESG risk may turn out to be important not only from the perspective of a single bank, but also in terms of the security of the whole EU banking sector.

III. METHODOLOGY

The following research methods were used in the conducted empirical studies: a questionnaire survey, statistical analysis, case study analysis, the observation method, and the synthesis method. The research procedure consisted of two stages (stage 1 and stage 2). In the first stage, the obtained results of the questionnaire survey were analysed, while in the second stage, their statistical analysis was carried out. The adopted research methodology was aimed first at analysing the results from the questionnaire survey, and then their evaluation based on the adopted statistical tests, which at the same time allowed the research hypothesis to be verified.

The questionnaire survey was carried out in two periods (referred to here as stage 1a and stage 1b respectively). At both stages, questionnaires were carried out among representatives of the 10 largest commercial banks in Poland, due to the fact that their share in the total assets of the Polish banking sector is 74.29%,⁴⁸ and their total assets amount to PLN1,486.32 bln.⁴⁹ The research sample included the following banks: PKO BP, Bank Pekao S.A., Santander Bank Polska, mBank, ING Bank Śląski, BNP Paribas, Bank Millennium, Alior Bank, Citi Handlowy and Getin Bank. Therefore, it should be assumed that the results obtained are representative and reflect the whole banking sector.

The first part of the questionnaire survey (stage 1a) was carried out in the first quarter of 2020. It covered the issues of new prudential regulations and their impact on:

⁴⁷ Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector, Official Journal of the European Union, L 317/1, 9 December.

⁴⁸ Pyka, Nocoń, Pyka (2021): 57–74.

⁴⁹ PFSa Office (2020).

– bank risk management, including the scale of created provisions, risk transfer and retention,

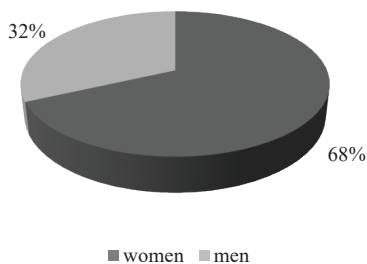
- bank financing structure,
- the amount and security of bank risk capital,
- the profitability and efficiency of banking activities.

The results presented in this study concentrate on new prudential regulations in the context of bank risk capital management.

When it comes to the research sample, 110 representatives of commercial banks participated in the survey: 49.09% held managerial positions and 50.91% represented risk management departments, and 80.91% of the respondents had at least 10 years of experience in the banking industry. The structure of respondents by gender and age is presented in Chart 2 and 3.

Chart 2

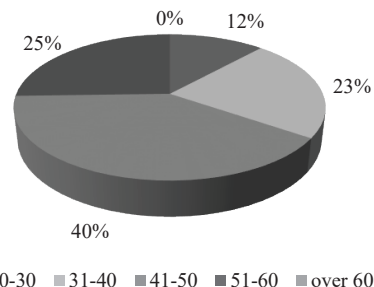
Structure of respondents by gender



Source: the authors' own elaboration.

Chart 3

Structure of respondents by age



Source: the authors' own elaboration.

At this stage we also assessed the internal consistency of the applied tool – through the Cronbach's Alfa coefficient.⁵⁰ The Cronbach Alpha takes values in the range $<0; 1>$. It is desirable for an index to be 1,⁵¹ while the correct and generally accepted minimum value for it is 0.7. The values obtained above 0.7 indicate the questionnaire has an appropriate structure. The value of the Cronbach Alpha coefficient is 0.8230 for 29 questionnaire questions, which indicates a very high internal consistency, and thus that the developed tool has a very good structure.

The second part of the questionnaire (stage 1b) was conducted in the second quarter of 2021. The main research subject was sustainable finance of commercial banks in Poland and the process of greening bank loan portfolios. At this stage, 129 respondents took part in the research: 26.36%

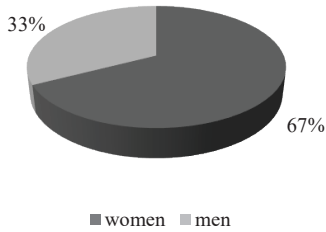
⁵⁰ Taherdoost (2016): 28–36.

⁵¹ Rule for describing internal consistency using Cronbach Alpha coefficient: $0.9 \leq \alpha$ excellent; $0.8 \leq \alpha < 0.9$ good; $0.7 \leq \alpha < 0.8$ acceptable; $0.6 \leq \alpha < 0.7$ questionable; $0.5 \leq \alpha < 0.6$ poor; $\alpha < 0.5$ non-acceptable.

held managerial positions, and 73.64% represented other positions. At least 49.61% of the respondents had at least 10 years of experience in the banking industry. The structure of respondents by gender and age is presented in Chart 4 and 5.

Chart 4

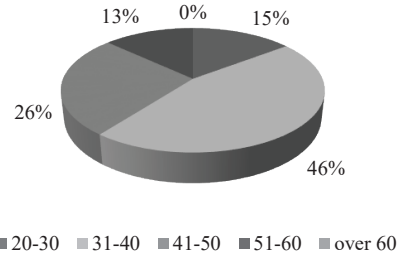
Structure of respondents by gender



Source: the authors' own elaboration.

Chart 5

Structure of respondents by age



Source: the authors' own elaboration.

The Cronbach's Alpha coefficient is 0.9306 for 36 questionnaire questions, which also confirms the developed questionnaire tool has a very good structure.

All questions at both stages were developed in the form of microtheses. Their aim was to obtain information on the degree of their acceptance by respondents. Therefore, they were statements using the 5-point Likert scale, according to the following categories:

- strongly disapprove – 1
- disapprove – 2
- undecided – 3
- approve – 4
- strongly approve – 5.

The second stage of the empirical research included a statistical analysis (stage 2), which was aimed at verifying the research hypothesis stating that financing green investments change banks' approach to credit risk management.

