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GREENING MONETARY POLICY: A CONCEPTUAL FRAMEWORK

“ОЗЕЛЕНЕННЯ” ГРОШОВО-КРЕДИТНОЇ ПОЛІТИКИ: КОНЦЕПТУАЛЬНІ ОСНОВИ

Introduction. As policymakers worldwide grapple with implementing measures aimed at reducing carbon emissions, central banks delve into the impact of climate-related risks on managing price and financial stability objectives. Meanwhile, sustainable finance disclosure regulation is being considered to promote green securitization in Ukraine.

Materials and methods. The paper explores the potential for central banks to adjust monetary policy frameworks to facilitate the transition towards a greener economy. Through a comparative analysis of central banks' efforts to encourage green monetary policies, the study sheds light on the approaches to promote the greening of asset purchases, credit operations, disclosure requirements, and collateral frameworks.

Results and discussion. Green measures commonly adopted by central banks (adjusting asset portfolio, modifying collateral frameworks, amending credit operations to promote sustainable practices, and providing transparency about the efforts to integrate climate risks) face such challenges as inconsistent definitions and methodologies for measuring climate-related risks, limited official statistical data on these risks, and the potential for greenwashing. Analysis of practical experience suggests that central banks can encourage greening banks' balance sheets by incentivising ESG performance through enforcing disclosure requirements of climate-related risks. Banks can offer

more favourable interest rates for green lending and prioritise green asset purchases, such as green bonds. Central banks can green collateral frameworks by increasing collateral haircuts for assets exposed to climate-related risks.

Conclusions. The design of the green monetary policy involves incorporating environmental considerations into central bank practices, namely climate-related risk assessment, greening of credit operations, asset portfolios and collateral. The National Bank of Ukraine has initiated embedding climate risk into banks' analytical frameworks and green requirements for lending and bond products. However, further regulatory measures are required to take into account ESG aspects in banking practice and expand the availability of green finance products.

Keywords: monetary policy, central bank, climate risk, ESG, loan, bond, collateral.

Вступ. Зростання глобальної стурбованості зміною клімату стимулює уряди до впровадження заходів, спрямованих на скорочення викидів вуглецю. Це спонукає центральні банки вивчати вплив кліматичних ризиків на ціль забезпечення цінової та фінансової стабільності. В Україні розглядається питання щодо регулювання розкриття інформації щодо сталого фінансування для сприяння “зеленій” сек’юрітизації.

Матеріали та методи. У цій статті досліджуються способи адаптації грошово-кредитної політики центральними банками для прискорення переходу до екологічно стійкої економіки. Проведено порівняльний аналіз заходів центральних банків щодо заохочення реалізації “зеленої” грошово-кредитної політики (встановлення вимог щодо розкриття інформації; коригування кредитних операцій, купівлі активів та умов застави) протягом останнього десятиліття.

Результати і обговорення. “Озеленення” грошово-кредитної політики центрального банку (коригування портфеля активів, вимог до застав, умов кредитування для сприяння сталим інвестиційним практикам і забезпечення транспарентності щодо заходів з оцінки кліматичних ризиків) стикається з такими викликами, як відсутність уніфікованих визначень та методологій вимірювання кліматичних ризиків, обмеженість офіційних статистичних даних та ризик “грінвошингу”. Аналіз практики засвідчив, що центральні банки можуть стимулювати “озеленення” балансів банків, заохочуючи дотримання ESG через встановлення вимог щодо розкриття інформації про кліматичні ризики. Банки можуть пропонувати більш привабливі відсоткові ставки для “зеленого” кредитування та надавати пріоритет купівлі “зелених” активів, зокрема “зелених” облігацій. Центральні банки можуть “озеленити” портфелі застав, збільшивши дисконт до застави для активів, які піддаються кліматичним ризикам.

