

INCLUSIVE GREEN FINANCE FOR SMALL COMPANIES

A CASE STUDY OF PILOT CITIES IN CHINA'S ZHEJIANG PROVINCE

Jingyi Zhang
Peter Knaack
Danqing Shao

AUTHORS

Jingyi Zhang - Researcher, Macro and Green Finance Lab, National School of Development, Peking University, China.

Peter Knaack - Associate, Council on Economic Policies, Switzerland, and Adjunct Professor, American University, USA.

Danqing Shao - Researcher, Macro and Green Finance Lab, National School of Development, Peking University, China.

ACKNOWLEDGEMENTS

The authors would like to express gratitude to People's Bank of China Taizhou Branch, People's Bank of China Quzhou Branch, People's Bank of China Zhejiang Provincial Branch, Huzhou Financial Work Office, Taizhou Bank, MYbank, Ant Group Research Institute, Trans Fintech, and Capacity-building Alliance of Sustainable Investment (CASI) for their contributions to the case studies in this paper. The authors also thank Alexander Barkawi, Majorie Chalwe-Mulenga, Chiara Colesanti Senni, Hu Xu, He Xiaobei, Ulrich Hess, Ma Jun, Davide Mare, Pierre Monnin, Jana Mudronova, Rodrigo Pereira Porto, Muhammad Qaisar, Krysten Song, Fiona Stewart, and Isabelle Zheng for their valuable suggestions. The authors take full responsibility for the content.

ABSTRACT

Green finance flows have grown significantly in recent years, yet large firms dominate this market. Micro, small, and medium-sized enterprises (MSMEs), which contribute significantly to greenhouse gas (GHG) emissions, are crucial for the transition to a sustainable economy. However, they face major challenges in accessing financing for sustainable investments. This paper examines two key obstacles to scaling up green finance for MSMEs. First, it distinguishes between entity-based and activity-based green finance and argues that the latter is unsuitable for most MSME financial needs. Second, the study focuses on the cost of green due diligence. It analyzes how pilot zones in China's Zhejiang province are addressing these obstacles through innovative standards, financial products, and digital platforms. The paper concludes with policy recommendations to promote broader adoption of green MSME finance in China and other emerging markets and developing economies (EMDEs).

Keywords: inclusive green finance; financial inclusion; green finance; green MSMEs; MSME finance; information asymmetry; China pilot cities

1. INTRODUCTION

Global green finance flows have increased significantly in recent years.¹ More than \$500 billion in green bonds have been issued worldwide in 2024, roughly double the size of the market in 2019 (CBI, 2024; World Bank, 2024). Data on green loans is less consistent. The European Union for example lacks a green loan standard, and while some banks try to make sense of the EU taxonomy to define what a green loan is, most banks develop their own definitions.² Bloomberg estimates that in Europe, the outstanding amount of green and sustainability-linked loans together reached €156 billion (ca. \$162 billion) in 2022, more than double their amount in 2020 (EBA, 2023). The amount of green loans outstanding in China surpassed 35 trillion yuan (ca. \$4.9 trillion) by Q3 2024 (People's Daily, 2024). Unlike traditional debt, green loans and bonds are earmarked for environmental improvements. In some jurisdictions, green debt instruments receive government support such as interest rate subsidies. In others, they simply represent a channel in which environmentally minded investors can dedicate much-needed funds to sustainability.

Micro, small and medium-sized Enterprises (MSMEs) play an important role in the transition to a sustainable economy. They comprise 99% of firms across OECD countries and contribute approximately 40% of greenhouse gas (GHG) emissions (Wildnerova et al., 2024). In the European Union and in China, MSMEs are estimated to account for over half of GHG emissions (IFC, 2023; Meng et al., 2018). Thus, MSMEs play an important role in the transition to a sustainable economy. Many need financial support for the necessary investments.

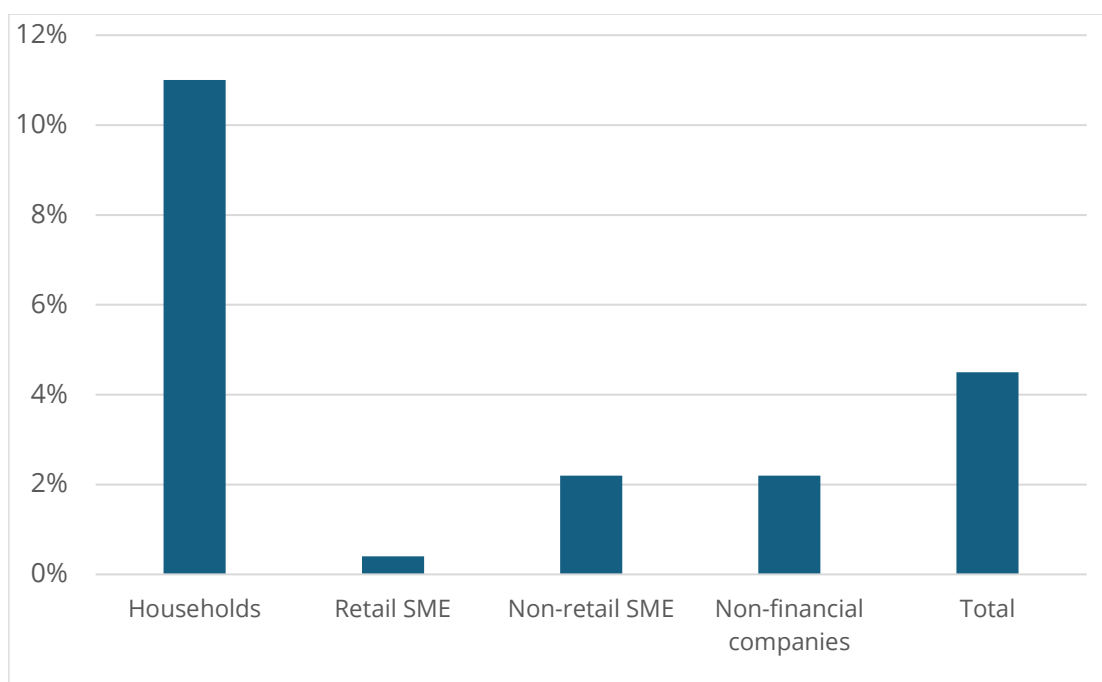
But MSMEs are struggling to access green finance. The majority of green finance flows go to large firms, including energy conglomerates, utilities, and multinational food and transport corporations. In contrast, MSMEs face difficulties in accessing green finance. A survey by the EBA (2023) finds that while green loans make up ca. 4.5% of European bank portfolios, that share drops to 2% for non-retail MSMEs and close to zero for retail MSMEs (see Figure 1). China does not release data on the subject, but statistics from some banks show that MSMEs account for less than 5% of all green loans, even though MSMEs make up ca. 49% of total business loans (IIGF, 2024b; PBOC, 2025).³ A recent survey of 140'000 MSME loans reveals that a significant share of these loans are not recognized as green loans even though they serve environmental purposes (Bei & Hu, 2024). Similarly, in ASEAN-5 countries, sustainable debt flows largely to listed, investment-grade firms, while MSMEs barely have access to it (WB & IFS, 2022). Financial constraints affect both green-sector MSMEs and those that aim to adopt sustainable practices (Koirala, 2019).

¹ This paper focuses on green finance, that is finance dedicated to benefit or reduce harm to the environment, for example by reducing pollution and greenhouse gas emissions, minimizing waste and improving efficiency in the use of natural resources. Green finance as a concept is more encompassing than climate finance, but does not include social purposes (ISO, 2022).

² Of 83 EU-based banks surveyed in 2023, only 7 use the substantial contribution and do no significant harm criteria of the EU taxonomy to define their green loans. 12 institutions use substantial contribution only. The rest develop their own definitions. See EBA (2023) for more details.

³ The volume of outstanding loans to micro and small enterprises (Chinese definitions vary by sector, the limit is 300 employees in the manufacturing sector for example) reached 59.6 trillion yuan in 2022, 49% of all business loans. See OECD (2024) Table 33.1 and PBOC (2023) for more details.

