ZEW policy brief

// NO.04 | MARCH 2025

// Tabea Bucher-Koenen (ZEW, University of Mannheim), Anna-Lena Herforth (ZEW, University of Mannheim), Karolin Kirschenmann (ZEW, University of Mainz), Monireh Ravanbakhshhabibabadi (ZEW, University of Mannheim)

Financing the green transition: The role of private capital

The greening of the European economy will require large amounts of capital to flow into green projects. As the public sector alone will not be able to achieve this, European capital markets and the European banking system will play an important role in financing the green transition. In this policy brief, we provide evidence on the drivers and barriers for private and institutional investors to engage in financing the green transition from two recent projects funded by the German Federal Ministry of Education and Research (BMBF) and the ZEW Sponsors' Association, respectively. For private investors, increasing (sustainable) financial literacy is crucial to increase the capital market participation of EU households in general and sustainable investments in particular. Furthermore, reliable and accessible information on sustainable financial products is important to facilitate retail investors' decisions to invest in green projects. For institutional investors, engagement and the integration of sustainability as an integral part of investment decisions seem to be the most promising ways to effectively create impact. For securitization to become a more attractive tool for financing the transition, it should be placed on a level regulatory playing field with other financial products with similar risks. And while the new disclosure regulations impose high costs, their impact on sustainability remains unclear. Overall, policymakers should focus on effective climate policies in the real economy and enabling regulatory frameworks for the financial sector.

KEY MESSAGES

- For private investors, increasing (sustainable) financial literacy is crucial for raising capital market participation in general and sustainable investments in particular.
- Reliable and accessible information on sustainable financial products is important to facilitate retail investors' decisions to invest in green projects.
- For institutional investors, engagement and the integration of sustainability as an integral part of investment decisions seem the most promising ways to achieve impact.
- To foster the attractiveness of securitization as a tool for financing the green transition, a level regulatory playing field with other financial products with similar risks is needed.
- The new EU regulation on ESG rating activities may be helpful for institutional investors, but less so for retail investors as information requirements remain high.
- Policymakers should carefully assess the costs and benefits of the new disclosure regulations in the coming years and make necessary adjustments.
- Policymakers should focus on effective climate policy in the real economy and on enabling regulatory frameworks for the financial sector that are not constantly adapted in order to provide reliability to financial market participants.

MOBILIZING PRIVATE CAPITAL FOR THE GREEN TRANSITION

Large amounts of private capital need to flow into green projects

For the greening of the European economy, large sums of capital will have to flow into green projects in the coming years. As the public sector alone will not be able to achieve this, European capital markets and the European banking system will play an important role in financing the green transition. The financing of innovation through the capital market is essential, for the transformation of CO_2-intensive industries in particular, as the necessary technologies are not yet available, or not available in sufficient quantities. At the same time, the European economy will remain highly dependent on bank financing in the medium term – also because bank loans are the most important source of external financing for small and medium-sized enterprises (SMEs). One important instrument to link the European banking system to the capital markets is securitization.

A single market for capital in the EU can facilitate the green transition

The European capital market currently suffers from several weaknesses. European capital markets are still fragmented and cross-border financing is comparatively low. In addition, securitization markets in Europe are significantly smaller than in the United States (US). Institutional investors, which have a crucial role to play in mobilizing large amounts of private capital for the transformation, are often constrained by regulation that limits their investment scope. Private investors' participation in capital markets is low in most European countries compared to the US. There are many reasons for this, including the lower relevance of capital market-based products for long-term retirement savings. At the same time, a lack of financial literacy in general and with regard to sustainable investments limits private engagement in capital markets.

A single market for capital in the European Union (EU) can help to facilitate access to finance. European policymakers have been working on the Capital Markets Union project since 2014 to promote capital market financing in the EU with moderate success and limited progress. In summer 2024, the EU rapporteur on the future of the single market, Enrico Letta, therefore proposed developing the, as yet, incomplete Capital Markets Union into a Savings and Investment Union in order to make the savings of EU citizens increasingly available for investments within the EU via the capital markets.