Висновки. Розробка “зеленої” грошово-кредитної політики передбачає інтеграцію оцінки кліматичних ризиків і вимог до розкриття інформації, запровадження пільгового режиму для “зеленої” застави, активізацію “зеленого” кредитування та купівлі “зелених” активів. Хоча НБУ розпочав процес включення кліматичних ризиків у банківську аналітику та впровадження ESG вимог у кредитні та боргові продукти, однак існує потреба в подальшому удосконаленні регуляторних вимог щодо урахування ESG аспектів в банківській практиці та розширення пропозиції “зелених” фінансових продуктів.

Ключові слова: грошово-кредитна політика, центральний банк, кліматичний ризик, ESG, кредит, облігація, застава.

JEL Classification: E52, E58, Q58.

Introduction. The central bank is primarily accountable for maintaining price stability as a regulatory body. Hence, the central bank may find it challenging to integrate a carbon-neutral stance into its decision-making processes in pursuing this objective. However, supply-side factors, particularly climate risk-related, now predominantly influence inflation. Furthermore, climate shocks, as well as climate policies, affect both macroeconomic stability and the transmission of monetary policy, reflected through the interest rate, credit, asset price, and expectations channels. This forces

central banks to re-evaluate how much inflation deviation can be tolerated when energy prices significantly impact inflation.

In this regard, academic contributions focus on, first of all, uncertainty from carbon pricing. Unlike predictable carbon taxes, fluctuating cap-and-trade systems introduce greater uncertainty into inflation forecasting. Additionally, climate disruptions are expected to exacerbate supply shocks, making it harder to assess output gaps and inflation. This complexity hinders the effectiveness of traditional monetary policy frameworks reliant on accurate forecasts. Meanwhile, nominal income targeting, which avoids these complexities, better suits economies facing climate disruptions (McKibbin, 2020). Secondly, studies concerning greening monetary policy highlight the limitations of existing forecasting models. Traditional macroeconomic models, used by central banks, may not adequately capture the economic impacts of climate change and related policies. These models often focus on long-term relationships between demand, supply, and prices but may only partially account for climate-related disruptions (Breitenfellner, 2021). This necessitates reconsidering the optimal length of the policy horizon under an inflation-targeting regime. Longer horizons can minimise negative impacts on output, employment, and volatility. However, extending the horizon too far can risk the central bank's credibility and lead to frequent missed inflation targets. Thus, a delicate balance is needed between the horizon length and credibility (Ferrucci, 2022).

The current inflationary pressure in Ukraine constrains the implementation of climate change policies. High-interest rates deter investments in innovative and renewable energy projects, requiring significant upfront expenses. The high-risk environment due to the war further limits the development of green financing (green loans and bonds). Despite these challenges, the NBU is taking steps towards greening its monetary policy, recognising the importance of mitigating climate risks.

Against this backdrop, the paper aims at exploring the conceptual underpinnings of adjusting monetary policy to address climate risks.

Materials and methods. The study entails a comparative and descriptive analysis of the practices of central banks' monetary policies in taking climate-related risks into account during the latest decade.

Results and discussion. Central banks are increasingly acknowledging the financial risks posed by climate change. They are taking various steps to assess these risks by releasing reports, creating tools to mitigate the effects of climate change, and implementing regulatory changes that encourage investments in low-carbon assets through loans and guarantees. Central banks consider applying higher haircuts to "brown" assets in operations to account for the potential liability risk they may pose (Pfister, 2021) since assets used for reserve management, collateral, and non-standard monetary policy measures are at a high risk of devaluation.

Central banks can utilise further options to incorporate climate-related aspects into their monetary policies (Fig. 1).

The European central banks actively integrate climate change into their framework, aligning with the EU's environmental reporting policies. These measures include (Tabakis, 2023):

- a. adjusting the market capitalisation benchmark for corporate bond holdings to incorporate climate change factors;
- b. introducing CSRD-based disclosure requirements for issuers, promoting harmonised climate disclosures for structured finance;
- c. setting collateral pool composition limits, integrating climate change risks in haircut reviews, advocating for more transparency in credit ratings, and developing common standards for the Eurosystem's in-house credit assessment systems.