Figure 1: Share of green loans in total loans (by business line), a sample of 83 European financial institutions



Source: EBA (2023)

Financial inclusion policies aim to improve MSME financing but rarely contemplate environmental sustainability. In many emerging markets and developing economies (EMDEs), financial inclusion policies focus on mitigating MSME financing barriers, using tools such as partial credit guarantees, subsidized credit schemes, and capacity-building measures (WB, 2019). They do not, however, address the problem of how MSMEs can obtain financing for the transition to a sustainable economy, despite growing public and private support for this purpose. Some research even suggests that financial inclusion policies have contributed to environmental degradation by strengthening pollution-intensive projects and inefficient production patterns (Le et al., 2020; Zhao et al., 2022). In short, today's green finance is not inclusive, and inclusive finance is not green (Xu, 2024).

In this context, this paper raises the following two research questions:

1. What are the key obstacles to scaling up green finance for MSMEs?
2. How can these obstacles be addressed?

The remainder of this paper starts with a brief review of the MSME finance literature. It identifies two main obstacles to green MSME finance, namely (1) inadequate green finance standards and products and (2) costly green due diligence. The paper introduces the distinction between activity-based and entity-based green finance, which turns out to be highly relevant for green MSME finance. In a nutshell, the vast majority of today's green finance standards and products use an activity-based approach, which is unsuitable for most MSME financing needs. The second obstacle are costly green due diligence requirements to avoid "greenwashing", which threaten to make green MSME financing commercially unviable. The subsequent sections explore how pilot zones in Zhejiang Province address these challenges. Zhejiang's pilots (1) develop an entity-based approach that is adequate for

MSMEs. And they (2) establish public green finance digital platforms that collect relevant data and make it available to financial institutions, sharply reducing the cost of green due diligence. The paper provides a deep dive into the individual pilot programs, comparing the standards and the green digital platforms developed by Huzhou, Quzhou, Taizhou, and that of Ant Group, a fintech company, with an extensive annex for a detailed description. The paper concludes with some thoughts on preconditions for a wider adoption of Zhejiang's emerging best practices in other parts of China and other EMDEs, and with policy recommendations.

2. INADEQUATE STANDARDS AND COSTLY GREEN DUE DILIGENCE AS KEY OBSTACLES TO GREEN FINANCE FOR MSMEs

Economic research has long identified market frictions and failures that constrain MSME access to finance in general. A basic but useful analytic approach starts with the distinction between supply-side and demand-side constraints (Cressy & Olofsson, 1997; Carbó-Valverde et al., 2009). On the supply side, the main obstacles to MSME finance are transaction costs, risk, and information asymmetry (Berger & Udell, 1998). On the demand side, the lack of incentives for investment and lack of awareness of financing options are key constraints (Beck & De La Torre, 2007). Most of the traditional constraints also apply to green MSME finance. But as this paper will show, information asymmetry stands out as a distinct challenge because it poses an obstacle of greater magnitude – and a qualitatively different one – compared to traditional MSME finance.

Financial institutions are often reluctant to serve MSMEs because of fixed transaction costs and missing economies of scale. All financial transactions entail costs, and those that are proportional to the value of the transaction do not pose a particular obstacle to MSME finance. But some transaction costs such as legal compliance, IT systems, and the operation of physical infrastructure are fixed, at least in part. Financial institutions thus must exploit economies of scale either through sufficiently high-volume or high-value transactions to be profitable. But scale economies are negligible and fixed transaction costs are high relative to the revenue financial institutions can expect to derive from serving small-ticket customers such as MSMEs (Beck & De La Torre, 2007).

In that context, information asymmetry is a particularly significant obstacle to MSME finance. Obtaining information about a prospective borrower, their willingness and ability to repay, is costly for a bank. Financial institutions also need to check prospective clients for signs of financial malfeasance in order to comply with anti-money laundering and terrorist financing regulations (Claessens, 2006). Customer due diligence, the work required to reduce information asymmetry, is a subset of transaction costs that merits special attention as an obstacle to MSME finance. While obtaining information to “Know Your Customer” is costly for all bank clients, these costs are disproportionately high relative to expected returns for MSMEs.

Demand for MSME finance is limited by a lack of incentives and lack of awareness.

Even when financial institutions offer loans, business owners may be reluctant to borrow if expected returns on investment are uncertain. Additionally, many MSMEs are unaware of available financing options. Cultural norms—such as a general aversion to debt—may further suppress demand.

While green MSME finance faces all traditional supply-side and demand-side constraints, obstacles related to information asymmetry are more pronounced, and qualitatively different.

Transaction costs from IT systems or physical infrastructure for example are not expected to be appreciably higher or lower. But as the following paragraphs will show, green MSME finance faces obstacles related to *information asymmetry* that are more pronounced than in traditional MSME finance. In particular, the following two issues represent key obstacles:

1. *Green standards for loans (and bonds) are generally activity-based, not entity-based, which makes them unsuitable for many MSME financing needs.*
2. *Green due diligence is costly.*

The following paragraphs will elaborate on each obstacle separately.

MSMEs usually obtain financing from banks, rather than via equity or bond markets.

Very few MSMEs are listed on stock exchanges, and few can tap directly into bond markets. The (green) financial products of relevance for MSMEs are provided by banks, and chiefly include loans. Banks are noteworthy actors in the green bond market though, and they can finance green loans to MSMEs from the proceeds of the green bonds they issue. Thus, while the focus of the following paragraphs is on green loans, they also consider the characteristics of green bonds.

Green finance imposes additional information requirements. Traditional lenders primarily assess a borrower's creditworthiness, considering factors such as cash flow and business models. They generally do not monitor how loan proceeds are spent. Green finance, however, requires additional scrutiny—banks must verify that loan funds are used for specific environmentally sustainable *activities*.

Green finance is largely activity-based, not entity-based. Most green finance frameworks classify investments based on eligible activities, not firms' overall sustainability performance. Sustainable finance taxonomies list specific "green" activities rather than defining "green" companies. Most green debt instruments are also activity-based. Green bonds and loans are used to finance green activities such as the purchase and installation of solar panels or the energy-efficient retrofitting of housing. These products are not designed to include consideration of the overall environmental performance of the borrower.

Use of Proceeds (UoP) requirements pose challenges for MSMEs. Green debt instruments include strict UoP requirements, which can be difficult for MSMEs to meet. Green bonds for example are defined as "any type of bond instrument where the proceeds or an equivalent amount will be exclusively applied to finance or re-finance, in part or in full, new and/or existing eligible Green Projects" (ICMA, 2021). Lists of eligible green projects are provided, inter alia, by the Climate Bonds Initiative and national taxonomies (CBI, 2021). The Green Loan Principles issued by the Loan Market Association, a global industry body, similarly define green loans as any loans "made available exclusively to finance, re-finance or guarantee, in whole or in part, new and/or existing eligible Green Projects" (APLMA et al., 2023). Borrowers need to clearly identify how financed projects or assets fit into eligible

categories, proceeds must be tracked, and internal governance mechanisms must be in place to ensure tracking and reporting meet integrity and transparency requirements. Otherwise, the providers of capital face the reputational risk of “greenwashing”, that is allegations that funds earmarked for green projects are used for other purposes. Large firms often have the resources to manage compliance, but MSMEs typically lack the necessary internal processes and data tracking capabilities, making access to green credit more challenging.

Table 1: *Activity-based vs entity-based approach*

Approach	Activity-based	Entity-based
Standards	Taxonomy	ESG ratings Emissions/resource usage tracking Carbon accounting
Products	<i>Proceeds must be used for specified purpose:</i> Green/social/sustainable bond Green/social/sustainable loan	<i>Use of proceeds is unrestricted, performance of borrower matters:</i> Sustainability-linked bond Sustainability-linked loan

Activity-based green finance is ill-suited for many MSME financing needs. As noted above, the proceeds from green loans and bonds must be dedicated to a clearly identified green project to qualify, regardless of how environmentally sustainable the borrowing firm is as a whole. As a consequence, even a firm that is squarely inside the green economy cannot use green loans to finance *activities* that are not “green”, such as an upgrade of IT systems (BBVA, 2024). While this model works well for capital expenditures (CapEx) such as installing solar panels or purchasing electric vehicles, MSMEs frequently require working capital loans to cover ongoing operating expenses (OpEx) (IFC, 2023). Because these funds are used for various business activities rather than a single project, UoP products are not a good fit for many MSMEs financing needs. In other words, even if green due diligence was free and information asymmetry negligible, MSMEs would not be able to obtain green credit to finance their OpEx needs for a green transition. An entity-based approach to green finance could better align with MSME needs.