Pricing the externality is the most efficient and effective tool for policymakers to support the green transition

Various policy instruments can be used to encourage the allocation of funds to sustainable projects. From the perspective of economists, the most efficient and effective way is a price or tax that internalizes externalities where they occur and makes unsustainable behavior more expensive. As a result, the sustainability of a project is directly reflected in its return and risk – metrics that financial investors are accustomed to considering when making investment decisions. Internationally, however, there are no comprehensive CO_2 prices (yet), let alone prices for other sustainability dimensions. Even within Europe, where CO_2 pricing and other regulatory requirements have been implemented to ensure that it is in the best interest of financial investors to support sustainable projects, the current carbon price does not reflect the societal cost of carbon emissions.

Instead of solving the problem of CO_2 pricing, policymakers in the EU primarily focus on regulation to push the financial sector to channel funds into sustainable investments: First, with the EU Taxonomy Regulation policymakers have created a standardized classification system of sustainable economic activities as the backbone for all other sustainability-related regulations of the financial sector. Second, the Corporate Sustainability Reporting Directive (CSRD), which replaces and extends the Non-Financial Reporting Directive (NFRD), requires banks and other financial institutions (as well as companies) that fall under its realm to disclose sustainability-related information and key performance indicators to increase transparency and accountability with regard to their sustainability. Third, with the Sustainable Finance Disclosure Regulation (SFDR) policymakers impose mandatory ESG disclosure rules on asset managers and other financial market participants in order to make it easier for investors to select sustainable investments.

However, transparency regulation is only relevant if investors have green preferences and are willing and able to select investments according to those preferences. So far, the evidence does not suggest that those regulatory efforts have had a significant impact on channeling funds into projects that create real green impact.

In this policy brief, we provide and synthesize evidence from different sources on the drivers and barriers for private and institutional investors to engage in financing the green transition. We draw on existing literature and our own work. Specifically, we summarize insights from two recent projects. First, in quantitative empirical research funded by the German Federal Ministry of Education and Research (BMBF), we analyze the entire process of financial intermediation: from investor demand and new regulations to transmission mechanisms and the contribution of financed investments to greenhouse gas reductions. Second, our project on the financing of the green transition of companies, funded by ZEW's Sponsors Association, complements the quantitative results with qualitative work. To this end, we conducted a World Café with thirteen practitioners from the financial sector. The World Café method is an established format for obtaining in-depth insights on pre-formulated questions in a (semi-) structured way that allows all participants to discuss and contribute to all questions.

The policy brief is structured into evidence related to the role of private and the role of institutional investors in financing the green transition.

WHAT ROLE CAN PRIVATE INVESTORS PLAY IN FINANCING THE GREEN TRANSITION?

Current evidence shows limited participation in capital markets among European private households

Private investors can play a key role in the green transition by investing directly in sustainable financial products. However, the limited participation of EU households in the capital market may reduce the effectiveness of this channel. According to the latest ECB Household Consumption and Finance Survey (2020 – 2022), only 11% of the EU population hold listed shares, and 13% invest in investment funds. While voluntary pensions and life insurance are more common (28% participation), bonds have the lowest participation rate at just 3% (European Fund and Asset Management Association (EFAMA), 2024). At the same time, only a small share of European households' financial wealth is allocated to capital market instruments, with only 6% held in listed shares, 10% in investment funds and 2% in debt securities at the end of 2022. Other shares remain low as well: 17% in life insurance and 24% in pension funds (EFAMA, 2024).

Regarding sustainable investments, European Central Bank (2020) documents that in the second quarter of 2020, households held 37% of euro area ESG fund assets (based on a sample of 1,076 equity funds, bond funds, and mixed funds), compared to 27% held by insurance companies and pension funds, 21% by investment funds, and 15% by other financial market participants. In addition, in a 2023 survey of retail investors from the UK, Germany, France, and Switzerland (Morgan Stanley, 2024), 15% of participants reported allocating more than half of their portfolio to sustainable assets. 30% reported allocating between 21% and 50% of their portfolio to sustainable assets, while 22% reported allocating less than 20%. Only 6% said they had no exposure to sustainable investments. Meanwhile, 28% of respondents were unsure about the amount of sustainable assets in their portfolio.