A survey by the NGFS (2023)¹ revealed the most common measures adopted by central banks (in 2021–2023):

- a. asset purchase programs: adjusting asset purchase programs to favour sustainable investments (implemented by 35% of surveyed banks, primarily from the Eurozone);

¹URL: https://www.ngfs.net/sites/default/files/monetary_policy_and_climate_change_-_key_takeaways_from_the_membership_survey.pdf (accessed 10.02.2024)

b. collateral frameworks: modifying collateral frameworks to consider climate risks (implemented by 31% of surveyed banks, mostly from the Eurozone);

c. credit operations: amending conditions and criteria for credit operations to promote sustainable practices (implemented by 5% of surveyed banks, mainly from emerging economies).

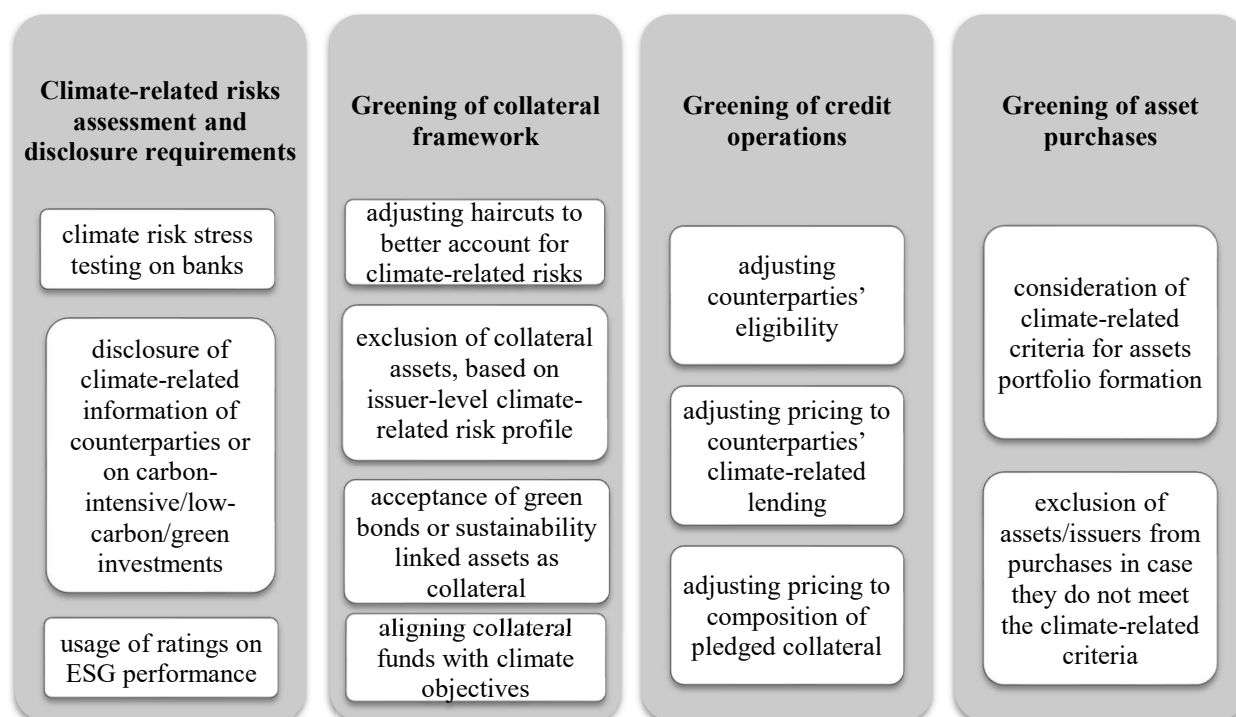


Fig. 1. Greening of monetary policy instruments

Source: compiled by the author based on the *Adapting central bank operations to a hotter world. Reviewing some options. NGFS, Technical document, March 2021.* URL: https://www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf

Climate-related risks assessment and disclosure requirements

Central banks are advised to be transparent about integrating climate-related risks into their frameworks, and, accordingly, banks are mandated to provide information regarding their exposure to climate change. This can be achieved by setting clear green targets addressing physical and transition risks and goals to reduce greenhouse gas emissions from internal operations². Central banks and supervisors are also developing methodologies to assess climate change's impact on price stability. Notably, in 2023, the ECB and EU member state central banks launched a joint initiative to develop statistical indicators for analysing climate risks affecting monetary policy, price stability, and the financial system. These indicators fall into three categories:³

a. sustainable finance indicators: while these cover issuances and holdings of sustainable debt securities, inconsistent definitions hinder implementation;

b. carbon emission indicators of financial institutions: suffer from inconsistent coverage and lack adjustment for inflation and exchange rates;

c. physical risk indicators: may not provide details on vulnerable debtor activities or risk mitigation measures.

Hence, despite many financial regulations introduced at the EU's level, official statistical data remains limited in practice, except for a small amount of data on a few counterparties. This hinders designing climate stress test scenarios.

² URL: https://www.ngfs.net/sites/default/files/medias/documents/guide_on_climate-related_disclosure_for_central_banks.pdf (accessed 10.02.2024)

³ URL: https://www.ecb.europa.eu/pub/pdf/other/ecb.climate_change_indicators202301-47c4bbbc92.en.pdf (accessed 10.02.2024)

Meanwhile, the Netherlands Bank (DNB), which established the Dutch sustainable finance platform in 2016⁴, has developed a strategy to incorporate sustainability risks into its supervisory methodology and has implemented a forward-looking toolkit that identifies macroprudential sustainability risks. In order to minimise green-washing, the People's Bank of China (PBOC) has updated its Green bond endorsed project catalogue (from 2015) and has promoted the development of Chinese green bond principles, issued in 2022. The PBOC has also issued the Guideline on environmental information disclosure for financial institutions in 2021, which outlines the requirements for disclosing environmental information, including the form, frequency, qualitative and quantitative information. Additionally, the PBOC conducted its first climate risk stress test, utilising carbon price scenarios from the NGFS as a reference. The test focused on analysing the effect of various levels of carbon pricing in China's national emissions trading scheme on banks' capital adequacy, specifically concerning transition risks in specific high-risk industries. The cumulative effect of these measures has led to a substantial rise in green finance in China: outstanding green lending has surged to 28 tn yuan, with outstanding green bonds reaching 1.8 tn yuan (as of Q3 2023)⁵.

Greening of asset purchases

Apart from formulating assessment criteria for evaluating the risks associated with green assets, central banks can mitigate the effects of climate change by engaging in securities transactions or by implementing credit policies tailored to the targeted entities' carbon footprint. Central banks can utilise various measures to ensure that refinancing is conducted with appropriate green collateral. This involves setting criteria for banks' collateral pool to account for the climate-related risks. When conventional (high-carbon) assets decrease, and green (low-carbon) assets increase in the collateral pool, green loans' borrowing rates decrease while conventional loans increase. This shift prompts a change in the investment structure of the real economy, favouring green investments (McConnell, 2022).

Specifically, starting from 2021, the Swedish central bank (the Riksbank) has limited its purchases of corporate bonds to those companies that comply with sustainability standards⁶. The ECB has reported a reduction in the climate risk of its overall corporate portfolio over 2018-2022. The decrease in carbon emissions, from 238 to 166 tons of CO₂ equivalent, is primarily attributed to the increased carbon efficiency of issuers. In October 2022, the ECB altered its asset purchase strategy to avoid companies with high carbon emissions. As a result, the yield-to-maturity of eligible green bonds decreased by 4 basis points compared to conventional bonds (Dobkowitz, 2023).