To verify the adopted research hypothesis, two statistical tests were carried out:

- test for the mean,
- test for the proportion.

Test for the mean is a parametric test that tests a hypothesis about the mean value of a population. In the research, it was assumed that the hypothesis will be positively verified if the mean results are not statistically significantly lower than 4 (because we expect a value of 4 or 5). The test for the proportion is a test that allows the hypothesis regarding the value of fractions (proportions) in the general population to be verified, or their values in two or more populations to be compared. The proportion (fraction) in the statistics is

the ratio of a number of elements distinguished to the number of all elements of the sample (or population):

$$p = \frac{m}{n},$$

where m – number of elements distinguished in the sample (population), n – number of all elements of the sample (population).

It was assumed that the hypothesis would be verified positively if the percentage of respondents assigning grades 4 or 5 was statistically significantly higher than 70%.⁵²

In order to verify the null hypothesis, we use the U-statistic of the form:

$$U = \frac{\frac{f}{n} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} = \frac{f - np_0}{\sqrt{np_0(1-p_0)}}$$

where: f – number of sample elements that meet a given condition, n – sample size, p_0 – assumed value of the fraction index.

The statistical significance level was 0.05.

IV. RESULTS

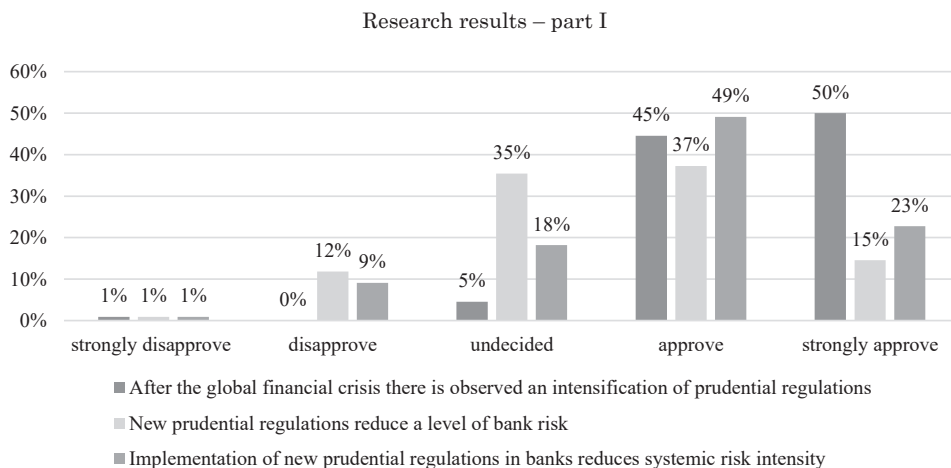
1. The role of new prudential regulations in the context of bank risk capital management

The empirical research results confirm the growing scale and scope of prudential regulations for a banking sector in Poland: 94.55% of the respondents (the total share of respondents who answered approve or strongly approve) noticed an intensification of prudential regulations for the banking sector after the outbreak of the global financial crisis (see Graph 1).

It is positive that, according to the respondents, the new regulatory framework fulfils one of the most important objectives – it is conducive to reducing risk in banking institutions (see Graph 1). Over half of the respondents (51.82%) indicated that the implemented regulations reduce the level of bank risk. In turn, 35.45% of them do not have an unambiguous opinion on this issue, while 12.73% did not notice this impact. Despite this, it should be recognized that prudential norms concerning limiting the scale of risky activity, securing undertaken risk and stricter supervision over banking activity are reflected in the lower risk taken on by banks. Thus, they achieve the results desired by their creators – regulators and legislators.

⁵² The research adopted a post-positivist paradigm, which allows the researcher to use the subjective approach to the analysed problem.

Graph 1



Source: the authors' own elaboration.

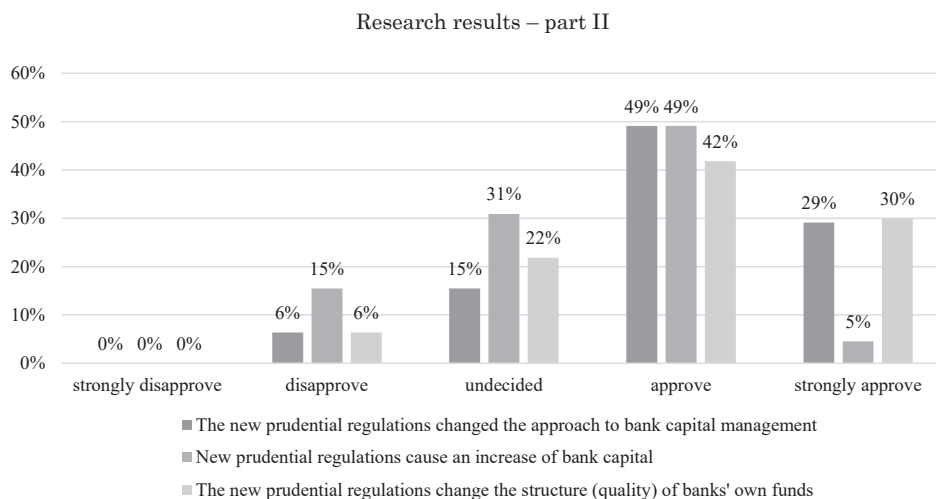
Furthermore, an important area of the new prudential regulations is limitation of banks' exposure to systemic risk. Systemic risk, resulting from interdependence of institutions, markets and financial instruments, turned out to be one of the most important factor intensifying the financial crisis of the first decade of the twenty-first century. The contagion effect, in the form of single events transferring into multiple institutions, markets and financial instruments, involved the rapidly spreading sources of the collapse to almost whole global economy. 22.73% of respondents indicate that implementation of new prudential regulations in commercial banks in Poland significantly reduces the intensity of systemic risk (Graph 1), and 49.09% believe that these goals are largely achieved. Only 10% of respondents are against this view. While, 18.18% have no opinion on this issue.