Limited degree of investment in sustainable financial products

In Germany, at the end of 2022, households had a higher participation rate than the EU average in almost all capital market instruments, with 15% investing in listed shares, 21% in investment funds, 42% in voluntary pension and life insurance and 3% in bonds (EFAMA, 2024). However, sustainable financial products remain less popular among German households.

Our own survey among households in Germany (Bucher-Koenen et al., 2025a; data were collected in the German Internet Panel in May 2024 and refer to over 3,300 respondents) shows that only 14% invest in sustainable funds. Participation is even lower for sustainable bank accounts (5%) and sustainable pension plans or life insurance (3%). Investment in non-financial green assets is more common. Among homeowners, nearly 78% have invested in at least one sustainable product to improve the energy efficiency of their buildings in the last 10 years, most commonly in windows, doors and gates (40%), followed by solar systems (36%). Heat pumps are the least common, with only 10% of homeowners having invested in them. Green consumer durables are also relatively common among households, with 11% owning electric cars and some 47% having green electricity contracts. Despite the low level of sustainable financial investments among German households, most respondents (82%) recognize the importance of climate change and agree to some extent that climate change is a serious problem that needs to be solved. In addition, when asked whether they prioritize a clean planet over increasing their own wealth, only about 17% strongly disagree, while 47% strongly agree and 36% are neutral.

THE ROLE OF FINANCIAL LITERACY FOR SUSTAINABLE INVESTMENT

(Sustainable) financial literacy plays an important role for stock market participation and sustainable investments of households

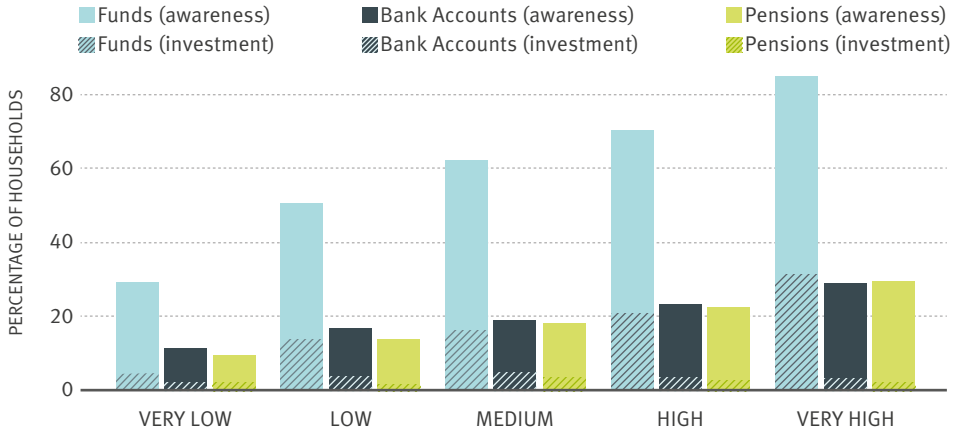
The literature on financial literacy documents a causal relationship between financial literacy and stock market investments: More financially literate households are more likely to invest in the stock markets (e.g. van Rooij et al., 2011, Bucher-Koenen et al., 2024), earn higher returns (e.g., Bianchi, 2018), and incurred fewer losses during the 2008/09 financial crisis (e.g., Bucher-Koenen and Ziegelmeyer, 2014). Moreover, a common assumption in theoretical asset pricing models (e.g., Pedersen et al., 2021; Pastor et al., 2021) is that investors manifest their pro-environmental preferences in their investment decisions. However, a large body of literature documents that a lack of (sustainable) financial literacy may prevent households from aligning their investment choices with their beliefs. Anderson and Robinson (2022) show that pro-environmental households are less engaged in financial matters and lack the knowledge to make informed investment decisions. As a result, these households are more likely to invest in funds with green-sounding names than in funds with an official ESG label. They also tend to avoid investing in the energy sector, which is widely perceived to be polluting, but do not actively avoid carbon-intensive companies – likely due to a lack of financial literacy to identify them. Filippini et al. (2024a) highlight the importance of sustainable financial literacy beyond general financial literacy. Their results document a positive and significant relationship between sustainable financial literacy and investment in sustainable financial products, suggesting that low levels of financial literacy may partly explain limited sustainable investment by households. Using a survey experiment, Filippini et al. (2024b) show that improving sustainable financial literacy increases private investment in the most sustainable funds (within their research set up) while reducing investment in the least sustainable funds.