As a predominant part of QE, green sovereign bond purchases can support the green transition. In economies that exhibit high levels of carbon intensity, the cost of climate misalignment is often manifested in a higher climate spread, which has a discernible impact on both sovereign risk and the overall performance of portfolios (Battiston, 2020). The greening of TLTROs can impact SMEs through banks. To achieve this, banks should first progress in measuring the climate-related risks in loan portfolios (Hartmann et al., 2022). Furthermore, there should be limited substitutability between green and brown bonds. However, even with this assumption, the impact of green QE on reducing emissions can be negligible and, in some cases, close to zero (Ferrari, 2024).

Nevertheless, the greening of central bank assets portfolios could have a significant impact, mainly because of central banks' current sizeable balance sheets. Beyond direct impacts, the greening of central bank portfolios can encourage the greening of non-monetary policy portfolios, such as staff pension funds. Some central banks have already begun allocating some of their foreign reserves to green securities, creating further trade-offs for reserve managers due to these assets' potentially lower liquidity and relatively small market share (Boneva, 2022).

Supervisory authorities can also implement targeted regulations to incentivise sustainable practices by adjusting capital adequacy requirements based on the environmental risk profile of

⁴ URL: <https://www.ngfs.net/en/conversation-ms-cindy-van-oorschot-director-pension-supervision-sustainability-de-nederlandsche-bank> (accessed 10.02.2024)

⁵ URL: <https://www.ngfs.net/en/conversation-mr-xuan-changneng-deputy-governor-peoples-bank-china> (accessed 10.02.2024)

⁶ URL: <https://www.riksbank.se/en-gb/markets/the-gold-and-foreign-currency-reserve/asset-management-and-sustainability> (accessed 10.02.2024)

financial institutions. For example, introducing a mechanism to mitigate discrimination as a part of Pillar 1 of the Basel requirements can entail imposing penalties on assets that release high levels of CO₂ (Pfister, 2021).

Greening of credit operations

One approach to promoting a sustainable economy involves linking central bank lending rates to a borrower's contribution to climate change mitigation. This could involve adjusting rates based on the borrower's alignment with decarbonisation goals compared to relevant benchmarks. Another approach is adjusting interest rates for counterparties that offer a greater percentage of low-carbon or carbon-intensive assets as collateral or establishing a credit facility accessible solely through low-carbon assets, potentially at concessional rates⁷.

Greening of collateral framework

Using bonds as collateral is increasingly viewed as a tool for greening monetary policy. Green bonds are issued by companies that do not emit greenhouse gases in their production process. The study, conducted in the Eurozone between 2010–2019, revealed that while preferential collateral treatment for green bonds can enhance overall welfare, their impact on the share of green investment remains limited. This is because the discount offered for green bonds cannot exceed zero, unlike conventional bonds, which can be discounted up to 100%. Given the inherent risk of default associated with bonds, central banks accept corporate bonds as collateral for commercial banks in refinancing only if the interest rate falls. For the bank, the lower the central bank discount rate, the more valuable the bond. If the central bank applies a lower discount to bonds issued by green companies than similar traditional companies, green bonds become more attractive, increasing demand. This, in turn, leads to green firms changing their capital structure, issuing more bonds, and increasing their investments. However, it is essential to note that the debt-to-equity ratio of green companies also increases, leading to an increase in the risk of default on green bonds. This contrasts with carbon taxes, which only affect the attractiveness of physical capital investment without impacting the relative appeal of bonds versus equity financing (Giovanardi, 2023).