Therefore, the new regulatory framework, mainly focused on limiting bank risk and an attempt to secure it, significantly changes the approach to bank capital management. The conducted empirical research shows that this view is confirmed by 78.18% of the respondents (Graph 2), 15.45% of the them do not have an opinion on this issue, while only 6.36% deny that regulatory changes determine the strategy of bank capital management.

The most significant aspect of the new prudential regulations is an increase in bank capital, the value of which should be adequate. This means that in the event of bank's losses, they should be fully absorbed by maintained capital. It mainly concerns Tier 1 capital, which is used to cover losses from normal operations. Thus, the new standards emphasize one of the main functions of capital, which is loss absorption, so that banking institutions are able to bear the consequences of excessively risky activities on their own. At the same time, it will help to avoid a situation in which the only way to prevent their bankruptcy is to recapitalize them from public funds, as was

observed during the global financial crisis. 53.64% of the respondents agreed that the new prudential regulations resulted in an increase of bank capital, 30.91% of them did not have an opinion on this matter, while 15.45% did not notice any changes in the amount of bank capital after the implementation of the new prudential framework (Graph 2). Thus, the conducted empirical research indicates that changes in the capital requirements for banks and credit institutions included in the new prudential regulations caused an increase of bank capital.

Graph 2



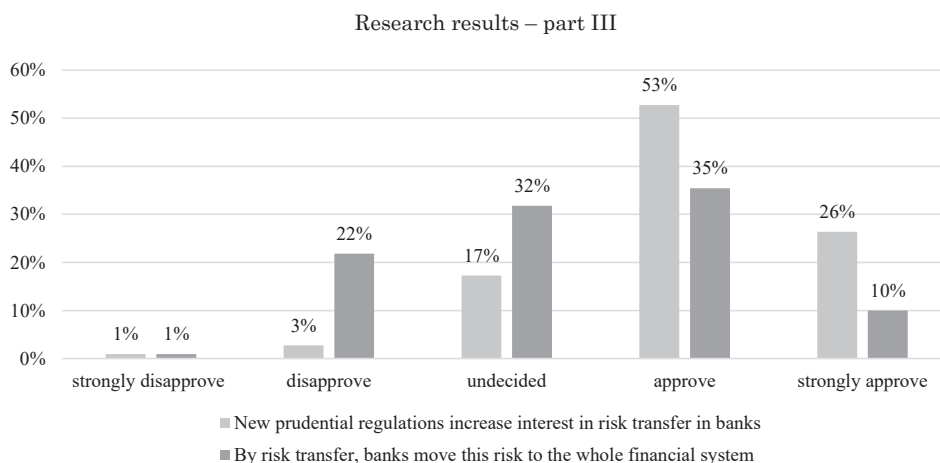
Source: the authors' own elaboration.

At the same time, it should be noticed that the new regulatory framework draws attention not only to the adequate amount of bank capital, but also to appropriate structure of the banks' own funds. This is confirmed by 71.82% of the respondents, who observed changes in the structure of the banks' own funds, which took place after the implementation of the new prudential norms (Graph 2), 21.82% do not have an opinion on this subject, while only 6.36% are against this view. The new regulations tightened the criteria for recognizing bank's capital components as their own funds by specifying the conditions that must be met by components of the core as well as supplementary capital. The global financial crisis prompted regulatory authorities to assign a greater role to core capital (Tier 1), which necessitated improving the quality of capital by banks that hold to a large extent hybrid instruments, classified under the previously applicable regulations as the highest quality capital.

The conducted empirical research also shows that the new prudential regulations change the approach to bank risk management: 79.09% of the respondents believe that they contribute to increasing interest in an active risk

management strategy, based on its transfer (mitigation) rather than risk retention (Graph 3), 17.27% of them do not have an opinion on this issue, while only 3.64% are against this view. Risk transfer means relocation of all or part of the consequences of risk materialization to another entity. In banking institutions, it is performed mainly in the securitization process and through hedging, that is, the use of derivative instruments.

Graph 3



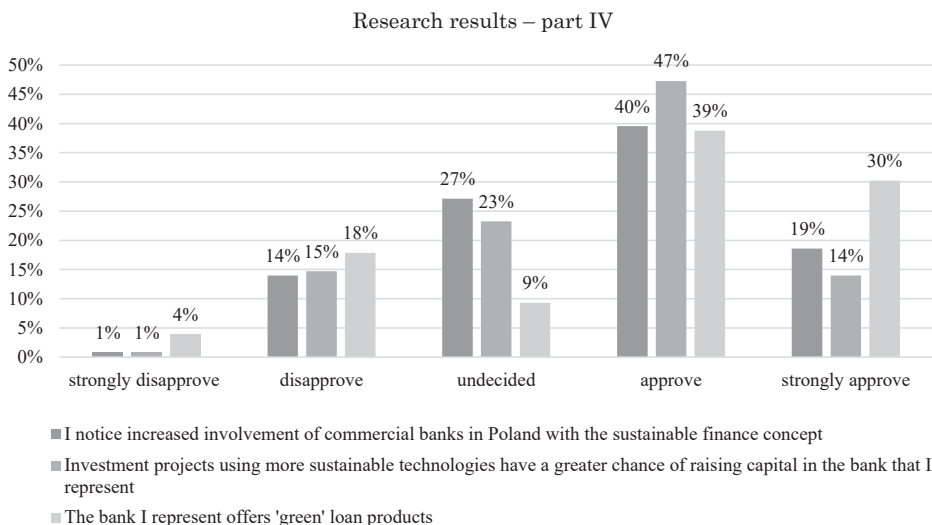
Source: the authors' own elaboration.