Our own survey results are consistent with these findings in the literature (Bucher-Koenen et al. 2025a). We assess both financial literacy and sustainable financial literacy among German households by asking four classic questions for each. On average, respondents correctly answer 2.9 general financial literacy questions, while their average score for sustainable financial literacy is lower at 1.4. Overall, nearly 40% of respondents answer all the general financial literacy questions correctly, while only about 5% answer all four sustainable financial literacy questions correctly. More critically, many respondents have never heard of sustainable financial products: only 15% say they are aware of sustainable pension or life insurance plans, 17% have heard of

sustainable bank accounts, and 52% are aware of sustainable funds. Among those who are aware of sustainable financial products, only 26% say they invest in sustainable funds, 17% in sustainable bank accounts, and 11% in sustainable pension plans or life insurance.

In Figure 1, we show the relationship between households with different levels of sustainable financial literacy and their awareness of and investment in sustainable financial products. Sustainable financial literacy is positively and significantly associated with awareness of and investment in sustainable funds. It is also positively and significantly related to awareness of sustainable bank accounts and retirement plans, but not significantly related to investments in such assets – this is not surprising given the very low overall investment in such financial products.

FIGURE 1: AWARENESS OF AND INVESTMENT IN SUSTAINABLE FINANCIAL PRODUCTS BY LEVEL OF SUSTAINABLE FINANCIAL LITERACY



Note: The graph shows the relationship between sustainable financial literacy and the percentage of households aware of and invested in sustainable financial products. Sustainable financial literacy is assessed through four questions, with literacy levels ranging from very low (no correct answer) to very high (four correct answers). The unshaded bars depict the percentage of households aware of sustainable financial products: blue for sustainable funds, black for green bank accounts, and green for sustainable pensions or life insurances. Shaded bars represent the percentage of households that invest in these products. The graph is based on a sample of 3309 observations. Data were collected in the German Internet Panel (GIP) in May 2024.

THE ROLE OF UNCERTAINTY ABOUT CARBON PRICES AND ESG RATINGS FOR HOUSEHOLDS' INVESTMENT DECISIONS

Expectations about sustainable investments play a role for investment decisions of private investors, but reliable information is critical

Another factor influencing households' sustainable investments is their expectations about the financial performance of sustainable assets. Giglio et al. (2025) show that only a very small fraction of private investors hold sustainable assets primarily for financial reasons and expect such assets to outperform conventional assets. On average, private investors expect sustainable assets to underperform conventional assets (Giglio et al., 2025; Riedl and Smeets, 2017). In turn, other factors, including ethical incentives and climate hedging, drive investors to hold sustainable assets. However, while ethical incentives are the main driver of sustainable investing, expectations also play a role, as the share of investors' portfolios allocated to ESG funds increases with higher expected returns (Giglio et al., 2025; Riedl and Smeets, 2017).

Our own research, based on randomized experiments among German retail investors, shows how uncertainty about future CO_2 prices and divergent ESG ratings affect investment behavior. We find

the following patterns: Private investors who are informed about future CO_2 price expectations of financial market experts in an information treatment adjust their CO_2 price expectations but do not change their investment strategies (Bucher-Koenen et al., 2025b). This suggests a missing link between participants' CO_2 price expectations and their investments. In a second experiment, we investigate the role of ESG ratings and rating divergence on the behavior of retail investors (Janssen and Zhang, 2025). Overall, high ESG ratings increase sustainable investments, but ESG rating divergence reduces such investments. This suggests that reliable information about the sustainability of investment options may play a critical role in channeling retail investors' capital into sustainable projects.

