SUSTAINABLE BANKING, FINANCIAL STRENGTH AND THE BANK LENDING CHANNEL OF MONETARY POLICY

María Cantero-Saiz[1], Begoña Torre-Olmo[2], Sergio Sanfilippo-Azofra[3]

[1] *Universidad de Cantabria, Faculty of Economics and Business, Business Management Department (Santander Financial Institute), Spain, ORCID: 0000-0002-1442-3130, canterom@unican.es;*
[2] *Universidad de Cantabria, Faculty of Economics and Business, Business Management Department (Santander Financial Institute), Spain, ORCID: 0000-0001-6081-9868, torreb@unican.es;*
[3] *Universidad de Cantabria, Faculty of Economics and Business, Business Management Department (Santander Financial Institute), Spain, ORCID: 0000-0001-8941-2033, sanfilis@unican.es.*

Abstract: *The aim of this article is to analyse how sustainable banking affects the transmission of monetary policy through the bank lending channel. We also quantify how these effects are determined by the financial strength of each bank. These objectives, which have not been studied previously, represent an important contribution because real sustainable concerns in banking did not emerged until recently, mainly with the adoption of the Sustainable Development Goals that should be reached by 2030. Since then, some studies have focused on the effects of sustainability on aspects such as bank profitability, risk or efficiency, but none has considered the effects on the bank lending channel of monetary policy. In fact, central banks have incorporated sustainability criteria into their agenda and are analyzing how to include these criteria in the monetary policy framework, so we contribute even more by shedding some light on these aspects and how they depend on the financial strength of the banking sector. We used quarterly data from 79 listed banks from the OECD between 2016 and 2019 (947 observations) and we found that the bank lending channel is operative either for banks with very low sustainability ratings or a weak financial position. When sustainability ratings increase and financial strength becomes moderate, the bank lending channel is ineffective and monetary shocks do not affect lending. For banks with certain sustainable compromises and a strong financial position, the impact of monetary shocks on lending is the opposite of the one that the bank lending channel proposes, and this impact is more intense as sustainability ratings increase. Finally, our results also show that increases in central bank assets boost lending only for banks with low or moderate sustainability ratings, regardless of their financial strength. Overall, these results suggest that more sustainable banks are less dependent on monetary policy decisions.*

Keywords: *Monetary policy, sustainable banking, financial strength, bank lending.*

JEL Classification: *G21, E52.*

APA Style Citation: *Cantero-Saiz, M., Torre-Olmo, B.,* & *Sanfilippo-Azofra, S.* (2022). Sustainable Banking, Financial Strength and the Bank Lending Channel of Monetary Policy. *E&M Economics and Management, 26*(1), 165–185. https://doi.org/10.15240/tul/001/2023-1-010

Introduction

In the last few years, the bank lending channel has attracted enormous interest among researchers (Albertazzi et al., 2021; Cantero-Saiz et al., 2014, 2022; Jiménez et al., 2020). This channel proposes that monetary policy decisions alter the supply of loans by affecting the financial conditions of banks (Bernanke

& Blinder, 1988; Disyatat, 2011). However, the reaction of banks to monetary shocks depends on their financial strength. In this regard, the credit supply of weaker banks, such as those that are smaller, less liquid or more poorly capitalised, is more sensitive to monetary impulses because these banks have more difficulties in obtaining loanable funds (Kashyap & Stein, 2000; Kishan & Opiela, 2000).

Another important factor that can also affect the financial conditions of banks and the bank lending channel, which has received scant exploration, is the implementation of sustainable business models, which are becoming a key element in the strategies and practices of many banks. Sustainable strategies cover social, environmental and economic issues. So, not only do sustainable banks focus on the economic benefits, but also on the planet and the people (Valls-Martínez et al., 2020). As a result, these banks are more concerned in guaranteeing financial inclusion and trying to satisfy all stakeholders, instead of maximising shareholder profitability only; for this reason, changes in financial conditions and loan supply caused by monetary shocks could be less important for these banks (GABV, 2013). Moreover, sustainable strategies could even improve the funding conditions of banks – and hence, make them less dependent on monetary shocks – by reducing risk and enhancing reputation and efficiency. For instance, valuing sustainability can be perceived as a differentiation strategy that attracts more loyal customers and investors (Igbudu et al., 2018). In addition, sustainable banks tend to be more transparent and less speculative, which reduces their risk and facilitates their access to financing (Saïdane & Abdallah, 2020). Furthermore, sustainable strategies strengthen the industry's future sustainability standards, which improves efficiency and reduces costs in relation to those of the competitors (Clarkson et al., 2011).

Despite these benefits, sustainable compromises are costly, so the full implementation of sustainable practices requires a solid structure and a large resource base, properly used. The financial crisis of 2008 weakened banks' balance sheets sharply and led to high uncertainty and funding restrictions (Cantero-Saiz et al., 2022). The mere willingness of joining sustainable initiatives may not be sufficient to effectively insulate lending from monetary shocks if banks do not ultimately restore their financial soundness. In this context, healthier banks could be able to obtain more funds from financial markets or other external funding sources to invest in social and environmental initiatives (Egly et al., 2016). These banks could also reduce risk more significantly, which is essential to become a sustainable business (Gutiérrez-López & Abad-González, 2020; Hong et al., 2012).

Based on this background, the aim of this article is two-fold. First, we analyse how banks' engagement in sustainable activities affects the bank lending channel of monetary policy. Second, we quantify how these effects are conditioned by the degree of banks' financial strength. More specifically, we quantify how the marginal effect of monetary impulses on loan supply changes with the level of sustainable engagement under different financial strength scenarios (measured in terms of bank size, liquidity and capitalisation).

These aims represent two important contributions to the literature because to our knowledge, this is the first study to consider the influence of sustainability on the transmission of monetary policy through the bank lending channel. On the one hand, the literature on sustainable banking is relatively recent, since this was not a major concern for banks until the financial crisis of 2008 and the later adoption of the Sustainable Development Goals (SDGs) that should be reached by 2030. During this crisis, financial institutions paid excessive attention to economic aspects while did not focus enough on other parts of business, which caused many bank failures and increased sharply banks' reputational risk. Despite this damaged reputation, the banking sector is essential in the achievement of the SDGs, because its implication in sustainable activities can have important effects on the sustainability of other sectors through the lending activity (Scholtens, 2012). Therefore, banks have attempted to reduce reputational risk and restore confidence by turning to sustainable business models (Cornett et al., 2016). In this regard, several authors have examined how sustainable compromises affect banks' profitability, risk, efficiency, and financial costs (Galletta et al., 2021; Saïdane & Abdallah, 2020; Torre-Olmo et al., 2021), but none of them has studied how these compromises alter the bank lending channel of monetary policy. Actually, it has not been until very recently that central banks have incorporated climate and

sustainability criteria into their agenda, both in the management of their own portfolios and in supervision and financial stability; and have even started to analyse how to include these criteria in the monetary policy framework (González-Martínez, 2021). So, our article contributes even more by shedding some light on these aspects.

On the other hand, although many studies have tested the effects of banks' financial strength on the bank lending channel of monetary policy (Albertazzi et al., 2021; Ehrmann et al., 2003; Kashyap & Stein, 2000; Kishan & Opiela, 2000), none of them has considered the role that sustainability can play in all this process. Furthermore, the assessment of marginal effects proposed in this article provides a much better and much more specific understanding for banking regulators and monetary authorities of how sustainability affects the transmission of monetary policy decisions depending on the financial strength of the banking industry.

Our empirical analysis involves quarterly data from 79 listed banks from 24 OECD countries (947 observations) over the period 2016–2019. We used two indicators for monetary policy. First, we used the conventional monetary policy instrument based on interest rate variations. Second, we used central bank assets as an indicator of unconventional monetary policy.

We structure the article as follows: In section 1, we review the theoretical background; in section 2, we focus on the research methodology; and in section 3, we describe and discuss the results. Finally, we show the main conclusions and implications.

1. Theoretical Background

The key role that banks play as lending suppliers has formed the foundation for the bank lending channel of monetary policy. The traditional view of this channel suggests that monetary shocks alter the volume and opportunity costs of bank deposits. Monetary restrictions, however, increase the minimum reserve ratio that entities must have in the central bank, which reduces the deposit base in order to meet the new reserve requirements. Monetary restrictions that raise interest rates make deposits less attractive compared to other assets, causing depositors to withdraw their funds in search of other more profitable investment opportunities. As deposits have traditionally been a key financial source for banks, the decline in the deposit volume will cause banks to curtail lending (Bernanke & Blinder, 1988). This traditional approach has been widely criticised, because banks have increased the use of market-based funding in the last decades and no longer depend on deposits, thus leading to a reformulation of the bank lending channel. A restrictive monetary policy thus increases the risk of banks and damages their balance sheets, which increases the cost of market-based funds and, hence, lending supply is reduced (Disyatat, 2011).

The intensity of the bank lending channel previously described depends on the financial health of banks, which has normally been captured through three indicators: size, liquidity and capitalisation. Lending from smaller, less liquid and more poorly capitalised banks is more responsive to monetary shocks because these banks have less ability to obtain funding (Kashyap & Stein, 2000; Kishan & Opiela, 2000).

Another aspect that has not yet been explored and is also prone to altering the funding conditions of banks is engagement in sustainable activities. Sustainable strategies are a recurrent topic of research at present and imply the integration of environmental aspects, social issues and economic benefit into business (Shah et al., 2019). Tab. 1 summarises the main features of sustainable banks compared to conventional banks.

Based on these features, sustainable banks would be less responsive to monetary shocks because they have a more active role against financial exclusion and normally have greater loans to assets ratios than conventional banks (GABV, 2013). The deterioration in financial conditions caused by monetary shocks would also be of less concern for sustainable banks as they are less oriented towards maximising short-term profits and more focused on maximising value for all their stakeholders (Boitan, 2015). Rather, the competitive advantage of sustainable banks would be based on emotional factors, a differentiated business culture or better results in non-financial indicators (Agirre-Aramburu & Gómez-Pescador, 2019).