However, risk transfer may mean that banks transmit risk to other entities or markets, and finally to the whole financial system. This favours increasing – as mentioned earlier – systemic risk. 45.45% of the respondents agree with the statement that banks transmit the risk to the whole financial system through risk transfer, 31.82% have no opinion on this issue, while 22.73% of them are against this view (Graph 3). Therefore, the opinions are divided and it is difficult to decide to what extent risk transfer may favour an increase of systemic risk.

2. The process of greening loan portfolios in commercial banks in Poland

The second part of the questionnaire was aimed at assessing the process of greening loan portfolios in commercial banks in Poland. The research results clearly indicate that Polish banking institutions increase their involvement in the implementation of sustainable finance assumptions. This is indicated by 58.14% of the respondents (Graph 4). The concept of financing sustainable development or sustainable investments is gaining importance not only in the Polish banking sector, but in the whole world economy.

Graph 4



Source: the authors' own elaboration.

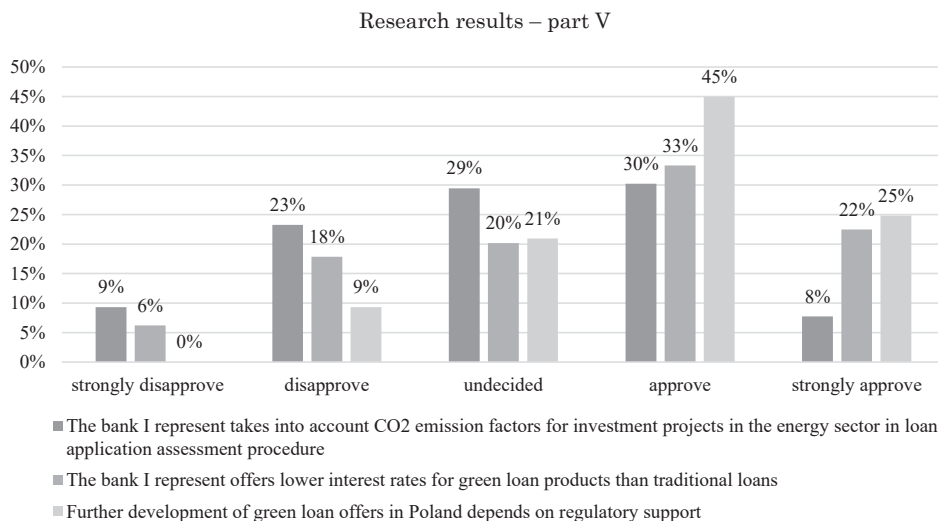
The respondents also indicated that investment projects using more sustainable technologies have a greater chance of obtaining capital in commercial banks in Poland. This view is shared by 61.24% of respondents (Graph 4) who notice sustainable finance elements in their business strategies and product offer, 23.26% of them do not have an opinion on this issue, while only 15.50% of the respondents are against this view. The results of the conducted empirical research also prove that green loans are available in most of the banks whose representatives participated in the research. This is confirmed by 68.99% of the respondents. The case study analysis shows that the following banks in Poland have the most extensive offer of green loans: BNP Paribas, ING Bank Śląski, Credit Agricole, PKO Bank Polski and Bank Ochrony Środowiska. Their offer includes credit products conducive to the financing of sustainable development targets, both for individuals and institutional clients.

The mentioned transformation is taking place not only in the area of extending the offer of green loan products. Commercial banks in Poland also implement adequate changes in the area of assessing loan applications. In the opinion of 37.98% of respondents, CO₂ emission factors are taken into account in the procedure of assessing the financing of investment projects from the energy sector (Graph 5).

According to the questionnaire, commercial banks in Poland also propose preferential interest rates on loans favourable to climate and energy targets: 55.81% of the respondents indicated that the banks they represent offered lower interest rates on green loans than traditional ones (Graph 5). This means that they want to encourage clients to make socially responsible investments,

and at the same time are ready to resign from a part of the margin in order to support the financing of sustainable development. 20.16% of respondents do not have an opinion on this subject, while 24.03% of them did not notice a difference in the interest rates offered for traditional and green loans. Moreover, the case study analysis proved that apart from a preferential interest rate, banks do not charge a commission for granting a loan supporting green transformation, there is also a possibility to postpone the repayment of the capital instalment of such loans, while a commission for early partial or full repayment is zero. Green loans are also often subsidized by government institutions. In its strategy for 2021–2023, Bank Ochrony Środowiska (BOŚ) declared that in 2023 the share of green loans in its loan portfolio would increase to over 50%.⁵³

Graph 5



Source: the authors' own elaboration.

However, regulatory support seems to be an important aspect in further process of greening the loan portfolios of commercial banks in Poland. The conducted research showed that 69.77% of respondents believe that the development of a green loan offer depends on legislation (Graph 5). Only 20.93% do not have an opinion on this issue, and 9.30% of them are against this opinion. This means that banks expect the development of certain standards and rules for granting financing for purposes of broadly understood environmental protection in the further development of their green loan offer.

⁵³ BOŚ (2021).

3. Financing green investments and the approach to credit risk management in commercial banks in Poland

The second stage of the empirical research was a statistical analysis aimed at verifying the hypothesis that financing green investments changes banks' approach to credit risk management. For this purpose, 8 questions were used. In accordance with the adopted methodology, the following statistical tests were used:

- test for the mean,
- test for the proportion.

The results obtained for the test for the mean are presented in Table 1.