Summing up, there is potential for greater participation of private investors in EU capital markets. However, increasing financial literacy and sustainable financial literacy are critical factors for raising capital market participation in general and sustainable investments specifically. Furthermore, reliable and accessible information about sustainable financial products is important to facilitate retail investors' decisions to invest in green projects.

HOW TO INVOLVE INSTITUTIONAL INVESTORS IN FINANCING THE GREEN TRANSITION

Institutional investors are crucial for financing the green transition

When private investors allocate their money to institutional investors such as insurance companies, pension funds or asset managers, the ultimate decision to invest sustainably rests with the institutional investors. This raises the question of what financial instruments they can use to effectively finance green projects and how they can achieve impact.

Green investor preferences do not lead to large funding advantages

The basic assumption when using the financial sector and its actors to achieve the green transition is that they can effectively influence real economic decisions through their financing behavior. Investors with green preferences who are prepared to compromise on financial returns for sustainable impact can theoretically play a driving role in the green transformation (e.g. Zerbib, 2022; Pastor et al., 2021; Pedersen et al., 2021). Then, companies would receive more favorable financing conditions for green projects and thus have an incentive to carry out such projects. On the bond market, however, the measured yield differences between green bonds and comparable conventional bonds of the same companies are often very small (e.g. Dorfleitner et al., 2022; Zerbib, 2019). Our own research reflects this discrepancy between theory and practice: in a theoretical model, we find that companies can lower their funding costs by issuing green and sustainability-linked bonds (Zilke, 2025), while in empirical studies, we do not find systematic funding advantages for banks that issue green bonds (Brückbauer et al., 2025). We also do not find economically significant differences in the reactions of green bond premiums compared to conventional bond premiums to large supply shocks of green bonds (Bun and Cézanne, 2025).

However, green bonds and thus their investors can contribute to the green transition via a "use-of-proceeds channel". We identify this impact channel with the help of bond, bank, credit, and company data (Brückbauer et al., 2025). We find that banks forward the proceeds from green bonds particularly to projects with a green label and through loans with purpose-contingency. When these loans open up additional financing options, they achieve emission reductions at the borrowing companies.

Integration of sustainability as an integral part of investment decisions

Directly influencing real economic decisions in companies through proxy voting and engagement may therefore be more promising than hoping for yield differentials in the capital market. Indeed, engagement is considered by economists, experts and regulators to be the most powerful financial mechanism (Stroebel and Wurgler, 2021; Krueger et al., 2020).

Research shows that institutional investors' investments are negatively correlated with companies' CO_2 emissions (Kahn et al., 2023; Azar et al., 2021), reduce companies' downside risks (Hoepner et al., 2024), and improve their environmental and social performance (Dyck et al., 2019). However, these findings appear to be at least partly driven by the fact that companies sell CO_2-intensive parts (Berg et al., 2023).

The results of the World Café with 13 industry experts also show that a bottom-up approach, in which sustainability is considered as a risk component and thus an integral part of investment decisions, is seen as the most important and promising way, given the underlying objective of institutional investors to generate returns for their clients. This finding goes hand in hand with the underlying motivations of institutional investors to integrate sustainability into their strategy and operations. The results of the World Café show that risk-return considerations, the development of new business areas, competitive issues and long-term strategic planning are important motives. The related literature also identifies economic considerations as an important motive for institutional investors to integrate sustainability in their decisions (Stroebel and Wurgler, 2021; Krueger et al., 2020; Nofsinger et al., 2019), along with customer demand (Ceccarelli et al., 2024; Döttling and Kim, 2024; Gibson Brandon et al., 2021a; Hartzmark and Sussman, 2019).