Apart from these principles, the improvement in the financial conditions that sustainable activities imply would also allow banks to insulate their loan supply from monetary shocks more effectively. In this regard, sustainable strategies can reduce the financial costs

Tab. 1: Sustainable banks vs. conventional banks

Feature	Sustainable banks	Conventional banks
Purpose	They have a triple purpose (social, environmental and economic).	They seek to maximize their profit to reward shareholders.
Economic profit	Economic profit is a means to achieve environmental and social objectives.	Economic profit is the final objective.
Investment purpose	They invest in projects that satisfy social and environmental needs.	They invest in speculative transactions.
Investment selection	They select investments with positive effects on the people and the planet (environment, employment creation, culture), and reject investments with negative impact (armament, polluting companies, child exploitation).	They only select investments that maximize profitability and minimize risk.
Lending policy	Their lending policy seeks to guarantee financial inclusion.	Their lending policy excludes certain segments of society.
Transparency	They are more transparent.	They are less transparent.
Branches	A few branches.	A lot of branches.

Source: based on Valls-Martínez et al. (2020)

of banks through improvements in reputation, risk and efficiency. First, sustainable engagement can be understood as a differentiation strategy to signal concern for environmental and social issues (García-Benau et al., 2013). This aspect would improve bank reputation, which would attract more clients and reinforce investor confidence (Igbudu et al., 2018). Not only do consumers of sustainable products or services focus on the consumption itself, but also on belonging to a community or social group, which is why they are more loyal (Daub & Ergenzinger, 2005). This loyalty is very important in the banking sector, because competition is usually very strong and the commercial relationships between customers and their banks tend to be closer (Ferreira et al., 2015).

This greater loyalty would make it possible to obtain better margins and more favourable financing conditions, and this has received empirical support. Mason (2012) found that green customers are willing to pay a higher price for environmentally responsible products, so banks that fund companies manufacturing such products can indirectly benefit from this higher price. Sustainable banks can also attract more deposits, because their customers do not focus so much on financial return, but on reinforcing their prosocial identity by financing sustainable projects (Paulet et al., 2015). Deposits can thus also be attracted at a lower interest rate, as Galletta et al. (2021) has shown for banks that best contribute to the reduction of carbon emissions. On the other hand, not only do sustainable initiatives lower the cost of deposits but also the cost of market-based funding. This is confirmed by Azmi et al. (2021), who found a negative relationship between these initiatives and the cost of equity. Similarly, green bonds have better ratings and lower yields than conventional bonds, because environmentally friendly actions are highly valued by investors (Hachenberg & Schiereck, 2018). At the same time, sustainable compromises can avoid other sources of costs, such as those that come from legal and regulatory sanctions (Murè et al., 2021).

Second, apart from reputation, sustainable strategies can improve financing conditions through risk reduction, which would also help banks preserve their lending during monetary shocks. On the one hand, by adopting sustainable compromises, banks try to avoid excessive risks and improve risk management (Harjoto & Laksmana, 2016). In fact, financial stability is essential for implementing sustainable strategies, which is why these banks have a lower risk of default and are able to respond better to economic shocks (Saïdane & Abdallah, 2020).

On the other hand, a higher level of sustainable activism is associated with higher levels of transparency and better moral standards. These aspects contribute to reducing moral hazard and adverse selection issues, which are the main reasons for non-performing loans (Goss & Roberts, 2011).

Various studies have supported this negative relationship between sustainable activities and bank risk. Ruiz et al. (2016) found that environmentally responsible actions reduce the reputational risk of banks, which leads to more stable financing conditions. Chiaramonte et al. (2021) revealed that European banks with higher sustainability scores have lower risk, while Scholtens and Van't Klooster (2019) have also shown that these banks contribute less to the risk of the whole financial system. Chollet and Sandwidi (2018) reported a virtuous circle between sustainability and bank risk. Sustainable activities thus appear to reduce financial risk and, therefore, the commitment to environmental and social practices is reinforced.

Finally, increased efficiency is another factor that would help improve the financing conditions of sustainable banks and mitigate the bank lending channel of monetary policy. On the one hand, sustainable banks tend to have a good relationship with all stakeholders, which can help them find more investment opportunities and obtain and use resources more efficiently (Hambrick, 1983). On the other hand, sustainable activities can also improve the efficiency and costs of banks relative to their competitors. If a bank adopts sustainable strategies, future sustainability patterns in the industry increase, which pushes up the costs of competitors (Clarkson et al., 2011). Banks that proactively pursue sustainable strategies are likely to be those with superior management capabilities and greater financial resources (Christmann, 2000).

In relation to the empirical evidence, Shah et al. (2019) have shown that sustainable banks exhibit higher levels of productivity and operational efficiency than conventional ones. Chang et al. (2021) used a sample of Asian entities and reported that, in developed countries, environmental initiatives improve cost efficiency, while in emerging countries, this improvement comes from social initiatives. Other studies have also found a positive relationship between sustainable strategies and bank efficiency but only in certain institutional contexts. For example, Belasri et al. (2020) supported this relationship in developed countries with a high degree of investor and stakeholder protection. According to Forgione et al. (2020), not only is stakeholder protection necessary for sustainable activities to improve efficiency but so too is the existence of a common law system.

In summary, monetary shocks restrict credit supply by reducing access to funding in the financial sector, but this aspect could be less relevant for sustainable banks, because these banks do not focus only on economic aspects, but also on environmental and social issues, which include the needs of all their stakeholders and achieving financial inclusion. Sustainable banks could also enjoy relatively better funding conditions than conventional banks, because sustainable strategies enhance reputation, boost efficiency and reduce risk. As a result, the lending activity of sustainable banks would be less affected by monetary shocks. Based on all the previous arguments, we propose our first hypothesis:

H1: Sustainable strategies reduce the intensity of the bank lending channel of monetary policy.

Sustainable compromises are costly, which is why the full integration of sustainable business models requires a large resource base and a strong financial structure. Financial strength would not only condition the transmission of the bank lending channel, but also the possibility of banks to become sustainable businesses. For instance, larger banks have more access to capital markets and other external funding sources (Egly et al., 2016), so they would have a larger resource base to invest in sustainability and take advantage of its possible moderating effect on the bank lending channel. Furthermore, sustainable banks tend less to speculation and thus have better liquidity and guarantee ratios (Valls-Martínez et al., 2020). This superior liquidity reinforces solvency and reduces risk, which is an essential condition for integrating sustainable activities (Gutiérrez-López & Abad-González, 2020). Furthermore, not only are more capitalised banks less risky, but they also have more funds to carry out sustainable strategies (Hong et al., 2012). These more liquid and more capitalised banks are precisely the ones that have relatively fewer bad funding conditions during monetary shocks,

so their greater chances of sustainability could help them further insulate their lending from such shocks. We therefore propose our second hypothesis:

H2: The moderating role of sustainable strategies on the bank lending channel is more pronounced for banks with a stronger financial position.

2. Research Methodology

2.1 Sample

To test *H1* and *H2*, we selected all OECD listed banks with quarterly financial data available in the S&P Capital IQ database. Because we used sustainability indicators, we could only include those banks that also have ESG (environmental, social and governance) ratings in Morgan Stanley Capital International (MSCI) in the sample. We included some variables lagged one quarter and the variation rate of the lagged variables, so we removed banks with data available for less than six consecutive quarters between 2016 and 2019. This condition is necessary in the second-order serial correlation test, which was performed to ensure the robustness of the estimates obtained by system generalised method of moments (GMM; Arellano & Bond, 1991). Our final sample consists of an unbalanced panel of 79 listed banks from 24 OECD countries between 2016 and 2019 (947 observations). Tab. 2 shows our sample composition. We used S&P Capital IQ database to obtain the financial information on each bank, MSCI data to obtain the sustainability ratings, and the OECD statistics and the central banks of some countries to get the macroeconomic information.

2.2 Econometric Model and Methodology

Our model is based on the approach that has been traditionally used to analyse the bank lending channel (Cantero-Saiz et al., 2014; Kashyap & Stein, 2000; Kishan & Opiela, 2000; Sanfilippo-Azofra et al., 2018). However, our study incorporates the importance of sustainability and its interactions with the monetary policy indicators and with the variables related to banks' financial strength:

$$\begin{aligned}\Delta \ln(loans)_{j,q} &= \beta_0 + \beta_1 \Delta \ln(loans)_{j,q-1} + \\ &+ \beta_2\, \Delta GDP_{m,q} + \beta_3 ESG_{j,q} + \beta_4\, \Delta i_{m,q} + \\ &+ \beta_5\, CB\_ASS_{m,q} + \beta_6 (ESG_{j,q} \times \Delta i_{m,q}) + \\ &+ \beta_7 (ESG_{j,q} \times CB\_ASS_{m,q}) + \beta_8 SIZE_{j,q-1} + \\ &+ \beta_9 LIQ_{j,q-1} + \beta_{10} CAP_{j,q-1} + \\ &+ \beta_{11} (ESG_{j,q} \times \Delta i_{m,q} \times SIZE_{j,q-1}) + \\ &+ \beta_{12} (ESG_{j,q} \times \Delta i_{m,q} \times LIQ_{j,q-1}) + \\ &+ \beta_{13} (ESG_{j,q} \times \Delta i_{m,q} \times CAP_{j,q-1}) + \\ &+ \beta_{14} (ESG_{j,q} \times CB\_ASS_{m,q} \times SIZE_{j,q-1}) + \\ &+ \beta_{15} (ESG_{j,q} \times CB\_ASS_{m,q} \times LIQ_{j,q-1}) + \\ &+ \beta_{16} (ESG_{j,q} \times CB\_ASS_{m,q} \times CAP_{j,q-1}) + \\ &+ \sum_{t=1}^{q} \pi_q\, Quarter_q + \varepsilon_{j,q} \qquad (1)\end{aligned}$$

The dependent variable, $\Delta(loans)_{j,q}$, captures the lending growth rate (Cantero-Saiz et al., 2014; Ehrmann et al., 2003). We also included the lending growth lagged one quarter as an independent variable [$\Delta(loans)_{j,q-1}$] to measure the persistent effect of the dependent variable. ΔGDP is the gross domestic product (GDP) growth rate and controls for the economic cycle, as GDP growth has a positive effect on the supply of loans (Cantero-Saiz et al., 2014). *ESG* denotes the environmental, social and governance ratings published by MSCI and is a proxy for each bank's sustainable engagement (Albuquerque et al., 2019; Sabbaghi, 2022). It represents a dummy variable that takes a whole number from 0 to 6 according to the ESG rating scale available at MSCI (Tab. 3). Some evidence suggests that sustainable banks provide more loans than conventional banks (GABV, 2013).