Table 1

Results for the test for the mean

| Question | Hypotheses | Mean | <i>t</i> -statistic | <i>p</i> -value* | Decision |
|--|--|-------|---------------------|------------------|--|
| 2. The bank I represent implements the assumptions of sustainable finance. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.519 | -5.455 | <0.001 | <i>p</i> -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 9. Financing green investments will require bank risk mitigation to a greater extent focused on limiting its effects in the banking system than hedging by bank capital. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.256 | -9.352 | <0.001 | <i>p</i> -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 15. The bank I represent takes into account CO ₂ emission factors for investment projects in the energy sector in loan application assessment procedure. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.039 | -9.864 | <0.001 | <i>p</i> -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |

| | | | | | |
|--|--|-------|--------|--------|---|
| 17. The bank I represent implements a new green investment financing policy, resulting from the new European guidelines. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.481 | -4.917 | <0.001 | p -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 19. Further development of a green loan offer in Poland depends on regulatory support. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.853 | -1.854 | 0.033 | p -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 22. In the bank I represent, I expect a higher share of financing green investments by long-term loans, granted directly to the special purpose vehicle (SPV). | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.264 | -7.650 | <0.001 | p -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 23. In my opinion, credit risk of green investments will decrease. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.155 | -9.418 | <0.001 | p -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |
| 24. I think that it will be necessary for a bank to prepare more restrictive and more extensive documentation on granting green loans. | H_0 : mean value is 4 H_1 : mean value is below 4 | 3.171 | -9.000 | <0.001 | p -value indicates that the H_0 hypothesis should be rejected at the adopted significance level. Thus, the mean value is below 4. The hypothesis has been validated negatively. |

* Significance level was 0.05.

Source: the authors' own elaboration.

Using the test for the mean, it was observed that for each of the questions the mean value is significantly lower than 4. Therefore, the hypothesis has been validated negatively for all questions.

After that, the test for the proportion was carried out. In this case, it was assumed that the hypothesis would be verified positively if the percentage of respondents assigning grades 4 or 5 is statistically significantly higher than 70%. The obtained results are presented in Table 2.

Table 2

Results for the test for the proportion

| Question | Hypotheses | Proportion | <i>u</i> -statistic | <i>p</i> -value | Decision |
|--|--|------------|---------------------|-----------------|--|
| 2. The bank I represent implements the assumptions of sustainable finance. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 58.14% | -2.940 | 0.998 | <i>p</i> -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 9. Financing green investments will require bank risk mitigation to a greater extent focused on limiting its effects in the banking system than hedging by bank capital. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 44.19% | -6.398 | 1.000 | <i>p</i> -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 15. The bank I represent takes into account CO ₂ emission factors for investment projects in the energy sector in loan application assessment procedure. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 37.98% | -7.935 | 1.000 | <i>p</i> -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 17. The bank I represent implements a new green investment financing policy, resulting from the new European guidelines. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 55.81% | -3.516 | 1.000 | <i>p</i> -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |

| | | | | | |
|--|--|--------|--------|-------|---|
| 19. Further development of a green loan offer in Poland depends on regulatory support. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 69.77% | -0.058 | 0.523 | p -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 22. In the bank I represent, I expect a higher share of financing green investments by long-term loans, granted directly to the special purpose vehicle (SPV). | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 44.96% | -6.206 | 1.000 | p -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 23. In my opinion, the credit risk of green investments will decrease. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 41.09% | -7.166 | 1.000 | p -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |
| 24. I think that it will be necessary for a bank to prepare more restrictive and more extensive documentation on granting green loans. | H_0 : the proportion is 70% H_1 : the proportion is higher than 70% | 44.96% | -6.206 | 1.000 | p -value indicates that there is no reason to reject the H_0 hypothesis at the adopted significance level. Thus, the proportion value is not more than 70%. The hypothesis has been validated negatively. |

Source: the authors' own elaboration.

Using the test for the proportion, it was observed that for each question, the percentage of people giving grades of at least 4 was not statistically significantly higher than 70%. Thus, the hypothesis has been verified negatively. The closest to the adopted level were the results for question no. 19, for which the proportion was 69.77%.

V. DISCUSSION AND CONCLUSIONS

Green loan policies, according to the conducted theoretical and empirical research, are being introduced into the European Union's banking sector with

increasing intensity. First of all, this is related with the banks' new goals of creating a loan portfolio and a higher share of green investments. At the same time, banks, undertaking new challenges of sustainable development, are increasingly exposed to ESG risk. The research results presented in the publication clearly indicate that banking institutions in Poland are increasing their commitment to the implementation of sustainable finance assumptions, and green investments have a greater chance of getting financed by commercial banks in Poland. Currently, banks' policies are focused primarily on financing those projects that contribute to the achievement of net zero emission targets in the European economy by 2050, as set in the 'European Green Deal'.⁵⁴

The results of the empirical research also showed that green loans are available in most of the analysed banks. Commercial banks in Poland have also been introducing adequate changes with regard to assessing loan applications, taking into account CO₂ emission factors in the consideration of financing investment projects from the energy sector. Furthermore, commercial banks in Poland offer preferential interest rates on loans conducive to climate and energy targets. The conducted research results indicate that banks are waiting for the development of final standards and principles of green financing, which will determine the further development of the 'green' loan offer.

In May 2020, the EBA published the Guidelines on loan origination and monitoring.⁵⁵ These guidelines specify the obligations of banks focusing on environmentally sustainable lending.⁵⁶ They cover five main areas of credit procedures: lending, management, monitoring, valuation and pricing. In the context of the implemented regulatory changes, the burden of various costs on banks is undoubtedly increasing. Only in the pricing policy is it indicated that credit institutions should take into account and reflect all costs, such as capital costs, financing costs, operating and administrative costs, or credit risk costs, including previous experience and any other actual costs related to a specific loan. Given that – in accordance with the guidelines – the valuation of costs should reflect them in the business strategy, green loans should be price-competitive on the financial market. This situation is undoubtedly important from the perspective of the effectiveness of banks' operation, if they are involved in green investment financing. It is indicated that the application of supporting factors as well as penalizing factors supporting green lending has positive and negative sides, leading in general to irregularities in the amount of bank risk capital and problems with maintaining safety or financial stability.⁵⁷ Controversies around the profitability of green financing also arise in the background of the valuation of other costs of these institutions, which often are unpredictable and non-regulatory. In their assets portfolio, banks can collect green bonds, generating the so-called alternative costs of green

⁵⁴ European Council, European Green Deal, <https://www.consilium.europa.eu/pl/policies/green-deal>; European Commission, A European Green Deal. Striving to be the first climate-neutral continent, 2022, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

⁵⁵ European Banking Authority (2020).