The asset and collateral portfolio of the ECB has been observed to be overweight in carbon-intensive firms. ECB's asset and collateral portfolio holds an overweight share of assets from carbon-intensive firms. A “tilting” approach has been proposed to address this, which involves gradually increasing the share of low-carbon assets while not entirely excluding high-carbon ones (reducing carbon emissions in the central bank's corporate and bank bond portfolio by 55%) (Schoemaker, 2021). Similarly, since 2018, the People's Bank of China (PBoC) has added green financial bonds to the list of eligible collaterals for its Medium-term lending facility. Furthermore, these bonds have been accorded a first-among-equals status, highlighting their significance as a preferred instrument for collateral policy (Macaire & Naef, 2023). Likewise, the Hungarian National Bank (MNB) launched two programmes supporting green housing loans (the FGS Green home programme and Green mortgage bond purchase programme) and has incorporated green standards in the collateral framework. The favourable loan conditions have led to a rise in new housing loans. 43% of these loans were availed to finance detached house construction. The Green mortgage bond purchase programme (2021–2022) has resulted in the issuance of 156 bn HUF of mortgage bonds from five mortgage banks, representing a 10% share of the total market. These purchased assets are fixed-rate HUF mortgage bonds that adhere to the ICMA Green bond principles and CBI Climate bonds standard (Varga, 2023).

Monetary policy can also encourage green firms to invest in R&D activities, potentially leading to long-term technological advancements in the green sector (Ferrari, 2024). Overall, greening monetary policies include expanding the eligibility of green collateral, adjusting haircut spreads, implementing tilted asset purchases, and introducing differential lending rates based on the proportion of low-carbon assets used as collateral (Vestergaard, 2022).

Ukraine's case on green finance incentives

The matter of greening Ukraine's monetary policy has been a widely overlooked topic despite its growing significance in the current academic discourse. The National Bank of Ukraine

⁷ URL: https://www.ngfs.net/sites/default/files/media/2021/06/17/ngfs_monetary_policy_operations_final.pdf (accessed 10.02.2024)

(NBU) is presently working on incorporating climate risks into its regulatory framework. The NBU's Sustainable finance development policy by 2025, which was approved in 2021⁸, outlines a Roadmap for the growth and expansion of green finance. In collaboration with organisations like SBN⁹ and IFC¹⁰, the NBU is implementing ESG considerations into the banking regulatory framework, including conducting stress tests to assess banks' exposure to ESG risks.

Although a legal framework for issuing green bonds has been established in Ukraine, the green bond market has yet to experience significant growth. This can be attributed to the fact that the existing investment instruments, such as government securities or NBU's certificates of deposit, are considered more profitable and less risky than green bonds.

The Ukrainian banking industry is showing a lack of enthusiasm for green lending, which may be attributed to the inadequacy of incentives offered by the central bank for sustainable financing (such as the reduction of green asset risk ratings or the lowering of green liability provisioning expenses). Nevertheless, both domestic and foreign banks in Ukraine promote green financing strategies. Loans are primarily directed towards projects that enhance energy efficiency. Several prominent examples include:

- a. JSB "UkrGasbank"¹¹ offers loans for purchasing solar power plants and heat pumps;
- b. JSC "Oschadbank"¹² provides lending options under the "Green Energy" program;
- c. JSC JSB "Lviv"¹³ finances energy supply projects;
- d. JSC "Raiffeisen Bank"¹⁴ implements the "Financing of energy efficiency projects" program;
- e. JSC "ProCredit Bank"¹⁵ finances projects related to energy efficiency, renewable energy, and environmental protection;
- f. JSC "Credit Agricole Bank"¹⁶ evaluates clients based on ESG standards for agricultural lending.

State banks primarily provide concessional green lending to SMEs because IFC is more interested in financing large-scale projects. In addition, foreign investors are encouraging Ukrainian companies to adopt ESG principles. For instance, the EU4Business-EBRD credit line program, which began in 2018, assists small and medium-sized enterprises in align with EU standards, thereby enhancing their competitiveness. Loans are provided through partner banks (JSC JSB "Lviv", JSC "Credit Agricole Bank", LLC "OTP Leasing", JSC "ProCredit Bank", JSC "Ukreximbank", and JSB "UkrGasbank"¹⁷), requiring Ukrainian applicants to comply with EBRD's environmental and social policies. The promotion of green industries over brown ones, first and foremost, necessitates the adoption of ESG to attract foreign investments.