The monetary policy variable is represented by two indicators. On the one hand, we denoted the conventional monetary policy, Δi, by the short-term money market rate variation (Ehrmann et al., 2003). This is the key variable to test the bank lending channel, because, according to this channel, higher interest rates reduce the growth of bank loans. On the other hand, many central banks have adopted unconventional monetary policies since the beginning of the financial crisis, and this situation has given rise to an increase in the assets of central banks. These unconventional monetary policies might have affected both the bank lending channel and the sustainable development of financial markets (Kisel'áková et al., 2020). So, we included in Formula (1) the variable *CB_ASS*, which is the ratio between the total assets of the central bank of the country in which a bank operates and GDP (Fungáčová et al., 2014). In the case of banks operating in a Eurozone country, we used the total assets of the European Central Bank and the GDP of the Eurozone. To capture how sustainable engagement affects the bank lending channel, we interacted the *ESG* indicator and the monetary policy variables (*ESG* × Δi and *ESG* × *CB_ASS*).

Tab. 2: List of countries and banks

Country	Bank
Australia	Australia and New Zealand Banking Group; Commonwealth Bank of Australia; National Australia Bank Limited; and Westpac Banking Corporation
Austria	Erste Group Bank AG; and Raiffeisen Bank International AG
Belgium	KBC Group NV
Canada	Bank of Montreal; Royal Bank of Canada; The Bank of Nova Scotia; and The Toronto-Dominion Bank
Chile	Banco Santander-Chile; Banco de Chile; and Banco de Crédito e Inversiones
Colombia	Bancolombia S.A.
Czech Republic	Komerční banka, a.s.; and MONETA Money Bank, a.s.
Denmark	Danske Bank A/S
France	BNP Paribas S.A.; Crédit Agricole S.A.; and Société Générale S.A.
Germany	Commerzbank AG
Hungary	OTP Bank Nyrt
Israel	Bank Hapoalim BM; Bank Leumi le- Israel BM; Israel Discount Bank Limited; and Mizrahi Tefahot Bank Ltd.
Italy	FinecoBank Banca Fineco, S.p.A.; Intesa Sanpaolo, S.p.A.; and UniCredit, S.p.A.
Japan	Concordia Financial Group, Ltd.; Fukuoka Financial Group, Inc.; Japan Post Bank Co., Ltd.; Mitsubishi UFJ Financial Group, Inc.; Mizuho Financial Group, Inc.; Resona Holdings, Inc.; Shinsei Bank, Ltd.; Sumitomo Mitsui Financial Group, Inc.; Sumitomo Mitsui Trust Holdings, Inc.; The Bank of Kyoto, Ltd.; The Chiba Bank, Ltd.; and The Shizuoka Bank, Ltd.
Mexico	Grupo Financiero Banorte, S.A.B. de C.V; and Grupo Financiero Inbursa, S.A.B. de C.V
Netherlands	ABN AMRO Bank N.V.; and ING Groep N.V.
Norway	DNB Bank ASA
Poland	Bank Polska Kasa Opieki, S.A.; Powszechna Kasa Oszczednosci Bank Polsk; and Santander Bank Polska S.A.
South Korea	Hana Financial Group Inc.; Industrial Bank of Korea; K.B. Financial Group Inc.; Shinhan Financial Group Co.; and Woori Financial Group Inc.
Spain	Banco Bilbao Vizcaya Argentaria, S.A.; Banco Santander, S.A.; and CaixaBank, S.A.
Sweden	Skandinaviska Enskilda Banken AB; Svenska Handelsbanken AB; and Swedbank AB
Switzerland	Banque Cantonale Vaudoise
United Kingdom	Barclays PLC; HSBC Holdings PLC; and NatWest Group PLC
United States	Bank of America Corporation; Citigroup, Inc.; Citizens Financial Group, Inc.; Fifth Third Bancorp; First Republic Bank; JPMorgan Chase & Co.; KeyCorp, M&T Bank Corporation; Regions Financial Corporation; SVB Financial Group; The PNC Financial Services Group, Inc.; Truist Financial Corporation; U.S. Bancorp; and Wells Fargo & Company

Source: own

We also included three indicators of banks' financial strength in Formula (1): *SIZE*, *LIQ* and *CAP*. In order to avoid endogeneity bias, these variables were lagged one quarter (Ehrmann et al., 2003; Kashyap & Stein, 2000; Sanfilippo-Azofra et al., 2018). Following Cantero-Saiz et al. (2014; 2022) and Sanfilippo-Azofra et al. (2018), these variables were normalised with respect to the average of all banks in the sample. *SIZE* is the log of total assets. *LIQ* represents securities and cash due from banks over total assets. *CAP* is the equity to total assets ratio. Larger, more liquid and more highly capitalised banks tend to enjoy higher lending volumes (Kashyap & Stein, 2000; Kishan & Opiela, 2000). To test how banks' financial position determines the effects of sustainable engagement on the bank lending channel, we included the interaction terms between each bank-specific financial characteristic, its ESG rating and the monetary policy indicators (*ESG* × Δ*i* × *SIZE*, *ESG* × Δ*i* × *LIQ*, *ESG* × Δ*i* × *CAP*, *ESG* × *CB_ASS* × *SIZE*, *ESG* × *CB_ASS* × *LIQ* and *ESG* × *CB_ASS* × *CAP*).

Finally, quarter effect dummies were included to capture quarter-specific factors. We did not include country dummies because some countries in our sample contain only one bank. In this case, country dummies could just capture the specific situation of the bank instead of representing the global situation of the country (Cantero-Saiz et al., 2019). Instead, we carried out robustness checks in which we controlled for the situation of the country through several macroeconomic variables. The results of these robustness checks are similar to those reported later in this article. The error term is $\varepsilon_{j,q}$; i = 1, 2, …, I represents a specific bank i; m = 1, 2, …, M indicates a particular country m; and q = 1, 2, …, Q denotes a particular quarter q.

To interpret the effect of monetary policy variations (Δ*i* and *CB_ASS*) on the growth of loans properly, we need to bear in mind that we are interacting the variables Δ*i* and *CB_ASS* with other continuous variables. To capture the marginal effect of the conventional monetary policy of interest rates (Δ*i*) on the growth of loans, we, therefore, have to calculate the derivative of Formula (1) with respect to Δ*i*:

$$\frac{\partial \Delta \ln(loans)_{j,q}}{\partial \Delta i_{m,q}} = \beta_4 + \beta_6 ESG_{j,q} + \\ + \beta_{11}(ESG_{j,q} \times SIZE_{j,q-1}) + \beta_{12}(ESG_{j,q} \times \\ \times LIQ_{j,q-1}) + \beta_{13}\,(ESG_{j,q} \times CAP_{j,q-1}) \quad (2)$$

Similarly, to measure the marginal effect of an unconventional monetary policy (*CB_ASS*) on the loan supply growth, we need to calculate the derivative of Formula (1) with respect to *CB_ASS*:

$$\frac{\partial \Delta \ln(loans)_{j,q}}{\partial CB_{ASS_{m,q}}} = \beta_5 + \beta_7 ESG_{j,q} + \\ + \beta_{14}(ESG_{j,q} \times SIZE_{j,q-1}) + \beta_{15}(ESG_{j,q} \times \\ \times LIQ_{j,q-1}) + \beta_{16}\,(ESG_{j,q} \times CAP_{j,q-1}) \quad (3)$$

The marginal effects of monetary policy (Δ*i* and *CB_ASS*) on the growth of loans, shown in Formulas (2–3), depend on the sustainability rating (*ESG*) and the indicators of financial strength (*SIZE*, *LIQ* and *CAP*). Thus, the

Tab. 3: ESG rating values

MSCI Categories	MSCI Rating	Value assigned to ESG
Laggard	CCC	0
	B	1
Average	B.B.	2
	BBB	3
	A	4
Leader	A.A.	5
	AAA	6

Source: own

effectiveness of the bank lending channel will change for different values of these variables. In Formula (2) of the conventional monetary policy, β_4 captures the marginal effect when the variables *ESG* or *SIZE*, *LIQ* and *CAP* are zero, whereas in Formula (3) of the unconventional monetary policy, this marginal effect is represented by β_5. In Formula (2), β_6 captures the effect of the sustainability rating ESG, while this effect is captured in Formula (3) by β_7. Finally, the parameters β_{11}, β_{12} and β_{13} of Formula (2) represent the effect of sustainability (*ESG*) depending on size (*SIZE*), liquidity (*LIQ*) and capital (*CAP*), respectively, whereas in Formula (3), these effects are denoted by β_{14}, β_{15} and β_{16}, respectively. In order to facilitate the interpretation of the results, we use plots.