⁵⁶ The guidelines introduced the concept of 'environmentally sustainable lending'.

⁵⁷ Marcinkowska (2022).

finance. Therefore, there is a commonly signalled concern about the growing *greenwashing* phenomenon which may ultimately run counter to the objectives of green investment financing.

Moreover, the results of the conducted research indicate that despite the ongoing process of greening the loan portfolios of commercial banks in Poland, financing green investments does not change their approach to bank risk management. The Polish banking sector is increasingly aware of a need to finance socially responsible investments. That is why it is expanding the green loan offer, while treating these products as a priority, as well as limiting the lending of non-ecological projects. However the sector is not implementing significant modifications to bank risk management systems, under the influence of growing ESG risk. Only some of the banks of the Polish banking sector declare that they take into account or intend to take into account climate and environmental risks in the loan granting procedure, mainly for selected industries and sectors.⁵⁸

According to the conducted research, the banks' protective attitude towards ESG risk is accompanied by their complete subordination to the requirements of the new regulatory order that emerged following the crisis. They maintain an adequate amount of bank capital, as well as an appropriate structure of their own funds. They also fulfil new Basel recommendations that tightened the criteria for recognizing banks' capital components as their own funds, both in relation to core funds and supplementary funds. The analysed banks also subordinated changes in the bank risk management system to these new, post-crisis regulatory requirements.

In this context, we identified a new research gap related to their conforming to ESG risk protection that might be a subject of our further in-depth research. Undoubtedly, an important barrier to the growing problems related to ESG risk is the implementation of the compliance function in the banking sector. It is based on the document 'Compliance and the compliance function in banks', prepared by the Basel Committee on Banking Supervision (2005). Domestic banks were obliged to comply with it under the banking law and the resolution of the Polish Financial Supervision Authority in 2011.⁵⁹ According to the regulations, the bank's management board is responsible for effective compliance risk management, while a supervisory board oversees compliance risk management. Therefore, the compliance function is regarded as an element of integrated bank risk management and relates to the identification, measurement, assessment, monitoring, testing and reporting of compliance risk. Green loans, which are increasingly penetrating bank portfolios, increase the regulatory mix of bank risk, which may become a serious challenge for

⁵⁸ PwC (2021).

⁵⁹ Resolution No. 258/2011 of the Polish Financial Supervision Authority of 04 October 2011 on Detailed Principles of Functioning of the Risk Management System and Internal Control System and Detailed Conditions of Internal Capital Assessment by Banks and of Reviewing the Process of Internal Capital Assessment and Maintenance and the Principles of Determining the Policy on Variable Components of Remuneration of Persons Holding Managerial Positions at a Bank, Official Journal of PFSA, 23 November 2011, no. 11, item 42.

the banking compliance function. An important reason for the banks' conformism to ESG risk is undoubtedly the instability of the global economy, generated by the COVID-19 pandemic and Russia's aggression against Ukraine. In particular, it is currently difficult to determine the position of the European Union on the effects of the energy crisis.

The high costs of the energy transformation, although very important in the perspective of the EU's resource independence from Russia, increasingly obscure the possibility of returning to the previous economic and financial relations with Russia. The probability of such a scenario increases in proportion to the time of the Russian aggression. The green investments of banks and the associated ESG risk will therefore depend on whether the pressure of the EU authorities on green investments turns out to be a permanent trend in the implementation of the sustainable development concept of EU Member States or not. Currently, this problem is overshadowed in domestic banks by rapidly growing inflation, high interest rates, and tightening of monetary policy. The greater profitability of banking activity is accompanied by an increase in bank risk and a greater need for regulatory capital. Banks will therefore reduce their lending potential and monitor and improve their bank risk management systems. The accompanying ESG risk and related problems identified in the research remain in the background of bank risk management. However, the policy of green lending of sustainable investments and its consequences remain a real 'being', causing threats to the banking compliance function in the conditions of their holistic approach to bank risk, justifying the desirability of the authors conducting further in-depth research in this area in the future.

References

- Aldasoro, I., Gambacorta, L., Giudici, P., Leach, T. (2020). Operational and cyber risks in the financial sector. BIS Working Papers 840, February.
- Bank Ochrony Środowiska (2021). We are full of green energy. Development Strategy for Bank Ochrony Środowiska S.A. for the years 2021–2023. 22 June.
- Basel Committee on Banking Supervision (2005). Compliance and the compliance function in banks. BIS, April.
- Basel Committee on Banking Supervision (2010). Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems. Bank for International Settlements. Basel.
- Bevilacqua, E. (2022). European cooperative banks and sustainability. In M. Migliorelli, E. Lamarque (eds.), *Contemporary Trends in European Cooperative Banking. Sustainability, Governance, Digital Transformation, and Health Crisis Response* (pp. 165–192). Palgrave Macmillan.
- Borys, T. (2012). Trwały i zrównoważony rozwój [Permanent and sustainable development]. In: W. Gasparski (ed.), *Biznes, etyka, odpowiedzialność [Business, Ethics, Responsibility]* (pp. 477–479). Warsaw: Wydawnictwo Profesjonalne PWN.
- Borys, T., Czaja, S. (2009). Badania nad zrównoważonym rozwojem w polskich ośrodkach naukowych [Studies on sustainable development in Polish research centers]. In D. Kielczewski (eds.), *Od koncepcji ekorozwoju do ekonomii zrównoważonego rozwoju [From the Concept of Eco-Development to the Economy of Sustainable Development]* (pp. 51–58). Białystok: Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku.