Entity-based green financial standards for MSMEs are in early stages of development. Unlike large corporations, MSMEs have limited access to entity-based green financial standards. While ESG frameworks for publicly listed firms have existed for over two decades, they are often too complex for MSMEs. Many ESG indicators—such as board-level climate risk oversight—are ill-suited to MSMEs’ operational realities. Additionally, carbon tracking and accounting methods that measure emissions relative to financial indicators (e.g., turnover, profit) are not yet widespread and are largely inaccessible to MSMEs.

Entity-based green financial products exist, but they do not play a significant role for MSMEs. Sustainability-linked bonds and loans have been around for half a decade. Such entity-based products are linked to an entity’s overall sustainability performance rather than specific green projects. Borrowers commit to pre-defined sustainability targets—such as

reducing resource consumption or emissions—and, if targets are met, may receive a coupon or interest rate discount.

The loan market distinguishes between green or sustainable loans, which are activity-based, and sustainability-linked loans (SLLs), which are entity-based. During loan negotiations, the lender and borrower of an SLL agree on a sustainability target and key performance indicators (KPIs) on the way to reaching it. If the borrower reaches a given KPI at or before an agreed deadline, it is rewarded with a step-down in the interest rate. The global volume of SLLs surged from zero in 2016 to \$140 billion in 2019 (S&P Global, 2021). But the SLL market is geographically concentrated and in decline. In 2021, three industry bodies jointly issued guidelines for SLLs (APLMA et al., 2023). The European sustainable loan market is dominated by such products, with multi-million dollar SLLs issued to large corporations (BBVA, 2024). But elsewhere, the volume of SLL issuance is small. Emerging markets and developing economies (EMDE) only represented 5% of the global market in 2021 (de la Orden & de Calonje, 2022). In China's green loan market, SLLs play a marginal role (IIGF, 2024a). In the first 10 months of 2023, \$310 billion of sustainability-linked loans were issued worldwide, down from \$480 billion in the previous year (Wilkes et al., 2023). Analysts attribute the decline of the market to two factors: Lenders have become more circumspect over the credibility of SLLs and more wary of reputational risk arising from being involved in poorly designed sustainability-linked instruments (Barbalau & Zeni, 2022). And for borrowers, fatigue over reporting requirements and the cost of structuring a loan with complex ESG indicators and ratchets might limit appetite for SLLs (Sustainable Fitch, 2024).

Green due diligence is costly. When providing green loans, banks must not only gauge the willingness and ability of a prospective client to repay a loan. They must also collect environmental, and sometimes social and governance (ESG) information of a borrower. A survey of over 100 investors and corporates from 29 countries shows that companies spend between \$220'000 and \$480'000 annually on ESG data (ERM, 2023). In comparison to large firms, MSMEs struggle to provide information about their environmental performance at a price that is commensurable with the size of their loan. If the cost of green due diligence exceeds the expected risk-adjusted return, banks may deem green loans to MSMEs commercially unviable. The cost of green due diligence is one of several ways in which complex environmental financial regulations have unintended exclusionary consequences (Dias et al., 2024).

Green certification is the flipside of the same coin. MSMEs can undergo an assessment process by a third party that issues a green/sustainable certification if the firm meets predefined sustainability standards. Over 450 such environmental certifications and labels are currently in circulation worldwide (Ecolabel Index, 2024). But certification does not reduce the cost of green due diligence, it merely shifts the burden from lenders to firms. Green certifications at the product or firm level can cost upwards of \$10'000, and some only have a one-year validity (CAFI, 2024). This cost may be negligible for large firms, but it can be unaffordable for MSMEs, especially in EMDEs. If the cost of green due diligence is borne by the customer, it becomes a demand-side constraint to green finance, with MSME customers choosing a simple loan from a bank that asks fewer questions instead.

Table 2: Obstacles to green MSME finance and potential solutions

Obstacle	Potential Solution
Green finance standards at odds with MSME characteristics	Simplified, entity-based standards
Activity-based financial products unsuitable for MSME financing needs	Entity-based financial products, such as SLL
Costly green due diligence/certification	Green digital platforms

Credit registries lower the cost of due diligence in many countries, but they lack environmental information. These databases function as club goods—access is excludable, but usage is non-rivalrous (one institution’s access does not reduce the availability or quality of the data for others). As a result, financial institutions have a strong incentive to share due diligence costs by collectively funding credit registries. Such databases exist in many countries, ranging from simple blacklists to more sophisticated scoring systems, and including firms, individuals, or both. Some are managed by central banks or financial supervisors, some are private. In most cases, they operate by offering information access to financial institutions for a fee. Credit registries are empirically shown to be associated with greater MSME financing and growth (Ayyagari et al., 2007). Brazil’s central bank has established a Green Credit Bureau (Fitch, 2021) that contains a wide range of environmental information about farmers, including the GPS coordinates of their land, crops planted, and harvesting methods. Farmers applying for credit (at interest rates subsidized by the government) need to provide this information, and banks are requested to verify it and check, among other things, that the prospective client does not operate in protected areas of the Amazon and other biomes. In most other countries, however, credit registries contain no information that is useful to assess environmental sustainability.

3. HOW TO OVERCOME BARRIERS TO GREEN MSME FINANCE: A CASE STUDY OF ZHEJIANG PROVINCE IN CHINA

Background

China has a decade of experience in implementing national-level green finance policies. A prime example is the green credit statistical system introduced in 2013. Under this system, banks label loans as ‘green’ or ‘non-green’. China has also pioneered green finance initiatives in the bond market, launching the world’s first national green taxonomy in 2015⁴ – five years ahead of the EU taxonomy. Furthermore, the People’s Bank of China (PBOC) has implemented innovative policy tools such as the Carbon Emission Reduction Facility, a re-lending program supporting green and low-carbon development (introduced in

⁴ Green Bond Endorsed Projects Catalogue (2015 Edition)

2021 and extended to 2027), and green bank performance assessments (introduced in 2018, updated in 2021). Research suggests that these green credit policies have effectively spurred sustainable investment, encouraged green companies to increase their green investments, and fostered green innovation (Liu & Ren, 2023; L. Ma et al., 2024). Studies also indicate that green financial policy can promote sustainable growth for the economy at large (Pan, 2019).

Beyond national-level initiatives, China launched a pilot program in 2017, designating several cities as "Green Finance Reform Pilot Cities." These cities were empowered by the State Council to develop innovative green finance policies with fiscal support from local governments. Huzhou and Quzhou in Zhejiang Province, and six cities in four other provinces were selected as the first batch of green finance pilot cities in 2017. Empirical studies suggest that large, listed firms in pilot cities improved their environmental performance, possibly because greener firms enjoy lower debt financing costs (Dong et al., 2022; T. Zhang, 2023).

Inclusive finance pioneers also began to promote green MSME finance. In 2015, Taizhou in Zhejiang Province was designated as a national pilot city for MSME financial service reform and innovation (Pan & Wang, 2021). The city has started facilitating green finance for MSMEs in 2020. MYbank, an online bank based in Zhejiang, has also been actively involved in addressing barriers to green MSME financing.

To examine how Zhejiang's pilot cities are tackling these challenges, we first analyze how MYbank and Taizhou are defining new green finance standards for MSMEs. Next, we explore how Huzhou and Quzhou are reducing green due diligence costs. Finally, we assess the effectiveness of these policy innovations.

How did Zhejiang pilot cities address the hurdles of green finance standards (taxonomies) for MSMEs?