Tab. 4 shows the descriptive statistics of the variables and Tab. 5 represents the correlations between them. We used a two-step system-GMM with robust errors methodology to estimate the model of Formula (1), which is consistent in the presence of any pattern of heteroscedasticity and autocorrelation. This method allows endogeneity problems to be controlled and allows us to obtain consistent and unbiased estimates, as it uses lagged independent variables as instruments (Arellano & Bond, 1991). The quarter dummies were considered exogenous, whereas the rest of the variables are endogenous. The exogenous variables were instrumented by themselves and second lags were normally used as instruments for the endogenous variables. We only used three lags for the variables Δi and $ESG \times \Delta i \times LIQ$ in differences to avoid overidentification problems according to the Hansen test. We collapsed the instruments used in our estimation because

Tab. 4: Statistics of the sample

Variable	Mean	Std. deviation	Min	Max
Δln(*loans*)	0.0084	0.1484	−2.0893	2.5000
Δ*GDP*	0.5173	0.5057	−1.8617	2.6950
Δ*i*	0.0221	0.1624	−0.7233	0.9433
CB_ASS	1.6556	1.5932	1.1924	12.2003
SIZE	12.5274	1.3294	8.6568	14.8788
LIQ	0.0789	0.0763	2.43e−07	0.4219
CAP	0.08243	0.0356	0.0308	0.2986

Source: own

Note: The variables *SIZE*, *LIQ* and *CAP* are calculated before the normalization.

Tab. 5: Correlations

Variable	Δln(*loans*)	Δ*GDP*	Δ*i*	*CB_ASS*	*SIZE*	*LIQ*	*CAP*
Δln(*loans*)	1						
Δ*GDP*	0.0276	1					
Δ*i*	0.0029	0.0487	1				
CB_ASS	−0.0039	−0.2629	−0.0244	1			
SIZE	−0.0357	−0.1803	−0.0940	0.0113	1		
LIQ	−0.0346	−0.2471	−0.0907	0.5706	0.1880	1	
CAP	−0.0220	0.1851	0.1762	−0.2167	−0.5174	−0.3799	1

Source: own

collapsed instruments effectively reduce instrument count and the number of moment conditions used in the Hansen test, by constraining all quarterly moment conditions to be the same. So, collapsed instruments make this test more powerful (Wintoki et al., 2012).

3. Research Results

Tab. 6 shows the results. The first lag of the dependent variable is significant and negative, which indicates a negative persistence effect of lending growth. The conventional monetary policy indicator (Δi) is significant and negative. Because we are interacting several continuous variables, this result indicates that an increase in the money market rate is followed by a reduction in loan supply, as the bank lending channel proposes, when the variable *ESG* or the variables *SIZE*, *LIQ* and *CAP* are zero.

The variable *CB_ASS* has a significant and positive coefficient, so an increase in central bank assets boosts loan supply growth if the variable *ESG* or the variables *SIZE*, *LIQ* and *CAP* are zero. One of the main aims of unconventional monetary policies through asset purchases was to facilitate the provision of credit, which could justify this result (Afonso & Kazemi, 2018). Moreover, the variables $ESG \times \Delta i$, $ESG \times \Delta i \times LIQ$, $ESG \times \Delta i \times CAP$ and $ESG \times CB\_ASS \times SIZE$ have significant positive coefficients.

In any case, the effectiveness of the bank lending channel, which is shown in Formula (2) by the marginal effect of conventional monetary policy on the lending growth, varies for different values of both the sustainability rating (*ESG*) and the indicators of financial strength (*SIZE*, *LIQ* and *CAP*). Thus, to capture this marginal effect and its significance for different values of sustainability and financial strength, we performed linear restriction tests of the sum of the coefficients β_4, β_6, β_{11}, β_{12} and β_{13} in Formula (2) for different values of *ESG*, *SIZE*, *LIQ* and *CAP*, and we used graphs to properly interpret the results. The graphs show the marginal effect of conventional monetary policy when the variable *ESG* changes, but in each of them we fixed the variable *SIZE* at its 50th percentile, and set specific combinations of values for the variables *LIQ* and *CAP* (minimum, 25th percentile, 50th percentile, 75th percentile and maximum). The results shown in the article thus apply for a median sized bank. We repeated the analyses for the other combinations of the variable *SIZE* (minimum, 25th percentile, 75th percentile and maximum), and the results are quite similar to those shown in this study, although they become a little bit more intense as bank size increases. Due to brevity concerns, these figures are not shown, but can be provided on request.

Fig. 1a–1c report the marginal effect of conventional monetary policy on the lending growth in relation to sustainability ratings (*ESG*) for a median sized bank for different combinations of liquidity (*LIQ*) and capitalisation (*CAP*). The dotted lines represent the 90% confidence interval (Aiken & West, 1991). Confidence intervals of 90% shows when the monetary policy indicator has a statistically significant effect on the loan supply growth (whenever both upper and lower bounds of the 90% confidence interval are either above or below zero). On the one hand, when banks have a sustainability rating equal to 0 (CCC), the marginal effect is negative and significant, so there is evidence of a bank lending channel for these banks, even if they are financially strong (i.e., even when the variables *LIQ* and *CAP* are set at their maximum). Therefore, for banks with very low sustainable compromises, an increase in the interest rate is followed by a decline in loan supply regardless of financial health. On the other hand, for banks with a very weak financial position (i.e., when the variables related to the financial strength, *LIQ* and *CAP* are set at their minimum), the bank lending channel is also operative regardless of the sustainability rating value.

As both sustainability ratings increase and financial strength becomes moderate, the bank lending channel is not operative and monetary shocks do not have a significant impact on lending. For instance, when liquidity (*LIQ*) is set at its minimum and capitalisation (*CAP*) at the 25th percentile, there is evidence of a bank lending channel for banks with a sustainability rating lower than 5 (A.A.) only. However, if this rating is equal to 5 (A.A.) or higher, the marginal effect of conventional monetary policy on lending growth is not significant. In this case, the lower bound of the 90% confidence interval is below zero whereas the upper bound is above zero. The same result is obtained when liquidity (*LIQ*) is set at its 25th percentile and capitalisation (*CAP*) at its minimum. As the financial position gradually improves, the bank lending channel ceases to be significant for increasingly lower values of the sustainability rating.

Tab. 6: Results

Variable	Coefficient	*T*-student	*P*-value
Δln(*loans*)	−0.3117	−5.15	0.000***
Δ*GDP*	−0.0147	−1.29	0.195
ESG	0.0013	1.63	0.103
Δ*i*	−0.2828	−2.43	0.015**
CB_ASS	0.0505	2.12	0.034**
ESG × Δ*i*	0.1628	3.09	0.002***
ESG × *CB_ASS*	−0.0127	−1.18	0.237
SIZE	−0.0339	−1.53	0.127
LIQ	−0.0583	−0.09	0.925
CAP	−0.6183	−1.13	0.257
ESG × Δ*i* × *SIZE*	0.0058	0.71	0.476
ESG × Δi × LIQ	1.5647	2.53	0.012**
ESG × Δi × CAP	0.8962	2.88	0.004***
ESG × CB_ASS × SIZE	0.0084	2.61	0.009***
ESG × CB_ASS × LIQ	−0.0719	−0.82	0.415
ESG × CB_ASS × CAP	0.0324	0.28	0.781
CONS	0.0403	1.01	0.313
Quarter	Yes		
AR2	0.180		
Hansen test	0.130		

Source: own

Note: ***Level of significance of 0.01; **level of significance of 0.05; AR2 – *p*-value of the 2nd order serial correlation statistic; Hansen test is the *p*-value of the over-identifying restriction test.

For example, if *LIQ* and *CAP* are set at the 25th percentile, monetary policy does not affect lending for banks whose sustainability rating is equal to 4 (A) or higher. Moreover, if the previous financial position improves and *CAP* is set at its 50th percentile, the marginal effect is not significant for banks with a rating score equal or superior than 3 (BBB).

Nevertheless, if banks with certain sustainability compromises reach a high level of financial strength, the marginal effect is positive and significant, which implies that an increase in the interest rate pushes up lending. The effects of conventional monetary policy on lending growth are thus the opposite of those that the bank lending channel proposes. For instance, when *LIQ* is set at its 50th percentile and *CAP* at its 75th percentile, the marginal effect is positive and significant if the sustainability rating is equal or higher than 3 (BBB). The same result is observed for banks whose sustainability score is identical to 2 (B.B.) or higher, and when *LIQ* is set at its 50th percentile and *CAP* at its maximum. However, when *LIQ* and *CAP* are at their maximum, monetary restrictions increase lending if the sustainability rating is equal to or better than 1 (B).

These positive effects on lending are more pronounced as sustainability ratings and financial strength improve. Regarding the previous examples, the marginal effect of conventional monetary policy varies from 0.1298 (*ESG* rating = 3 or BBB) to 0.5424 (*ESG* rating = 6 or AAA) when *LIQ* is at the 50th percentile and

CAP at the 75th percentile. However, if the previous financial situation improves and *CAP* is at its maximum, the marginal effect ranges from 0.3446 (*ESG* rating = 2 or B.B.) to 1.5992 (*ESG* rating = 6 or AAA). Furthermore, when *LIQ* and *CAP* are at their maximum, this effect ranges from 0.6108 (*ESG* = 1 or B) to 5.0788 (*ESG* = 6 or AAA).

On the other hand, Formula (3) shows the marginal effect of unconventional monetary policy on the loan supply growth, which varies for different values of both sustainability rating (*ESG*) and the indicators of financial strength (*SIZE*, *LIQ* and *CAP*). Similar to the conventional monetary policy, to capture this marginal effect and its significance for different levels of sustainability and financial strength, we performed linear restriction tests of the sum of the coefficients β_5, β_7, β_{14}, β_{15} and β_{16} in Formula (3) for different values of *ESG*, *SIZE*, *LIQ* and *CAP*, and we used graphs to properly interpret the results. Fig. 2a–2c depict the marginal effect of unconventional monetary policy on the loan supply growth in relation to sustainability ratings (*ESG*) for a median sized bank (50th percentile of *SIZE*) and different combinations of liquidity (*LIQ*) and capitalisation (*CAP*) (minimum, 25th percentile, 50th percentile, 75th percentile and maximum). We repeated the analyses for other combinations of *SIZE*, and the results were quite similar to those reported in this article. These figures are available on request.