- Brando, D., Kotidis, A., Kovner, A., Lee, M., Schreft, S.L. (2022, 12 May). Implications of Cyber Risk for Financial Stability. FED Notes. <https://www.federalreserve.gov/econres/notes/feds-notes/implications-of-cyber-risk-for-financial-stability-20220512.html>
- Cicirko, M. (2022). Znaczenie czynników środowiskowego, społecznego i ładu korporacyjnego (ESG) we współczesnej gospodarce. Percepcja inwestycji ESG wśród studentów uczelni ekonomicznej [The importance of environmental, social and corporate governance factors (ESG) in the modern economy. The perception of ESG investment among students of economics]. *Ubezpieczenia Społeczne: Teoria i Praktyka* 152(1): 117–139. 10.5604/01.3001.0015.8055
- Deloitte (2022a, 24 March). Banki mogą odegrać kluczową rolę w ograniczeniu emisji dwutlenku węgla [Banks can play a key role in reducing carbon dioxide emissions]. <https://ceo.com.pl/deloitte-banki-moga-odegrac-kluczowa-role-w-ograniczeniu-emisji-dwutlenku-wegla-95339>
- Deloitte (2022b, June). Rising interest rates and inflation to slow growth. Economic outlook.
- Działgo, L. (2010). Zielony rynek finansowy. Ekologiczna rewolucja rynku finansowego [The Green Finance Market: The Eco Revolution of Financial Market]. Warsaw: Polskie Wydawnictwo Ekonomiczne.
- European Banking Authority (2020, 29 May). Final Report – Guidelines on loan origination and monitoring. EBA/GL/2020/06, 29 May.
- European Banking Authority (2021). EBA report on management and supervision of ESG risks for credit institutions and investment firms. EBA/REP/2021/18.
- Feyen, E., Natarajan, H., Saal, M. (2022, May 18). Fintech and the Future of Finance. World Bank report. <https://www.worldbank.org/en/publication/fintech-and-the-future-of-finance>
- Flak, P., Klimczak, B., Falkowski, T., Pękała, P. (2020). Zmiana klimatu w bankowości, czyli jak zarządzać ryzykiem klimatycznym w sektorze finansowym [Climate change in banking, or how to manage climate risk in the financial sector]. In: L. Kotecki (ed.), *Zielone finanse w Polsce* [Green Finance in Poland] (pp. 9–20). Warsaw.
- Ha, M.S., Nguyen, T.L. (2022). Digital transformation in banking: a case from Vietnam. In: T. Phan, D. Damian (eds.), *Smart Cities in Asia*. Springer Briefs in Geography (pp. 103–114). Singapore: Springer. https://doi.org/10.1007/978-981-19-1701-1_9
- Helbekkmo, H., Levy, C., White, O. (2020). Creating the bank enterprise risk management function of the future. McKinsey & Company.
- IMF (2011, 14 March). Macroprudential Policy: An Organizing Framework, prepared by the Monetary and Capital Markets Department.
- IMF (2022, 1 April). Digitalization and Development, Development Committee Meeting. DC2022-00021. <https://www.devcommittee.org/en/devcommittee/documents>
- Kopp, E., Kaffenberger, L., Wilson, Ch. (2017). Cyber Risk, Market Failures, and Financial Stability. IMF Working Paper WP/17/185: 1–35.
- Korenik, D. (2013). Zasady i formy społecznie odpowiedzialnej bankowości [Rules and forms for socially responsible banking]. In: G. Borys, A. Janusz (eds.), *Rola instytucji i rynku finansowego w świetle celów oraz zasad zrównoważonego rozwoju* [The Role of Institutions and the Financial Market in the Light of the Objectives and Principles of Sustainable Development]. *Research Papers of Wrocław University of Economics* 311: 134–143.
- Kotecki L. (2019). Climate change as a source of risk in the financial sector. *Bezpieczny Bank* 4(77): 63–80. <https://doi.org/10.26354/bb.4.4.77.2019>
- KPMG (2021a). Banki muszą się przygotować do zarządzania ryzykiem ESG [Banks have to prepare for ESG risk management]. <https://kpmg.com/pl/pl/home/media/press-releases/2021/07/media-press-banki-musza-sie-przygotowac-do-zarzadzania-ryzykiem-esg.html>
- KPMG (2021b). Raport: Ryzyka związane z ESG w bankach [Report: ESG risks in banks]. <https://kpmg.com/pl/pl/home/insights/2021/07/raport-ryzyka-zwiazane-z-esg-w-bankach.html>
- Kulińska-Sadłocha, E. (2009). Banki a zmiany klimatyczne [Banks and climate change]. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Ekonomiczne Problemy Usług* 38: 175–182.
- Kulińska-Sadłocha, E. (2022). W jaki sposób banki mogą wspierać transformację gospodarki w kierunku modelu zrównoważonego? [How can banks support the transformation of the economy towards a sustainable model?]. In M. Burchard-Dziubińska (ed.), *W poszukiwaniu zielonego ładu* [In Search of a Green Deal] (pp. 311–332). Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Loan Market Association (2021). Green Loan Principles.