Traditional activity-based green finance standards, such as taxonomies, often fail to meet the needs of MSMEs. These businesses primarily rely on working capital loans, which do not specify how funds are used, making it difficult to align with activity-based green finance requirements. Recognizing this gap, pilot cities and MYbank prioritized the development of alternative green finance standards tailored to MSMEs.

Entity-based green evaluation standards emerged as one approach to address this issue. In 2017, Huzhou and Quzhou began developing methods for evaluating the greenness of enterprises and publishing ratings for local businesses (Huzhou Government, 2018; Quzhou Government, 2020). However, these initial frameworks focused primarily on large enterprises, limiting their applicability to MSMEs.

MYbank pioneered an entity-based green standard specifically for MSMEs. In 2022, with the support of the Zhejiang provincial branch of PBoC, MYbank (an online bank with Ant Group as its largest shareholder), collaborated with research institutions to develop the "Greenness Evaluation Standard for Micro and Small Enterprises" (Zhejiang Society of Finance, 2022). The standard assesses MSMEs' greenness across six dimensions (production materials, business activities, business environment, community feedback, green business and green operations) and aggregates over 120 indicators through an algorithm-based scoring model. By leveraging both publicly available data and private customer information, MYbank continuously refines its model to improve accuracy. To date, it has rated more than 8 million MSMEs (MYbank, 2024). The bank also designed financial products based on the

rating results (see Annex Case 1) (MYbank, 2024). MYbank greenness ratings are now used by other local banks in Zhejiang. And the Greenness Evaluation Standard has been adopted and modified by multiple municipal governments in Zhejiang province.

The key innovation in MYbank’s model is its focus on entity-level evaluation to measure a business’s overall green impact. Since tracking the precise use of funds is challenging for MSMEs, the standard prioritizes indicators that reflect broader environmental performance. These include business activities (e.g., electricity, water, gas consumption), business environment (e.g., whether the company properly handles waste), and community feedback (e.g., whether the company has received an environmental award, see Annex Case 1 for details).⁵ Additionally, firms that have violated environmental laws and regulations are screened out. By incentivizing MSMEs to provide additional data and improve their green ratings, this approach encourages sustainable business practices while expanding access to finance. MYbank has observed a strong correlation between a firm’s greenness and its loan default rate—greener MSMEs tend to have lower default rates (MYbank, 2024a).

Figure 2: MYbank Greenness Rating Model



Source: MYbank

The second approach involves developing industry-specific activity-based standards for green working capital loans. China’s existing national green taxonomy is difficult to directly use to judge which of a company’s operational activities are green. For example, if a manufacturing firm wants to obtain a green working capital loan, it needs to assess whether its daily operational activities are aligned with the green taxonomy. It means the firm’s procurement of raw materials, the purchase of business services, and the sale of inventory goods need to be analyzed one by one. Since most loans for MSMEs are working capital loans (i.e., general-purpose loans), industry-specific guidance can help financial institutions identify MSME green activities more efficiently.

PBoC Taizhou Branch developed a industry-specific database of production activities to define green working capital loans. As the business activities in each sector are quite

⁵ For example, whether the MSME has received honors such as regularly assessed “green factory”, “green supply chain management enterprise”, or “green industrial park” by the national or provincial government.

different, the local authorities decided to develop green labeling guidance industry by industry. *The PBoC Taizhou Branch* focused on the city's two key industries— injection molding and auto parts. Based on the nation's current green product standards of the injection molding industry, the working group developed ways to identify green activities (Zhejiang Financial Association, 2023). It compiled lists of green raw materials, products, and fixed assets used in these industries and integrated them into a public digital platform called Micro Green Connect (微绿达). This system enables banks to upload contracts and invoices to assess how environmentally friendly a given operational activity is. For example, Micro Green Connect would use firm-specific data to determine that 30% of an MSME's working capital loan qualifies as green.

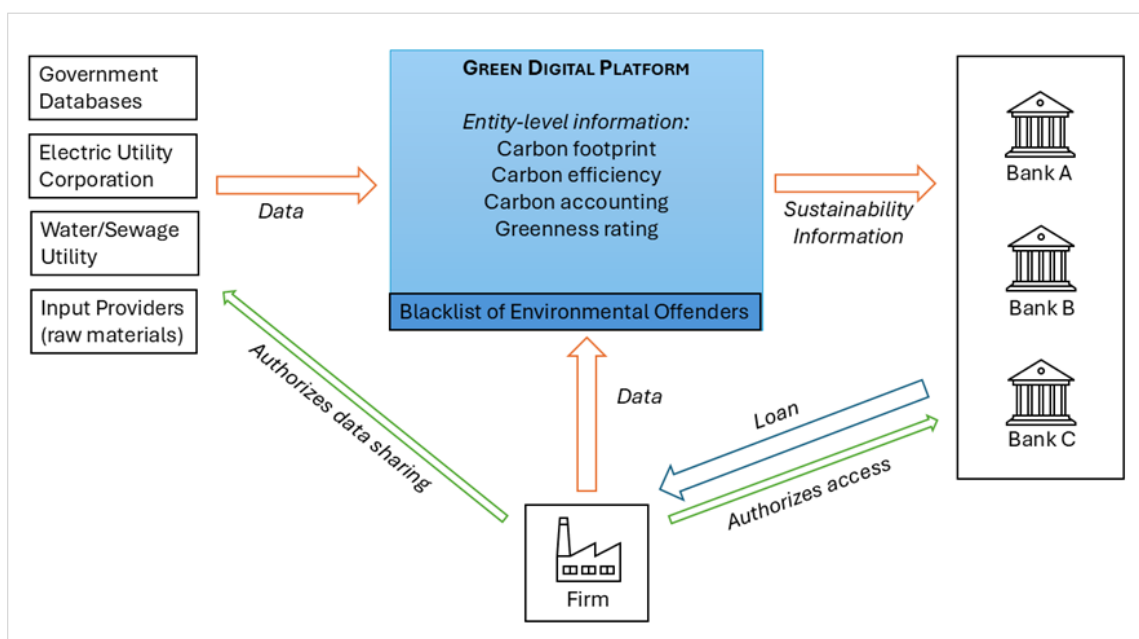
Each of these two approaches has its advantages and limitations. Entity-level green standards for MSMEs depend on available data and involve subjective decisions regarding the selection and weighting of indicators, which may lead to concerns about consistency and comparability. On the other hand, identifying green activities at the industry level requires substantial resources and time, as each sector must undergo a separate assessment.

How did pilot cities in Zhejiang address the problem of high green due diligence costs for MSMEs?

Once the standard problem is addressed, the next challenge is the cost of obtaining sustainability-related information on borrowers. Financial institutions require data on, inter alia, green certifications, pollutant emissions, and carbon footprints to assess eligibility for green financing. However, MSMEs struggle to provide this information due to limited capacity in managing environmental data and the cost of external certifications. Moreover, banks find it less cost-effective to collect such data for MSMEs, given their relatively low profit margins per customer.

Green digital platforms were introduced to lower due diligence costs. The development of such platforms in cities like Huzhou, Quzhou, and Taizhou required an initial public investment of approximately 3 million yuan (ca. \$410,000), with annual maintenance costs ranging from 15% to 30% of that amount, according to our interview partners. While large banks often invest in proprietary ESG rating systems at a cost of 1.5 to 3 million yuan, small and medium-sized banks have relied on government-built platforms to reduce their expenses. These platforms allow MSMEs to obtain environmental ratings at a lower cost by combining data from electricity utilities, supply chain partners, public agencies such as the environmental ministry, and MSMEs themselves (see Figure 3). Green digital platforms also eliminate the need for costly third-party green product certifications, environmental management system certifications, or carbon emission verifications that our interview partners estimate at between 5,000 and 90,000 yuan (ca. \$700 and \$12,000) per company, depending on certification complexity.