In most plots, the marginal effect is positive and significant when sustainability ratings are low [equal or lower than 1 (B)]. In a reduced number of plots, this positive and significant effect involves banks with moderate sustainability ratings, too [equal or lower than 2 (B.B.)]. So, in these situations, an increase in central bank assets leads to an increase in lending. However, all the plots show that when sustainability ratings are high or very high [at least equal to 3 (BBB)], the marginal effect is not significant, so increases in central bank assets do not significantly affect loans regardless of the banks' financial strength.

As robustness checks, we repeated the previous analyses by controlling for macroeconomic variables that can also affect loan supply: the banking sector depth (*BANKDEP*), the sovereign risk (*SR*) and the creditor rights index (*CRI*) of each country. Banks in financial systems that are predominantly bank-based or in countries with lower sovereign risk or higher creditor protection are more likely to extend more loans (Brissimis & Magginas, 2005; Cantero-Saiz et al., 2022; Davydenko & Franks, 2008). The results of these checks are similar to those shown previously. Due to brevity concerns, we did not include these results, but are available on request.

4. Discussion

Our results of conventional monetary policy (Fig. 1a–1c) show that either banks with very low sustainability ratings or with a weak financial situation reduce their loan supply after monetary shocks. In general, banks with very low sustainability are more concerned with the traditional profit maximisation objective, which is why they would significantly react to monetary shocks (Valls-Martínez et al., 2020). At the same time, the financial crisis increased reputational risk sharply and damaged the confidence of the banking sector, which forced many banks to adopt sustainable activities despite the costs and risks of such efforts (García-Benau et al., 2013). Nevertheless, the mere willingness to join sustainable initiatives would not be enough to protect lending from monetary shocks if banks do not also have a relatively strong financial position and a large base of resources.

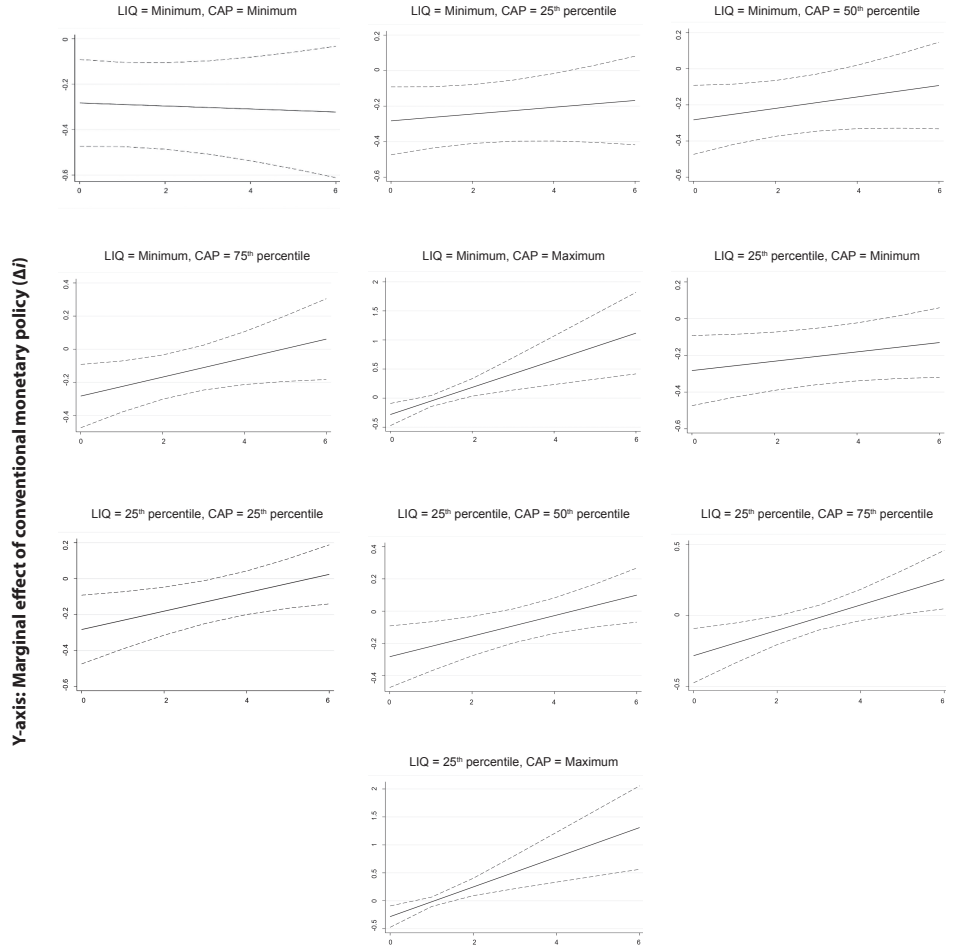
Our own results seem to confirm the previous idea because, in Fig. 1a–1c, as banks gradually improve their sustainability ratings and their financial position, they do not significantly react to monetary policy. Moreover, if banks adopt certain sustainable compromises and are financially strong too, their response to monetary policy decisions is the opposite of the one suggested by the bank lending channel, and lending increases during a restrictive monetary policy. This increase in credit supply becomes more important as banks reinforce their sustainability compromises.

In summary, sustainable strategies offset, or even reverse, the effects of conventional monetary policy, but only when banks have a moderate or a strong financial position. These results, which partially support *H1* and *H2*, could be explained in several ways. Monetary restrictions deteriorate the balance sheets of banks and reduce their access to loanable funds, which is why loan availability is relatively scarcer than in normal periods (Disyatat, 2011). In this context of credit rationing, sustainable banks would be relatively more concerned to guarantee loan availability than conventional

banks, because financial inclusion is one of the main sustainability principles (Valls-Martínez et al., 2020).

In fact, the adverse effects of monetary shocks should be of less concern for sustainable than for conventional banks because the former try to satisfy all stakeholders instead of just maximising their own economic profit (Boitan, 2015). This business culture could also enhance reputation and attract more loyal customers, reinforce investor confidence, reduce risk and boost efficiency, which would allow sustainable banks to

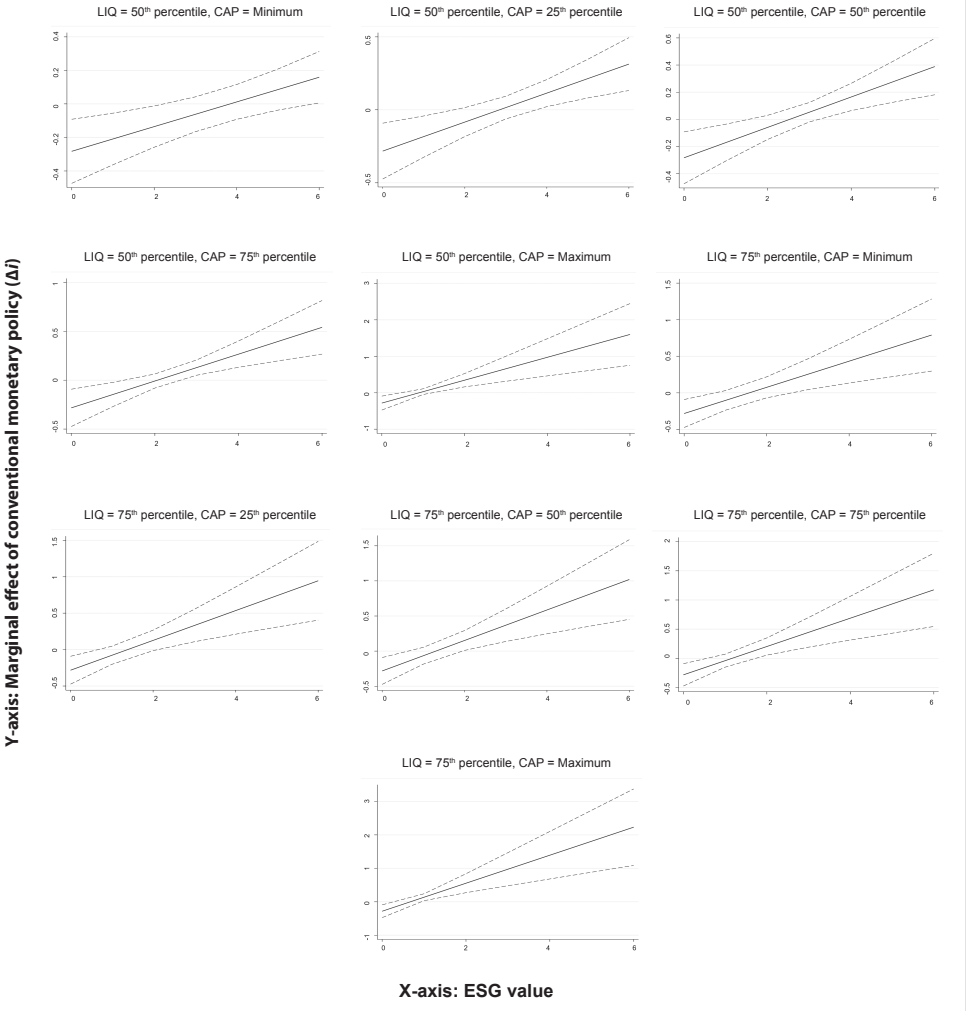
Fig. 1a: Marginal effect of conventional monetary policy (Δ*i*) on Δln(*loans*)



Source: own (based on Tab. 6)

Note: Marginal effect (—), upper and lower 90% confident limit (---) of Δ*i* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

Fig. 1b: Marginal effect of conventional monetary policy (Δ*i*) on Δln(*loans*)