- Marcinkowska, M. (2022). Próby włączenia ryzyka ESG do unijnych regulacji ostrożnościowych banków [Attempts to integrate ESG risks into EU prudential regulations for banks]. *Bezpieczny Bank* 88(3): 48–49. <https://doi.org/10.26354/bb.2.3.88.2022>
- Olech, D., Flak, P. (2021). EBA pyta banki o praktykę zarządzania ryzykiem ESG i wskazuje kierunki [The EBA asks banks about their ESG risk management practices and indicates directions]. *EY*. https://www.ey.com/pl_pl/biuletyn-ryzyka/eba-pyta-banki-o-praktyke-zarzadzania-ryzykiem-esg-i-wskazuje-kierunki
- Paluszak, G., Wiśniewska-Paluszak, J. (2018). Corporate Social Responsibility of the leading bank institutions in Poland. *Acta Universitatis Lodzianis Folia Oeconomica* 6(339): 17–40. <https://doi.org/10.18778/0208-6018.339.02>
- PFSA Office (2020). Report on the Activities of the UKNF and the Polish Financial Supervision Authority in 2019. <https://www.knf.gov.pl/knf/pl/komponenty/img/Sprawozdanie%202019.pdf>.
- PKO BP (2022). Ryzyka ESG [ESG risks]. <https://www.pkobp.pl/relacje-inwestorskie/esg-w-grupie-pko-banku-polskiego/ryzyka-esg/>.
- PwC (2021). Zielone finanse po polsku. Jak ESG zmieni sektor bankowy i finansowanie firm? [Green finance in Poland. How will ESG change the banking sector and corporate financing?]. https://www.pwc.pl/en/publikacje/green-finance-in-poland-how-will-esg-change-the-banking-sector-and-corporate-financing.html?utm_source=twitter&utm_medium=social&utm_campaign=ESG-raport-Green-Finance-in-Poland&utm_content=social-28-06-2021.
- Pyka, I., Nocoń, A. (2021). Responsible lending policy of green investments in the energy sector in Poland. *Energies* 14(21): 7298. <https://doi.org/10.3390/en14217298>
- Pyka, I., Nocoń, A., Pyka, A. (2021). Interactions between effectiveness and consolidation of commercial banks in the Polish banking sector. In: *Eurasian Economic Perspectives* (pp. 57–74). Springer. https://doi.org/10.1007/978-3-030-63149-9_4
- Ryszawska, B., Zabawa, J. (2018). The environmental responsibility of the world's largest banks. *Economics and Business* 32(1): 51–64. <https://doi.org/10.2478/eb-2018-0004>
- Smoleńska, A., van't Klooster, J. (2022). A risky bet: climate change and the EU's microprudential framework for banks. *Journal of Financial Regulation* 8(1): 51–74. <https://doi.org/10.1093/jfr/fjac002>.
- Spinachi, S. (2021). Green and sustainable finance. European Parliament, EPRS, PE 679.081
- Szpojankowski, A., Kapica, W. (2022, October 19). Ryzyko ESG w sektorze bankowym – stan obecny i perspektywy na 2022 i 2023 rok (aktualizacja) [ESG risk in the banking sector – current status and prospects for 2022 and 2023 (update)]. Lawarton. Warsaw.
- Taherdoost, H. (2016). Validity and Reliability of the Research Instrument. How to Test the Validation of a Questionnaire/Survey in a Research. *International Journal of Academic Research in Management* 5(3): 28–36. <https://doi.org/10.2139/ssrn.3205040>
- Tok, Y.W., Heng, D. (2022, May). Fintech: Financial Inclusion or Exclusion? IMF Working Paper WP/22/80.
- UNFCCC (2015). Conference of the Parties, Adoption of the Paris Agreement. Dec. 12, 2015. U.N. Doc. FCCC/CP/2015/L.9/Rev/1, United Nations, New York, USA.
- United Nations (1987). Report of the World Commission on Environment and Development: Our Common Future, transmitted to the General Assembly as an Annex to document A/42/427 – Development and International Co-operation: Environment. <http://www.un-documents.net/wced-ocf.htm>.
- United Nations (2015). Transforming our World: The 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1.
- Van Greuning, H., Brajovic Bratanovic, S. (2020). Analyzing Banking Risk: A Framework for Assessing Corporate Governance and Risk Management. 4th edn. Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/403931618461962435/Analyzing-Banking-Risk-A-Framework-for-Assessing-Corporate-Governance-and-Risk-Management-Fourth-Edition>
- Wróblewski, R. (2011). Zarządzanie ryzykiem w przedsiębiorstwie [Risk management in the enterprise]. *Zeszyty Naukowe Uniwersytetu Przyrodniczo-Humanistycznego w Siedlcach* 90 Seria: Administracja i Zarządzanie 90: 9–31.

- Wrochna, P. (2018). Ryzyko ekologiczne jako ryzyko społeczne. Na ile „rzeczywista” jest katastrofa klimatyczna? [Ecological risk as a social risk. How “real” is the climate catastrophe?]. *Annales Universitatis Mariae Curie-Skłodowska. Sectio I. Philosophy and Sociology* 43(1): 193–213. <http://dx.doi.org/10.17951/i.2018.43.1.193-213>
- Zabawa, J. (2015). Postrzeganie społecznej odpowiedzialności banków przez ich klientów. Perspektywa ekologiczna [Perception of social responsibility of banks by their customers]. *Studia Ekonomiczne* 239: 181–196.
- Zabawa, J. (2019). Bankowość ekologiczna w społecznej odpowiedzialności biznesu. Rola, uwarunkowania i mierniki [Eco-banking in corporate social responsibility. Roles, determinants and measures]. Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
- Ziolo, M. (2017). Zarządzanie ryzykiem środowiskowym i jego znaczenie dla stabilności sektora bankowego [Environmental risk management and its importance for the stability of the banking sector]. *Management Issues* 15(66, 1): 92–106. <https://doi.org/10.7172/1644-9584.66.6>
- Ziolo, M. (2020). *Finanse zrównoważone. Rozwój, ryzyko, rynek* [Sustainable Finance: Development, Risk, Market]. Warsaw: Polskie Wydawnictwo Ekonomiczne.