Figure 3: Green due diligence using digital platforms



Huzhou’s government played a leading role in reducing green and ESG data costs by integrating various public sector resources. The Huzhou Municipal Financial Office, in collaboration with the Municipal Economy and Information Bureau, Taxation Bureau, Statistical Bureau, and local utility companies developed a carbon efficiency rating system based on energy consumption data from local enterprises.⁶ Using data on coal, gas, oil, and electricity usage, the government estimated carbon emissions and benchmarked firms against industry averages (see Annex Case 3). Additionally, Huzhou established an ESG rating system that aggregates public data, including air pollutant emissions and environmental violation records. These two ratings have relatively high credibility based on consistent public data sources and methodologies, reducing the cost for companies and banks to seek third-party certification. All rating results are accessible on the Huzhou Green Finance One-Stop Service Platform for local banks.⁷

Quzhou adopted a similar digital rating approach with a broader sectoral coverage. Unlike Huzhou, which primarily focuses on carbon efficiency ratings for enterprises in locally dominant industries, Quzhou’s platform extends its ratings to individuals and businesses across various industries, including energy, transportation, construction, and agriculture. The system classifies firms and individuals into different carbon efficiency levels based on their industry, product type, and individual consumption patterns (see Annex Case 3)⁸ Banks can access these ratings through the digital platform with the borrower’s consent, enabling a more streamlined due diligence process.

Taizhou’s digital platform integrates green working capital loan labeling with green ratings. In addition to offering green enterprise ratings similar to Huzhou’s, Taizhou developed industry-specific methods to label green working capital loans (Annex Case 2).

⁶ In China, not all local governments are able to effectively aggregate enterprise administrative data and public utility data.

⁷ Huzhou Green Finance One-Stop Service Platform, <https://www.huzldt.com/>

⁸ Quzhou Carbon Accounts Platform, <http://qzqrt.yzb.qz.gov.cn:8080/entsilver/carbonProduct/view>

This automated assessment simplifies the due diligence process and allows financial institutions to evaluate green credit eligibility efficiently. Key features of the green digital platforms in the above-mentioned three pilot cities are shown in Table 3.

Table 3: Key features of green digital platforms in Zhejiang pilot cities

Huzhou Green Finance One-Stop Service Platform⁹	Quzhou Carbon Accounts Platform¹⁰	Taizhou Micro Green Connect
<ul style="list-style-type: none"> - Carbon efficiency rating - Green rating - Information about companies' green financing needs and FI's green finance products 	<ul style="list-style-type: none"> - Carbon account rating and rating report - Information about companies' green financing needs and FI's green finance products 	<ul style="list-style-type: none"> - Green working capital loan labeling - Green rating
<ul style="list-style-type: none"> - Coverage: 47,910 enterprises by December 2024, of which large enterprises accounted for 0.3%, medium-sized enterprises 2.3%, small enterprises 19.6%, and micro-enterprises 77.8%.¹¹ - Green loan volume: 405.6 billion yuan by December 2024, of which around 8% for MSMEs.¹² 	<ul style="list-style-type: none"> - Coverage: 4,000 enterprises (mainly large ones) and over 2 million individuals by end-2023 - Green loan volume: 76.3 billion yuan.¹³ 	<ul style="list-style-type: none"> - Coverage: 20,000 enterprises, of which ca. 4,000 MSME by June 2023 - Green loan volume: 90 billion yuan, of which nearly 7 billion yuan for MSMEs - Inclusive MSME loan share of green loan volume rose from 3.31% in June 2021 to 7.8% in October 2022 (F. Zhang et al., 2023)¹⁴

Through these digital platforms, Zhejiang's pilot cities reduced green due diligence costs by centralizing data collection and rating systems. By utilizing government resources to compile environmental data from the public sector and private providers, and making this information accessible to banks, they lowered the financial burden on MSMEs while improving the credibility and transparency of green finance assessments. In addition to green due diligence, the digital platforms also provide information about green finance

⁹ Huzhou Green Finance One-Stop Service Platform, <https://www.huzldt.com/>

¹⁰ Quzhou Carbon Accounts Platform, <http://qzqrt.ysb.qz.gov.cn:8080/>

¹¹ Data provided by the local government.

¹² Data provided by the local government.

¹³ Constantly enhance the supply of green finance, China News, 06 Feb 2024, <https://mp.weixin.qq.com/s/K24Gt7uoYILkuvj56pM-vQ>

¹⁴ Inclusive MSME loans (普惠小微贷款) are defined as below 10 million yuan, that is ca. \$1.4 million. See PBOC (2025) for more details.

products banks in the municipality offer. Potential borrowers can also use the platform to share preferences regarding the size and maturity of green debt financing they seek.

Financial product innovations

Financial institutions in Zhejiang's pilot cities have introduced innovative products to support green finance for MSMEs. After the public sector alleviated data collection burdens through digital platforms, the private sector developed financial solutions that link credit terms to environmental performance. Banks in these cities have tailored products such as greenness-rating-linked loans, carbon-efficiency-linked financing, and transition finance products. MYbank, for instance, offers green loans with a 10% interest rate discount (without direct government support) to approximately 1 million MSMEs that achieve a 5-star green rating. In Huzhou, financial institutions have introduced loans tied to the city's carbon efficiency ratings, where borrowers receive preferential interest rates if they improve their carbon efficiency over time (Diao, 2023). While not explicitly labeled as sustainability-linked loans (SLLs), these financial products operate under the same principles. Similarly, Quzhou's banks provide loans linked to corporate and individual carbon efficiency ratings, granting favorable loan terms to highly rated borrowers (Li & Lin, 2022). For example, Jiangshan City Peroxide Co., Ltd., an MSME, obtained a 5 million yuan (ca. \$700'000) "Green Carbon Reduction Loan" from the Agricultural Bank of Quzhou at an interest rate of 4.3%, a reduction of 30 basis points, after improving its carbon account rating from yellow to dark green (Li & Lin, 2022).

Policy support

The governments of Zhejiang's pilot cities provide strong policy support to encourage green finance adoption. In addition to establishing green finance standards and building digital platforms as public infrastructures, pilot cities in Zhejiang Province have allocated fiscal resources to directly incentivize green lending. Policy support measures include interest subsidies for green loans, credit guarantees, and discounts on the premium for credit default insurance. Huzhou and Quzhou, for instance, each allocate 10 billion yuan (ca. \$1.4 billion) annually to fund these green finance incentives, ensuring that financial institutions have the necessary support to scale up sustainable lending (Lei & Mei, 2023).

4. POLICY RECOMMENDATIONS AND POTENTIAL CHALLENGES

Policy recommendations

Policy recommendations for promoting green finance for MSMEs should address the key challenges identified and draw from the pioneering practices in Zhejiang Province's pilot programs. Based on these insights, we propose three main strategies: develop proper standards for green MSME finance, establish digital platforms to facilitate green due diligence, and provide policy support and incentives for both MSMEs and financial institutions.

First, financial regulators, together with local governments, should develop proper standards for green MSME finance, especially on the entity level. Since MSMEs often face significant challenges in accessing activity-based finance, entity-based standards are needed to provide green working capital loans for MSMEs. With entity-level standards in place, banks are better equipped to identify green MSMEs and then provide green or sustainability-linked (working capital) loans based on their sustainability performance, without intimidating challenges of tracking the use-of-proceeds of loans. By implementing entity-level green finance standards, financial institutions can more effectively identify and fund the greening of MSMEs.

Second, public authorities should establish or support the establishment of digital platforms to facilitate green due diligence. Such data platforms can help mitigate the information asymmetry problem between MSMEs and banks, enhancing credibility while lowering the costs of information disclosure for MSMEs and green due diligence costs for banks. With subsequent improvements and greater standardization, green digital platforms can also address cross-border information asymmetry problems. For example, they can help MSMEs meet environmental reporting requirements in international trade, such as from the EU Carbon Border Adjustment Mechanism (CBAM) or global value chain partners. Green digital platforms, as complements to existing credit registries, can be created at the municipal, provincial, or national level, and funded by the government, big data firms, or by a group of financial institutions as a shared resource. Authorities should also support research on carbon accounting methodologies and promote information-sharing across relevant agencies to ensure consistency and reliability.