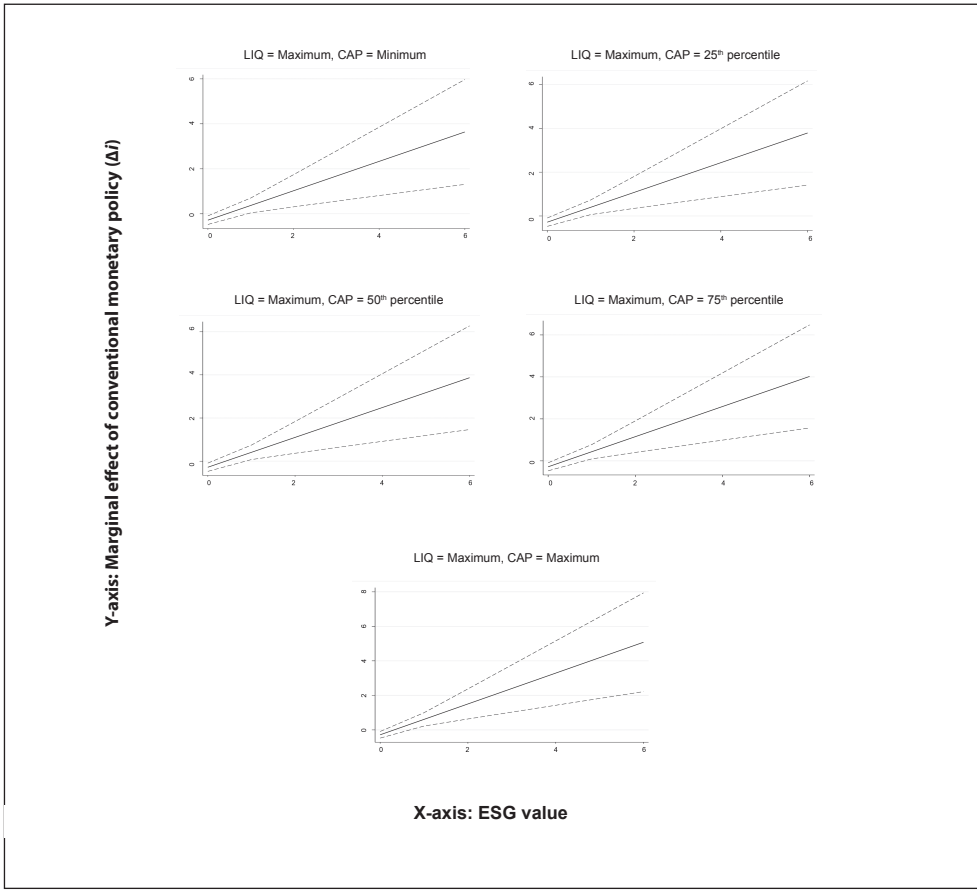


Source: own (based on Tab. 6)

Note: Marginal effect (—), upper and lower 90% confident limit (---) of Δ*i* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

obtain relatively better access to loanable funds than conventional banks (Igbudu et al., 2018; Saïdane & Abdallah, 2020). In this context, sustainable banks with a moderate financial position would just preserve their current lending from monetary shocks, and an increase in the short-term money market rate would not significantly alter their credit supply.

Fig. 1c: Marginal effect of conventional monetary policy (Δ*i*) on Δln(*loans*)



Source: own (based on Tab. 6)

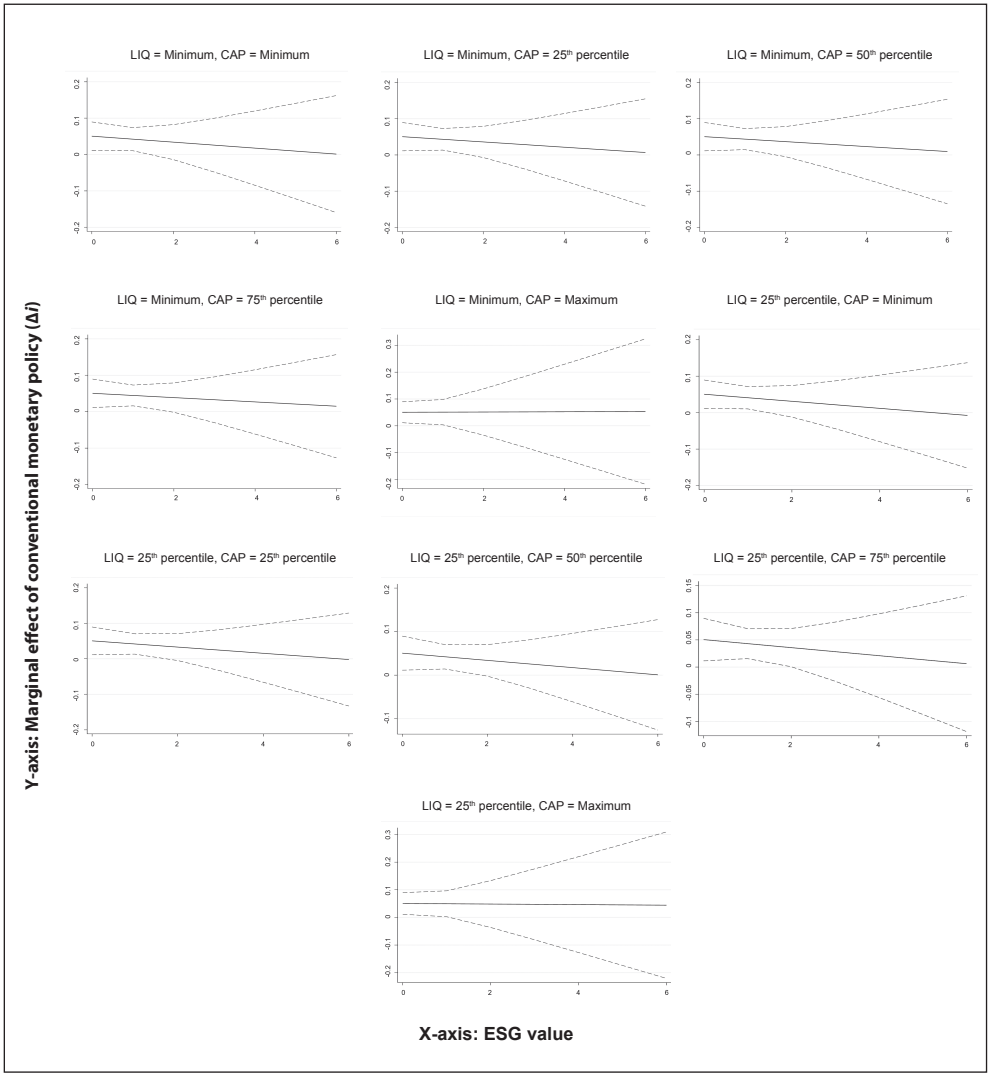
Note: Marginal effect (—), upper and lower 90% confident limit (---) of Δ*i* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

However, if sustainable strategies are also accompanied by a strong financial position, banks would have much more financial instruments available and, hence, could increase their credit supply to overcome the reduction in lending from conventional banks. This increase in lending would be more pronounced as financially strong banks boost their *ESG* rating, probably because, for these banks, the economic benefits of sustainable businesses and the commitment to financial inclusion become much more relevant.

On the other hand, Fig. 2a–2c show that unconventional monetary policy through central bank assets boost credit only for banks with low or moderate sustainability ratings. For banks with high sustainability ratings, unconventional monetary policy does not affect lending, regardless of their financial strength.

These results suggest that high sustainability ratings offset the effects of unconventional monetary policy, which partially supports *H1*. In the context of very low interest rates, even close to zero, many central banks

Fig. 2a: Marginal effect of unconventional monetary policy (*CB_ASS*) on Δln(*loans*)

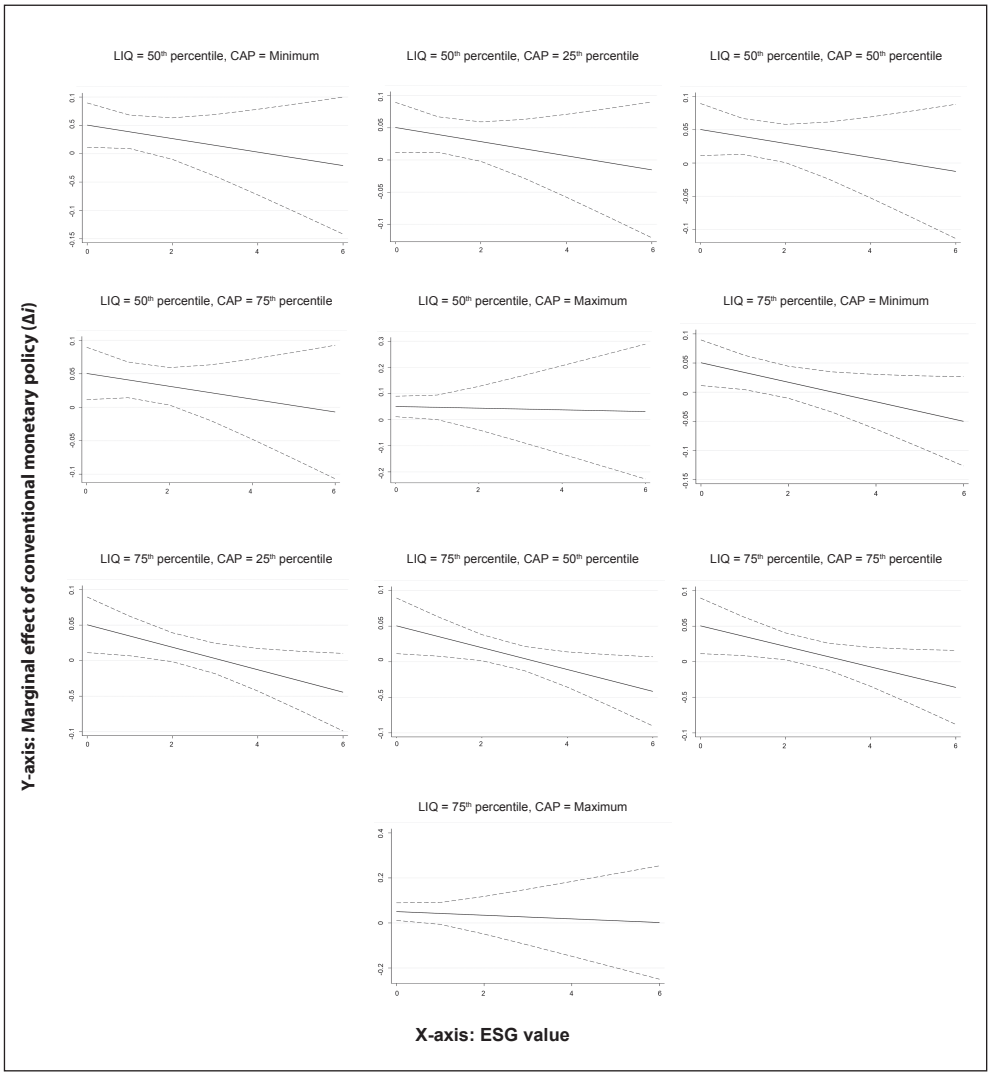


Source: own (based on Tab. 6)