On the whole, incorporating ESG principles into investment decisions amidst the "greenwashing" risk is costly in the short run, particularly for Ukraine's war-torn economy. However, long-term benefits are undeniable, as ESG implementation is crucial for the country's green transition across sectors. The need to finance Ukraine's green recovery has led to a reevaluation of decision-making processes by both Ukrainian banks and international financial institutions. These entities provide priority financing for projects aligned with ESG compliance. Despite the lack of sufficient incentives from the NBU to promote green financing development, banks are gradually adopting ESG criteria as part of their lending strategies in Ukraine. This trend is partly driven by foreign investors integrating climate risks into their project assessments and disclosures. The NBU's planned stress

⁸ URL: <https://bank.gov.ua/ua/news/all/politika-natsionalnogo-banku-ukrayini-schodo-rozvitku-stalogo-finansuvannya-na-period-do-2025-roku> (accessed 10.02.2024)

⁹ URL: <https://bank.gov.ua/en/news/all/natsionalni-banki-ukrayini-ta-gruziyi-prezentovali-svoje-bachennya-rozvitku-zelenih-finansiv-pid-chas-zustrichi-uchasnikiv-mereji-stalogo-bankingu> (accessed 10.02.2024)

¹⁰ URL: <https://bank.gov.ua/en/news/all/natsionalniy-bank-ta-ifc-spilno-pratsyuvatimut-nad-rozvitkom-zelenogo-finansuvannya> (accessed 10.02.2024)

¹¹ URL: http://www.ukrgasbank.com/private/credits/eco_energy (accessed 10.02.2024)

¹² URL: <https://www.oschadbank.ua/credit/green-energy> (accessed 10.02.2024)

¹³ URL: <https://www.banklviv.com/120-miljoniv-hryven-dlia-pidprijemtsiv> (accessed 10.02.2024)

¹⁴ URL: <https://raiffeisen.ua/storage/files/ee-2023.pdf> (accessed 10.02.2024)

¹⁵ URL: <https://www.procreditbank.com.ua/business-clients/loans/green-finance> (accessed 10.02.2024)

¹⁶ URL: <https://credit-agricole.ua/storage/files/annual-report-2021-ukr-full.pdf> (accessed 10.02.2024)

¹⁷ URL: <https://www.eu4business-ebdcreditline.com.ua/uk/> (accessed 10.02.2024)

testing based on green taxonomy compliance reflects this growing emphasis on ESG considerations.

Conclusions. Policymakers are being urged to adopt a proactive stance towards green monetary policy. Central banks can contribute to greening monetary policy by implementing green asset risk assessment standards, purchasing green assets, and green credit operations by distinguishing between green and conventional collateral. Adopting green-targeted refinancing operations can further reinforce central banks' efforts to adjust collateral for climate-related risks. Additionally, increasing collateral haircuts can green collateral frameworks. However, the preferential treatment for green bond collateral, compared to carbon tax, does not always promote green investment due to the mounting debt burden of green firms.

Most Ukrainian banks prioritize lending to the strongest borrowers without considering the potential environmental implications. In light of this, the NBU, as the authorized regulatory body for banks, should play a pivotal role in pricing climate-related risks by collaborating with financial intermediaries while ensuring price stability. To accomplish this, the NBU may consider exploring the possibility of green refinancing operations for banks, implementing ESG risk assessment tools and disclosure requirements. Encouraging banks to pledge green collateral for the NBU's lending operations, launching green mortgage bond purchase programs and preferential haircuts for green bonds, as demonstrated by the European experience, can aid in greening Ukraine's capital market.

Overall, the greening monetary policy is crucial in mitigating climate-related risks and deploying capital to accelerate the green transition. The research contributions can serve as a groundwork for central banks to integrate climate change into their monetary policies.

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