The design of green digital platforms must balance accuracy and accessibility. For example, information on electricity consumption is readily available at a granular level in most countries, and it is reasonably reliable as utility companies have few incentives to under-report the electricity bills of customers. But the relative weight of electricity consumption as a source of GHG emissions varies not only between sectors but also between firms in the same sector. More data sources can improve accuracy over time. Pilot cities in Zhejiang Province used electricity consumption and other proxies for emission evaluation at first and then established more sophisticated carbon accounts at a later stage. These are practical and valuable experiences of “create first, improve later” and “learning by doing” (J. Ma & Chen, 2024).

Third, governments and financial regulators should provide policy support and incentives to stimulate both the demand and supply sides of green MSME finance. On the demand side, governments can subsidize green certification costs for MSMEs, enabling them to develop sustainable business models and increase their eligibility for green financing. Additionally, policies that require large corporations to manage and disclose their Scope 3 emissions can create pressure for MSMEs within their supply chains to transition toward greener practices. On the supply side, financial regulators can encourage banks to offer preferential loans to green MSMEs by prioritizing them within existing policy incentives, such as re-lending facilities, financing guarantees, and green finance evaluations. Without such policy interventions, MSMEs are unlikely to adopt green finance products at scale, and financial institutions may find it unviable to offer these services.

Potential challenges

Potential challenges exist in replicating the experiences of Zhejiang's pilot cities in other regions of China and EMDEs. Three key obstacles include fiscal constraints, governance capacity, and the availability of existing data infrastructure and credit systems for MSMEs.

First, policy support requires fiscal resources. The development of green finance standards, construction of digital platforms, and subsidies for green loans, credit default insurance and certifications all require government spending, which could be challenging for some governments with tight budgets. Moreover, the success of Zhejiang's pilot cities is arguably policy-driven and largely dependent on government spending. However, currently there is little public information regarding the cost-effectiveness of these measures. To facilitate experience-sharing and improve policy efficiency, governments should analyze and disclose the cost-effectiveness of specific policy incentives. Key questions include how much digital platforms reduce due diligence costs for MSMEs and banks, the extent to which green certifications improve MSME sales and financing access, and the level of interest rate subsidies required, if any, to make green loans profitable for banks and affordable for MSMEs.¹⁵

Second, governance capacity must be sufficient. Effective implementation of green finance policies requires well-coordinated government actions, including a solid understanding of green finance and collaboration among different agencies. A robust and modernized data governance system is necessary for facilitating data-sharing arrangements with utilities and other stakeholders. Establishing such a system might also require revisions to outdated confidentiality laws and regulations that prevent consent-based data sharing. Ensuring data security and privacy protection is crucial to maintaining customer trust in green digital platforms.

Third, the feasibility of green digital platforms depends on existing infrastructure. The availability and quality of existing databases, including for environment- and climate-related data, largely influences the feasibility and costs of establishing digital platforms of green MSME finance. If strong credit registries that cover MSMEs exist, incorporating environmental and climate information of MSMEs into existing systems is far more efficient than building platforms from scratch. If proper databases or credit registries are absent, the public sector has a leading role to play in the construction of the necessary information infrastructure.

Policymakers seeking to promote green MSME finance can draw valuable lessons from Zhejiang's pilot programs, but each model comes with challenges that must be addressed. The different models presented above provide valuable experiences for other regions to develop inclusive green finance for MSMEs. Each model also comes with challenges to be tackled. Green finance policies alone are unlikely to be sufficient; coordination among various government agencies is essential to make green finance work for MSMEs.

¹⁵ Clear targeting of beneficiaries is key for cost effectiveness. A recent empirical study finds no significant difference in financing cost between green listed MSMEs in China's pilot zones and their peers elsewhere. However, the study includes all pilot zones in the country, not just in Zhejiang, and suggests that in some cases polluting MSMEs may have received policy support inadvertently, diluting the impact of green finance policies (S. Zhang & Cheung, 2025).

5. ANNEX

CASE ONE:

MYbank formulated standards to evaluate MSMEs' greenness at entity level

MYbank, a key affiliate of Ant Group—China's largest fintech company—is a digital bank headquartered in Hangzhou, Zhejiang Province. As of its 2023 annual report, it was serving over 53 million MSMEs (MYbank, 2024a). When expanding into green finance, MYbank encountered three main challenges: the absence of standardized green assessment criteria for MSMEs in China, limited access to environmental data and high information acquisition costs, and the lack of commercial sustainability in green MSME finance due to lower returns compared to costs.

To address these challenges, MYbank leveraged its expertise in risk management and algorithmic modeling to develop a digital, entity-based green evaluation standard for MSMEs. Collaborating with local financial regulators and research institutions, MYbank played a leading role in formulating the "Specification for Micro and Small Enterprise Greenness Assessment." This standard incorporates over 120 indicators across six categories: production materials, activities, environment, community feedback, green business, and green operations (Table 4). Recognizing data limitations, the framework differentiates between core and non-core indicators to enhance applicability.

Building on this standard, MYbank established a supervised algorithmic model to assess the greenness of MSMEs within its customer base. As of now, this model covers over 8 million MSMEs, demonstrating a scalable approach to green finance that integrates data-driven assessment with financial inclusion.

MYbank has integrated a green financing service into its internet platform, allowing MSMEs to easily access their green evaluation results online. The bank also encourages MSMEs to upload relevant green evidence to enhance their ratings, further refining the assessment process.

Leveraging these greenness ratings, MYbank has provided green loans with preferential interest rates to approximately 1 million MSMEs (MYbank, 2024a). The bank has observed a strong correlation between a firm's greenness and its loan default rate—greener MSMEs tend to have lower default rates. This finding should not be mistaken for causation – greenness and a low default rate might both be the result of good entrepreneurship, for example. But the correlation has nevertheless reinforced the commercial viability of green MSME finance by improving both risk management and profitability. In essence, MYbank's approach has helped mitigate the challenges of absent standards, limited data availability, and commercial sustainability that initially hindered its expansion into green finance.

Table 4: Methodology of MSME greenness assessment and indicator examples

Category	Assessment content and indicator example
Production Materials	Assessing the greenness of a company's equipment, supplies and other production materials (e.g., Whether these production materials are recyclable and comply with China's advanced energy efficiency or other green labels).
Business Activities	Assessing the greenness of a company's energy consumption and other resource usage behaviors (e.g., the relative performance of a company's electricity, water, gas, and carbon emissions)
Business Environment	Assessing the greenness of a company's environmental management systems (e.g., whether the company properly handles waste gas, wastewater and hazardous waste)
Community Feedback	Assessing the green awards and punishments given by the society (e.g., whether the company has been rewarded as a green company or green factory by the government)
Green Business	Assessing the greenness of a company's main business and products (e.g., whether the company's main produced or sold products have obtained green product certification or energy-saving product certification)
Green Operation	Assessing the greenness of a company's logistics and general administrative behaviors (e.g., whether the company's business transportation, warehouse storage and packaging meets some low carbon, high energy efficiency or recyclable standards)

Source: Zhejiang Society of Finance, 2022

CASE TWO:

Taizhou formulated standards to evaluate the greenness of MSMEs' working capital loans

Taizhou City, known for its dynamic private economy, has been a national pilot for MSME finance since 2015. By the end of 2023, the city had 598,500 MSME loan accounts, covering over 65% of market entities, with MSME loans making up 51.15% of total loans (Chen, 2024).

Despite this strong MSME financing landscape, green loans remain a small fraction of MSME lending in Taizhou. As of June 2021, inclusive green loans (under RMB 10 million) accounted for only 3.31% of all green loans in the city. Recognizing the challenge of labeling green working capital loans for MSMEs, the Taizhou government developed the Micro Green Connect (微绿达) digital platform to facilitate green loan labeling.

The platform was built through a step-by-step approach. First, key local industries with high MSME concentration, such as mold manufacturing and automotive parts production, were selected. Researchers mapped business processes that involve capital flows, including raw material procurement, equipment purchases, production processes, and sales. Next, national and local industry standards were integrated into these processes, forming a "green production database" to guide loan classification.

With this system in place, financial institutions now only need to input borrower names and fund usage details, and the platform determines what share of a loan aligns with China's green finance standards. Bank staff then manually verify compliance using the green production database, finalizing the green credit labeling.