Note: Marginal effect (—), upper and lower 90% confident limit (---) of *CB_ASS* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

carried out asset purchase programmes to improve financial conditions for banks and firms, boost bank lending and increase market liquidity (Afonso & Kazemi, 2018). Banks with lower sustainable compromises would thus react more to increases in central bank assets in comparison with more sustainable institutions. In fact, more sustainable banks already enjoyed the financial benefits of sustainability due to their better reputation

Fig. 2b: Marginal effect of unconventional monetary policy (*CB_ASS*) on Δln(*loans*)

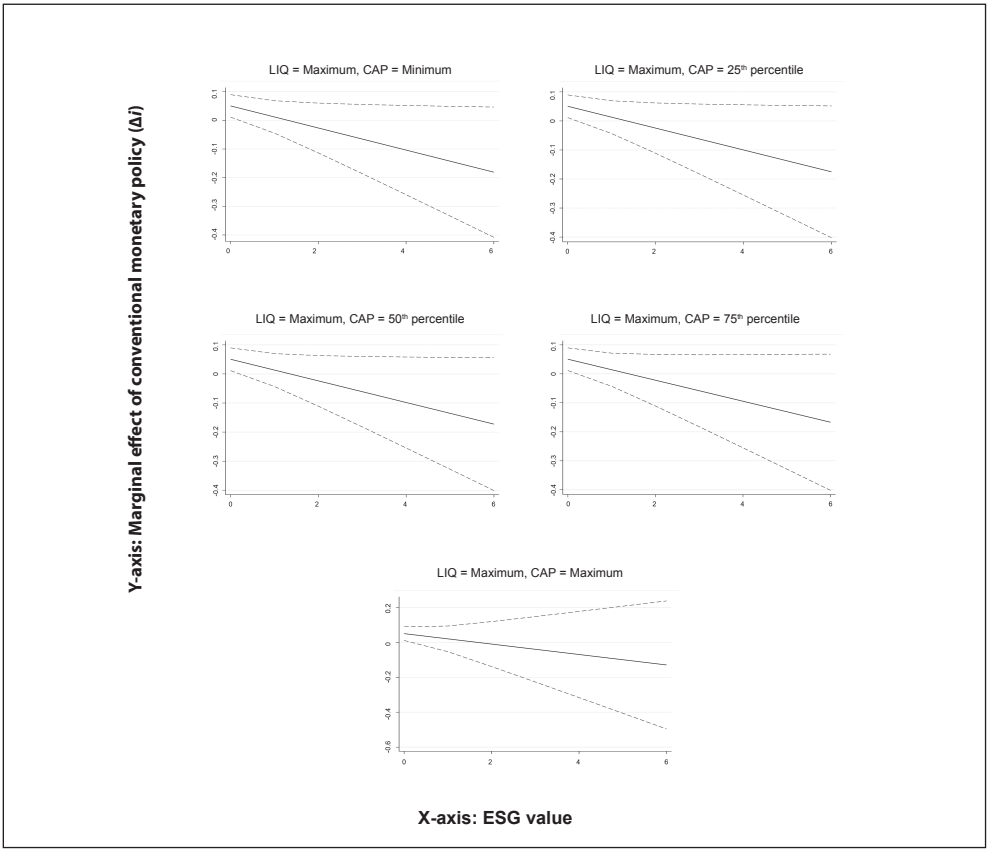


Source: own (based on Tab. 6)

Note: Marginal effect (—), upper and lower 90% confident limit (---) of *CB_ASS* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

and their lower risks (Goss & Roberts, 2011). Consequently, they could maintain their lending volumes without depending on the easing of monetary conditions. The effects described previously do not significantly vary across different values of liquidity and capitalisation, which would not support *H2*. Therefore, the transmission of the unconventional monetary policy is similar across different degrees of financial strength.

Fig. 2c: Marginal effect of unconventional monetary policy (*CB_ASS*) on Δln(*loans*)



Source: own (based on Tab. 6)

Note: Marginal effect (—), upper and lower 90% confident limit (---) of *CB_ASS* on Δln(*loans*) in relation to environmental, social and governance rating (ESG) for different combinations of bank capitalization (CAP), and liquidity (LIQ = minimum and 25th percentile). Results for a median sized bank (SIZE = 50th percentile).

Conclusions

This article analysed how sustainable practices determine the bank lending channel. We also tested how these effects were conditioned by the financial strength of each bank. Using a sample of banks from the OECD, we found that conventional monetary policy shocks lead to a decline in lending either for banks with very low sustainability ratings or with a weak financial position. As sustainability ratings increase and banks achieve moderate financial strength, conventional monetary policy does not significantly affect lending. Furthermore, if banks adopt certain sustainable compromises and are financially strong, the effects of monetary impulses on bank credit are the opposite of those that the bank lending channel proposes, and banks increase lending during monetary restrictions. This increase in lending is more intense as sustainability ratings improve. On the other hand, unconventional monetary policy through central bank assets boost credit only for banks with low or moderate sustainability ratings. For banks with high sustainability ratings, unconventional monetary policy does not affect lending, regardless of their financial strength.

These results are quite relevant, because they suggest that sustainable banks are less dependent on monetary policy decisions, both conventional and unconventional, which has important implications for international organisations, central banks and financial institutions. First, the lower dependence on monetary shocks by sustainable banks would facilitate financial inclusion – one of the priorities of the SDGs proposed by the United Nations – when monetary conditions are more restrictive. Second, as sustainability trends gain popularity in the future, the bank lending channel would progressively lose its effectiveness and most of the monetary policy instruments used by the central banks thus far would hardly affect the financial sector. Finally, although sustainable compromises still raise some concerns among bank managers due to their costs, our results show that these compromises also provide important financial benefits to banks. As a result, banks would be able to achieve sustainability goals for society as well as serving their own commercial objectives.

References

Afonso, A., & Kazemi, M. (2018). Euro area sovereign yields and the power of unconventional monetary policy. *Czech Journal of Economics and Finance*, *68*(2), 100–119. https://doi.org/10.32065/CJEF.2022.03.01

Agirre-Aramburu, I., & Gómez-Pescador, I. (2019). The effects of corporate social responsibility on customer loyalty: The mediating effect of reputation in cooperative banks versus commercial banks in the Basque Country. *Journal of Business Ethics*, *3*(154), 701–719. https://doi.org/10.1007/s10551-017-3438-1

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Sage Publications.

Albertazzi, U., Nobili, A., & Signoretti, F. M. (2021). The bank lending channel of conventional and unconventional monetary policy. *Journal of Money, Credit and Banking*, *53*(2–3), 261–299. https://doi.org/10.1111/jmcb.12766

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, *65*(10), 4451–4469. https://doi.org/10.1287/mnsc.2018.3043

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*(2), 277–297. https://doi.org/10.2307/2297968

Azmi, W., Hassan, M. K., Houston, R., & Karim, M. S. (2021). ESG activities and banking performance: International evidence from emerging economies. *Journal of International Financial Markets, Institutions and Money*, *70*, 101277. https://doi.org/10.1016/j.intfin.2020.101277

Belasri, S., Gomes, M., & Pijourlet, G. (2020). Corporate social responsibility and bank efficiency. *Journal of Multinational Financial Management*, *54*, 100612. https://doi.org/10.1016/j.mulfin.2020.100612

Bernanke, B. S., & Blinder, A. S. (1988). Credit, money and aggregate demand. *The American Economic Review*, *78*(2), 435–439.

Boitan, I. A. (2015). Determinants of sustainable banks' profitability. Evidence from EU countries. *Financial Studies*, *19*(1), 21–39.