Since its launch in late February 2022, Micro Green Connect has facilitated over 170,000 green loan labels by October 2022, benefiting more than 10,000 borrowers and exceeding 50 billion yuan in total financing. The platform achieved an accuracy rate of nearly 90% and helped increase the share of inclusive green loans from 3.31% in June 2021 to 7.8% in October 2022 (Zhejiang Financial Association, 2023).

Despite its success, the platform still faces high labeling costs, as each industry requires a tailored approach to define green activities within its business processes. Expanding this system to additional industries remains a challenge for Taizhou.

CASE THREE:

Huzhou City and Quzhou City compile carbon emission data for MSMEs

By leveraging digital platforms and sector-specific rating methodologies, Huzhou and Quzhou have made innovative efforts to improve MSME access to green finance, despite data limitations.

Huzhou and Quzhou, two green finance pilot cities in Zhejiang Province, have pioneered solutions to address the lack of carbon emission data for MSMEs. After being selected as pilot cities in 2017, both governments established public information platforms for green finance. Following China's 2020 carbon neutrality pledge, they began developing systems to help firms calculate their carbon emissions.

Huzhou created the carbon efficiency rating system (碳效码), which assesses enterprises across four sectors (industry, agriculture, services, and buildings). Based on our interviews, by the end of 2024, it had assigned carbon efficiency ratings to 19'000 enterprises, including 14'400 in the industrial sector. The rating for industrial enterprises is based on carbon intensity (GHG emissions per gross value added), categorized into five grades, with lower ratings indicating better performance. MSMEs that lack electricity consumption and business income data remain largely uncovered. For buildings, the rating is derived from electricity and gas consumption, comparing a building's emissions to the average of similar structures. By mid-2024, the MSME share of green loans in the city has reached 8%.

Quzhou developed a carbon account system (碳账户体系) covering five sectors: industry, agriculture, energy, construction, and transport. The system also functions as a rating mechanism, categorizing enterprises into four types (deep green, light green, yellow, and red) based on their performance relative to sector-specific averages. Unlike Huzhou, Quzhou employs multiple carbon intensity indicators for different sectors. For instance, the transportation sector considers mileage carbon intensity, vehicle carbon intensity, and freight or passenger turnover carbon intensity. By the end of 2022, Quzhou's system had rated over 2'700 industrial enterprises, more than 1'000 agricultural enterprises, and additional firms across the energy, construction, and transportation sectors (Li & Lin, 2022).

Although Quzhou's system covers fewer enterprises than Huzhou's, it provides more comprehensive ratings. Many industrial and energy sector firms in Quzhou use digital energy

data collectors that record energy consumption every 15 minutes (Li & Lin, 2022). Enterprises must also report monthly carbon emissions, which are reviewed by the Quzhou Environmental Bureau and verified annually by third-party institutions.

The carbon efficiency ratings from both cities have been integrated into local green finance digital platforms. Financial institutions use these ratings to innovate green finance products, while the government incentivizes financing entities by offering policy support for issuing carbon efficiency-related financial products (J. Ma & Chen, 2024).

6. REFERENCES

- APLMA, LMA, & LSTA. (2023). Green Loan Principles. <https://www.lma.eu.com/sustainable-lending/resources>
- Ayyagari, M., Beck, T., & Demirguc-Kunt, A. (2007). Small and Medium Enterprises Across the Globe. *Small Business Economics*, 29(4), 415–434. <https://doi.org/10.1007/s11187-006-9002-5>
- Barbalau, A., & Zeni, F. (2022). The optimal design of green securities. Available at SSRN, 4155721. https://acfr.aut.ac.nz/_data/assets/pdf_file/0003/573114/The-Optimal-GreenDebtDesign.pdf
- BBVA. (2024). Green and Sustainability-Linked Loan Newsletter. <https://www.bbvacib.com/green-and-sustainability-linked-loan-newsletter/>
- Beck, T., & De La Torre, A. (2007). The basic analytics of access to financial services. *Financial Markets, Institutions & Instruments*, 16(2), 79–117.
- Bei, D., & Hu, X. (2024). Enhance SMEs' Access to Sustainable Finance (提升中小企业可持续金融服务获得性). *China Finance (中国金融)*, 20, 50–52.
- Berger, A., & Udell, G. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance*, 22(6), 613–673. [https://doi.org/10.1016/S0378-4266\(98\)00038-7](https://doi.org/10.1016/S0378-4266(98)00038-7)
- CAFI. (2024). Financing SMEs for sustainability in China: Current status, issues and reflections (金融支持中小企业参与可持续发展——现状、问题与思考 社会责任投资研究系列).
- Carbó-Valverde, S., Rodríguez-Fernandez, F., & Udell, G. F. (2009). Bank market power and SME financing constraints. *Review of Finance*, 13(2), 309–340.
- CBI. (2021). Climate Bonds Taxonomy. https://www.climatebonds.net/files/files/Taxonomy/CBI_Taxonomy_Tables-08A%20%281%29.pdf
- CBI. (2024, November 27). Sustainable Debt Market Summary Q3 2024. Climate Bonds Initiative. <https://www.climatebonds.net/resources/reports/sustainable-debt-market-summary-q3-2024>
- Chen, S. (2024). Practice of High-quality Development of Small and Micro Finance in Taizhou. *Banker (银行家)*, 2024(3). https://kns.cnki.net/kcms2/article/abstract?v=d24vdHNzaZhqAd8L1Mzbn2ZvN4NwHWj0Cxmwf1eic3AdrDWIE11pvXZv116dKB6M048ltZCMB99IqwGckj7coUktHvjoiFp19l2rwwfbQ5eFLUuLmV8iBsnjxC_p_s_Gjbeh7NzRq899mrrB8xVLju6pbuxWIO4aKhu8vTQ5xcMlqkJo25Cr1ISjmQNGIDuOO&uniplatform=NZKPT&language=CHS
- Claessens, S. (2006). Access to Financial Services: A Review of the Issues and Public Policy Objectives. *The World Bank Research Observer*, 21(2), 207–240. <https://doi.org/10.1093/wbro/lkl004>
- Cressy, R., & Olofsson, C. (1997). European SME financing: An overview. *Small Business Economics*, 87–96.

- de la Orden, R., & de Calonje, I. (2022). Sustainability-Linked Finance: Mobilizing Capital for Sustainability in Emerging Markets (110; EM Compass).
- Diao, Q. (2023). From the Practice in Huzhou: The Path of Regional Transition Finance.
- Dias, D., Chalwe-Mulenga, M., Alonso, T., & Reyes Chamas, T. (2024). Exclusion Risks in Climate-Related Financial Regulation: An Analytical Framework. <https://www.cgap.org/research/publication/exclusion-risks-in-climate-related-financial-regulation-analytical-framework>
- Dong, Z., Xu, H., Zhang, Z., Lyu, Y., Lu, Y., & Duan, H. (2022). Whether Green Finance Improves Green Innovation of Listed Companies—Evidence from China. *International Journal of Environmental Research and Public Health*, 19(17), 10882. <https://doi.org/10.3390/ijerph191710882>
- EBA. (2023). EBA report on green loans and mortgages. <https://www.eba.europa.eu/publications-and-media/press-releases/eba-proposes-voluntary-eu-green-loan-label-help-spur-markets>
- Ecolabel Index. (2024). All ecolabels. <https://www.ecolabelindex.com/ecolabels/>
- ERM. (2023). Rate the Raters 2023: ESG Ratings at a Crossroads. <https://www.erm.com/insights/rate-the-raters-2023/>
- Fitch. (2021). Brazil Central Banks' Heightened ESG Initiatives Supportive of Credit. Fitch Ratings. <https://www.fitchratings.com/banks/brazil-central-banks-heightened-esg-initiatives-supportive-of-credit-16-07-2021>
- Huzhou Government. (2018). Specification on evaluation of green financing project. <https://gfm.sceex.com.cn/upload/20191219/0a2355abc5baea7762c359947094078f.pdf>
- ICMA. (2021). Green Bond Principles. <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/>
- IFC. (2023). Sustainable MSME Finance Reference Guide. <https://www.environmental-finance.com/content/focus/creating-green-bond-markets/publications/sustainable-msme-finance-reference-guide.html>
- IIGF. (2024a). 2023 Green Credit Progress Report (2023 年绿色信贷进展报告). <https://iigf.cufe.edu.cn/info/1013/8991.htm>
- IIGF. (2024b). The Green Inclusive Finance Platform of IIGF was launched. https://mp.weixin.qq.com/s/U0sc64F_r48i8lprAq7ccA
- ISO. (2022). Green and sustainable finance. <https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100458.pdf>
- Koirala, S. (2019). SMEs: Key drivers of green and inclusive growth. OECD. <https://doi.org/10.1787/8a51fc0c-en>
- Le, T.-H., Le, H.-C., & Taghizadeh-Hesary, F. (2020). Does financial inclusion impact CO2 emissions? Evidence from Asia. *Finance Research Letters*, 34, 101451. <https://doi.org/10.1016/j.frl.2020.101451>
- Lei, Y., & Mei, Y. (2023). Local governments support the construction of green finance reform and innovation pilot zones (地方政府助力绿色金融改革创新试验区建设). *China*

Finance Magazine (中国金融杂志). <https://finance.sina.com.cn/money/bank/yhpl/2023-03-22/doc-imymtmmw2839208.shtml>

Li, D., & Lin, Q. (2022). Quzhou's "Carbon Finance" Frontline Investigation: Effectively Linking Green Finance and Transition Finance through Carbon Accounts (衢州“碳金融”一线调查：以碳账户有效衔接绿色金融与转型金融). 21st Century Business Herald (21 世纪经济报道). <https://news.qq.com/rain/a/20221220A04TNP00>

Liu, L., & Ren, K. (2023). Research on the Impact of Green Credit Policies on the Quality of Corporate Green Innovation. Journal of Nankai University, 06, 131–145.

Ma, J., & Chen, Y. (2024). Green and Transition Finance on the Municipal Level: Case of Huzhou City. <https://rpc.cfainstitute.org/sites/default/files/-/media/documents/article/industry-research/nzg-green-and-transition-finance.pdf>

Ma, L., Zhang, R., & Ma, W. (2024). Effect and Transmission Mechanism of Green Structural Monetary Policy. Journal of Financial Research, 07, 40–58.

Meng, B., Liu, Y., Andrew, R., Zhou, M., Hubacek, K., Xue, J., Peters, G., & Gao, Y. (2018). More than half of China's CO2 emissions are from micro, small and medium-sized enterprises. Applied Energy, 230, 712–725.

MYbank. (2024a). MYbank Sustainability Report 2023. https://mdn.alipayobjects.com/huamei_dygfbf/afts/file/A*sDJ9Qqu_NnwAAAAAAAAAAAAADpacAQ/%E7%BD%91%E5%95%86%E9%93%B6%E8%A1%8C2023%E5%B9%B4%E5%8F%AF%E6%8C%81%E7%BB%AD%E5%8F%91%E5%B1%95%E6%8A%A5%E5%91%8A.pdf

MYbank. (2024b, May 16). MYbank's 2023 ESG Report: Green Ratings Cover 8.39 Million MSMEs (网商银行 2023 年 ESG 报告：绿色评级覆盖 839 万小微). https://mp.weixin.qq.com/s/ISUSumMKjFEITJOAHDv_kA

OECD. (2024). Financing SMEs and Entrepreneurs 2024. https://www.oecd.org/en/publications/financing-smes-and-entrepreneurs-2024_fa521246-en.html

Pan, D. (2019). The Economic and Environmental Effects of Green Financial Policy in China: A DSGE Approach (SSRN Scholarly Paper 3486211). <https://doi.org/10.2139/ssrn.3486211>

Pan, D., & Wang, Y. (2021). What Effects Can(not) "Green Financial Policy" Bring? Evidences from China Green Finance Database (2017-2020) (SSRN Scholarly Paper 4259596). <https://doi.org/10.2139/ssrn.4259596>

PBOC. (2023). Statistical report on loan allocation of financial institutions in the fourth quarter of 2022 (2022 年四季度金融机构贷款投向统计报告). <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4784452/index.html>

PBOC. (2025). Statistical report on loan allocation of financial institutions in the fourth quarter of 2024 (2024 年四季度金融机构贷款投向统计报告). <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/5588566/index.html>

People's Daily. (2024, November 11). China's Green Loans Surge in Q1-Q3 2024. <http://finance.people.com.cn/n1/2024/1111/c1004-40358080.html>

Quzhou Government. (2020). Evaluation method of Green Enterprises in Quzhou City (Trial).

<https://dbba.sacinfo.org.cn/stdDetail/17e2fe4bee97e01d8ed144cb017d40621fc7b57ce5704a4dfc0540531ff79b0c>

S&P Global. (2021). Environmental, Social, And Governance: How Sustainability-Linked Debt Has Become A New Asset Class.

<https://www.spglobal.com/ratings/en/research/articles/210428-how-sustainability-linked-debt-has-become-a-new-asset-class-11930349>

Sustainable Fitch. (2024). Sustainable Finance Outlook 2024.

https://your.fitch.group/rs/732-CKH-767/images/Sustainable_Finance_Outlook_2024_Fitch_10254518.pdf

WB. (2019). SME Finance. <https://www.worldbank.org/en/topic/smefinance>

WB, & IFS. (2022). Unleashing Sustainable Finance in Southeast Asia.

<https://www.worldbank.org/en/country/malaysia/publication/SFSEAreport>

Wildnerova, L., Menon, C., Dehghan, R., Kinne, J., & Lenz, D. (2024). Which SMEs are greening?: Cross-country evidence from one million websites. OECD.

<https://doi.org/10.1787/ddd00999-en>

Wilkes, T. R., Binnie, I., Wilkes, T. R., & Binnie, I. (2023, November 10). Loans linked to ESG face overhaul by under-pressure banks. Reuters.

<https://www.reuters.com/sustainability/sustainable-finance-reporting/loans-linked-esg-face-overhaul-by-under-pressure-banks-2023-11-10/>

World Bank. (2024). Labeled bonds market update.

<https://thedocs.worldbank.org/en/doc/70cdb690f0138e2b485fcedd7bc8fd71-0340012024/original/Labeled-bond-market-quarterly-newsletter-Q3-2024.pdf>

Xu, S. (2024). Survey and Research: Promoting the Deep Integration of Green Finance and Inclusive Finance (调查研究: 促进绿色金融与普惠金融深度融合). China Finance (中国金融), 2024(4). <https://mp.weixin.qq.com/s/tYigHKB67JmDxcAcaA1CaA>

Zhang, F., Shen, Y., & Leng, A. (2023). Progress and Prospects of Green Finance Supporting Local Green and Low-Carbon High-Quality Development (绿色金融支持地方绿色低碳高质量发展进展与展望). Modern Finance Journal (现代金融导刊), 9, 14–18.

Zhang, S., & Cheung, A. (Waikong). (2025). Are green finance and inclusive finance complements or substitutes for MSMEs? – Evidence from China's green finance reform and innovation pilot zone. Energy Economics, 141, 108125.

<https://doi.org/10.1016/j.eneco.2024.108125>

Zhang, T. (2023). Can green finance policies affect corporate financing? Evidence from China's green finance innovation and reform pilot zones. Journal of Cleaner Production, 419, 138289. <https://doi.org/10.1016/j.jclepro.2023.138289>

Zhao, F., Zhang, Y., Alharthi, M., & Zafar, M. W. (2022). Environmental sustainability in developing countries: Understanding the criticality of financial inclusion and globalization. Sustainable Development, 30(6), 1823–1837. <https://doi.org/10.1002/sd.2350>

Zhejiang Financial Association. (2023, September 25). Case Five of Inclusive Finance Reform and Innovation: Taizhou Inclusive Green Finance Service Platform "Micro Green Connect. <https://mp.weixin.qq.com/s/mZ-JbQoHuQ3fkpt1YpEmUg>

Zhejiang Society of Finance. (2022). Specification for Micro and small enterprise greenness assessment. <https://www.ttbz.org.cn/StandardManage/Detail/70349/>