Brissimis, S. N., & Magginas, N. S. (2005). Changes in financial structure and asset price substitutability: A test of the banking channel. *Economic Modelling*, *22*(5), 879–904. https://doi.org/10.1016/j.econmod.2005.06.003

Cantero-Saiz, M., Sanfilippo-Azofra, S., & Torre-Olmo, B. (2019). The single supervision mechanism and contagion between bank and sovereign risk. *Journal of Regulatory Economics*, *55*(1), 67–106. https://doi.org/10.1007/s11149-018-09373-6

Cantero-Saiz, M., Sanfilippo-Azofra, S., & Torre-Olmo, B. (2022). Sovereign risk and the bank lending channel: Differences across countries and the effects of the financial crisis. *Journal of Money, Credit and Banking, 54*(1), 285–312. https://doi.org/10.1111/jmcb.12794

Cantero-Saiz, M., Sanfilippo-Azofra, S., Torre-Olmo, B., & López-Gutiérrez, C. (2014). Sovereign risk and the bank lending channel in Europe. *Journal of International Money and Finance*, *47*, 1–20. https://doi.org/10.1016/j.jimonfin.2014.04.008

Chang, H. Y., Liang, L. W., & Liu, Y. L. (2021). Using environmental, social, governance (ESG) and financial indicators to measure bank cost efficiency in Asia. *Sustainability*, *13*(20), 11139. https://doi.org/10.3390/su132011139

Chiaramonte, L., Dreassi, A., Girardone, C., & Piserà, S. (2021). Do ESG strategies enhance bank stability during financial turmoil? Evidence from Europe. *The European Journal*

of Finance, *28*(12), 1173–1211. https://doi.org/10.1080/1351847X.2021.1964556

Chollet, P., & Sandwidi, B. W. (2018). CSR engagement and financial risk: A virtuous circle? International evidence. *Global Finance Journal*, *38*, 65–81. https://doi.org/10.1016/j.gfj.2018.03.004

Christmann, P. (2000). Effects of "best practices" of environmental management on cost advantage: The role of complementary assets. *Academy of Management Journal*, *43*(4), 663–680. https://doi.org/10.2307/1556360

Clarkson, P., Li, Y., Richardson, G., & Vasvari, F. (2011). Does it pay to be green? Determinants and consequences of proactive environmental strategies. *Journal of Accounting and Public Policy*, *30*(2), 122–144. https://doi.org/10.1016/j.jaccpubpol.2010.09.013

Cornett, M. M., Erhemjamts, O., & Tehranian, H. (2016). Greed or good deeds: An examination of the relation between corporate social responsibility and the financial performance of U.S. commercial banks around the financial crisis. *Journal of Banking and Finance*, *70*, 137–159. https://doi.org/10.1016/j.jbankfin.2016.04.024

Daub, C. H., & Ergenzinger, R. (2005). Enabling sustainable management through a new multi-disciplinary concept of customer satisfaction. *European Journal of Marketing*, *39*(9/10), 998–1012. https://doi.org/10.1108/03090560510610680

Davydenko, S. A., & Franks, J. R. (2008). Do bankruptcy codes matter? A study of defaults in France, Germany, and the UK. *The Journal of Finance*, *63*(2), 565–608. https://doi.org/10.1111/j.1540-6261.2008.01325.x

Disyatat, P. (2011). The bank lending channel revisited. *Journal of Money, Credit and Banking*, *43*(4), 711–734. https://doi.org/10.1111/j.1538-4616.2011.00394.x

Egly, P. V., Escobari, D., & Johnk, D. W. (2016). The impact of government intervention on the stabilization of domestic financial markets and on the U.S. banks' asset composition. *Journal of Economics and Finance*, *40*, 683–713. https://doi.org/10.1007/s12197-015-9320-z

Ehrmann, M., Gambacorta, L., Martínez-Pagés, J., Sevestre, P., & Worms, A. (2003). Financial systems and the role of banks in monetary policy transmission in the euro area. In I. Angeloni, A. Kashyap, & B. Mojon (Eds.), *Monetary policy transmission in the euro area* (pp. 235–269). Cambridge University Press. https://doi.org/10.1017/CBO9780511492372.018

Ferreira, F., Jalali, M., Meiudute-Kavaliauskiene, I., & Viana, B. (2015). A metacognitive decision making based-framework for bank customer loyalty measurement and management. *Technological and Economic Development of Economy*, *21*(2), 280–300. https://doi.org/10.3846/20294913.2014.981764

Forgione, A. F., Laguir, I., & Staglianò, R. (2020). Effect of corporate social responsibility scores on bank efficiency: The moderating role of institutional context. *Corporate Social Responsibility and Environmental Management*, *27*(5), 2094–2106. https://doi.org/10.1002/csr.1950

Fungáčová, Z., Solanko, L., & Weill, L. (2014). Does competition influence the bank lending channel in the euro area? *Journal of Banking & Finance*, *49*, 356–366. https://doi.org/10.1016/j.jbankfin.2014.06.018

Galletta, S., Mazzù, S., Naciti, V., & Vermiglio, C. (2021). Sustainable development and financial institutions: Do banks' environmental policies influence customer deposits? *Business Strategy and the Environment*, *30*(1), 643–656. https://doi.org/10.1002/bse.2644

García-Benau, M. A., Sierra-García, L., & Zorio, A. (2013). Financial crisis impact on sustainability reporting. *Management Decision*, *51*(7), 1528–1542. https://doi.org/10.1108/MD-03-2013-0102

Global Alliance for Banking on Values (GABV). (2013). *Real banking for the real economy: Comparing sustainable bank performance with the largest banks in the world*. Global Alliance for Banking on Values.

González-Martínez, C. I. (2021). *El papel de los bancos centrales en la lucha contra el cambio climático y en el desarrollo de las finanzas sostenibles* [The role of central banks in combating climate change and developing sustainable finance]. Economic Bulletin, Bank of Spain No 3/21.

Goss, A., & Roberts, G. S. (2011). The impact of corporate social responsibility on the cost of bank loans. *Journal of Banking & Finance*, *35*(7), 1794–1810. https://doi.org/10.1016/j.jbankfin.2010.12.002

Gutiérrez-López, C., & Abad-González, J. (2020). Sustainability in the banking sector: A predictive model for the European banking union in the aftermath of the financial crisis. *Sustainability*, *12*, 2566. https://doi.org/10.3390/su12062566

Hachenberg, B., & Schiereck, D. (2018). Are green bonds priced differently from conventional bonds? *Journal of Asset Management*, *19*,

371–383. https://doi.org/10.1057/s41260-018-0088-5

Hambrick, D. C. (1983). Some tests of the effectiveness and functional attributes of miles and snow's strategic types. *Academy of Management Journal*, *26*(1), 5–26. https://doi.org/10.2307/256132

Harjoto, M., & Laksmana, I. (2016). The impact of corporate social responsibility on risk taking and firm value. *Journal of Business Ethics*, *151*, 353–373. https://doi.org/10.1007/s10551-016-3202-y

Hong, H., Kubik, J. D., & Scheinkman, J. A. (2012). *Financial constraints on corporate goodness* (NBER Working Paper No. 18476). https://doi.org/10.2139/ssrn.1734164

Igbudu, N., Garanti, Z., & Popoola, T. (2018). Enhancing bank loyalty through sustainable banking practices: The mediating effect of corporate image. *Sustainability*, *10*(11), 4050. https://doi.org/10.3390/su10114050

Jiménez, G., Mian, A., Peydró, J. L., & Saurina, J. (2020). The real effects of the bank lending channel. *Journal of Monetary Economics*, *115*, 162–179. https://doi.org/10.1016/j.jmoneco.2019.06.002

Kashyap, A. K., & Stein, J. C. (2000). What do a million observations on banks say about the transmission of monetary policy? *The American Economic Review*, *90*(3), 407–428. https://doi.org/10.1257/aer.90.3.407

Kisel'áková, D., Filip, P., Onuferová, E., & Valentiny, T. (2020). The impact of monetary policies on the sustainable economic and financial development in the euro area countries. *Sustainability*, *12*(22), 9367. https://doi.org/10.3390/su12229367

Kishan, R. P., & Opiela, T. P. (2000). Bank size, bank capital and the bank lending channel. *Journal of Money, Credit and Banking*, *32*(1), 121–141. https://doi.org/10.2307/2601095

Mason, C. F. (2012). The economics of ecolabeling: Theory and empirical implications. *International Review of Environmental and Resource Economics*, *6*(4), 341–372. https://doi.org/10.1561/101.00000054

Murè, P., Spallone, M., Mango, F., Marzioni, S., & Bittuci, L. (2021). ESG and reputation: The case of sanctioned Italian banks. *Corporate Social Responsibility and Environmental Management*, *28*(1), 265–277. https://doi.org/10.1002/csr.2047

Paulet, E., Parnaudeau, M., & Relano, F. (2015). Banking with ethics: Strategic moves and structural changes of the banking industry in the aftermath of the subprime mortgage crisis. *Journal of Business Ethics*, *131*(1), 199–207. https://doi.org/10.1007/s10551-014-2274-9

Ruiz, B., García, J. A., & Revilla, A. J. (2016). Antecedents and consequences of bank reputation: A comparison of the United Kingdom and Spain. *International Marketing Review*, *33*(6), 781–805. https://doi.org/10.1108/IMR-06-2015-0147

Sabbaghi, O. (2022). The impact of news on the volatility of ESG firms. *Global Finance Journal*, *51*, 100570. https://doi.org/10.1016/j.gfj.2020.100570

Saïdane, D., & Abdallah, S. B. (2020). Sustainability and financial stability: Evidence from European banks. *Economics Bulletin*, *40*(2), 1769–1780.

Sanfilippo-Azofra, S., Torre-Olmo, B., Cantero-Saiz, M., & López-Gutiérrez, C. (2018). Financial development and the bank lending channel in developing countries. *Journal of Macroeconomics*, *55*, 215–234. https://doi.org/10.1016/j.jmacro.2017.10.009

Scholtens, B. (2012). Corporate social responsibility in the international banking industry. *Journal of Business Ethics*, *86*, 159–175. https://doi.org/10.1007/s10551-008-9841-x

Scholtens, B., & Van't Klooster, S. (2019). Sustainability and bank risk. *Palgrave Communications*, *5*(105). https://doi.org/10.1057/s41599-019-0315-9

Shah, A. A., Wu, D., & Korotkov, V. (2019). Are sustainable banks efficient and productive? A data envelopment analysis and the Malmquist productivity index analysis. *Sustainability*, *11*(8), 2398. https://doi.org/10.3390/su11082398

Torre-Olmo, B., Cantero-Saiz, M., & Sanfilippo-Azofra, S. (2021). Sustainable banking, market power and efficiency: Effects on banks' profitability and risk. *Sustainability*, *13*, 1298. https://doi.org/10.3390/su13031298

Valls-Martínez, M. C., Cruz-Rambaud, S., & Parra-Oller, I. M. (2020). Sustainable and conventional banking in Europe. *PLoS ONE, 15*(2), e0229420. https://doi.org/10.1371/journal.pone.0229420

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, *105*(3), 581–606. https://doi.org/10.1016/j.jfineco.2012.03.005