INSTITUTIONAL INVESTORS IN A BANK-BASED FINANCIAL SYSTEM

Securitization allows to integrate banking sector more closely with capital markets

Given that the European economy will remain highly dependent on bank financing in the medium term, another way to involve institutional investors would be to integrate the European banking system more closely with the capital markets, for example via securitizations. In the basic originate-to-distribute securitization, banks sell a pool of loans to a separate entity that finances the assets by selling tradable, interest-bearing securities with different risk-return profiles to institutional investors. By purchasing these securities, institutional investors thus gain direct access to the underlying loan pool. In the context of the green transition, the advantage over holding a green bond is that institutional investors know exactly which projects they are financing, which facilitates climate risk management and reporting.

Harmonized rules within the EU and level regulatory playing field for securitizations may foster their attractiveness

However, as we show in a related policy brief (Brückbauer and Kirschenmann, 2024), the current market potential for European securitization is significantly lower than estimated by policymakers. In addition, while large companies finance themselves directly on the capital market, SMEs need loans when they finance green projects externally. Therefore, the originate-to-distribute securitization model envisaged under the Capital Markets Union does not yet seem to fit the European context. For instance, the underlying assets of securitizations should in principle be very similar in their characteristics so that investors can easily understand what they are buying. So, if cross-border securitizations of SME loans are the goal, at the very least, country-specific laws regarding special purpose vehicles and insolvency laws should be harmonized within the EU. At the same time, it must be ensured that non-reporting SMEs do not incur additional costs for the provision of information. Our research shows that SMEs already have to bear a considerable burden due to the new sustainability reporting: in a survey of companies that are not yet required to report on sustainability, we find that the majority of these companies are affected by the so-called trickle-down effect: they already report on sustainability, especially to customers in the supply chain (Kirschenmann et al., 2025a).

Overall, for securitizations to become a more attractive investment option for institutional investors, they should be placed on a level regulatory playing field with other financial products with similar risk, for example in terms of documentation obligations or capital requirements.

CAN ESG RATINGS SUPPORT THE GREEN TRANSITION?

It is still unclear whether or not ESG ratings are helpful to investors

Ilhan et al. (2023) find in a survey that institutional investors value and demand climate risk disclosure. ESG ratings provide sustainability information to investors. The market for ESG ratings has grown enormously in recent years, with around 60 ESG rating providers in the EU alone in 2022 (European Securities and Markets Authority, 2022), but there are signs of consolidation and the market overall appears to be very dynamic.

The results of the World Café show a mixed picture of the role of ratings in the sustainable investment decisions of institutional investors. For some participants, differences in ESG ratings between rating agencies undermine their usefulness for investment decisions. In contrast, other participants highlighted ESG ratings as useful metrics that reflect different views on sustainability. The relevant literature suggests that disagreement among ESG ratings is mainly driven by measurement divergence among rating agencies (Berg et al., 2022). ESG rating divergence is positively related to stock returns (Gibson Brandon et al., 2021b), suggesting a risk premium for companies with higher ESG rating divergence, and to return volatility (Christensen et al., 2022). Our own results on retail investors already mentioned above point to a similar direction: overall better ratings increase invested amounts, but diverging ratings reduce them.

To this end, the new EU regulation on ESG rating activities may be helpful to institutional investors as it aims to strengthen the reliability and comparability of ESG ratings. ESG rating providers in the EU will be required to disclose their methodologies, models and key assumptions, as well as separate E, S, and G ratings or their respective weightings. However, it may be less helpful for retail investors as no standardization of ESG ratings is foreseen and information requirements remain high.

REGULATING THE FINANCIAL SECTOR TO FINANCE THE GREEN TRANSITION

There is no straightforward causal relationship between the funding and investment sides of companies' balance sheets

When pushing the financial sector to more sustainability with the help of new regulations, policymakers have to be aware that it is not straightforward to establish a causal link between the new regulations, changes in the behavior of financial market players in financing green projects and companies, and – most importantly – a positive impact on sustainability. On the one hand, financial intermediation is a multi-stage process in which the desired effects can be mitigated at many points. On the other hand, there is generally no causal relationship between the financing and investment sides of a company's balance sheet, i.e. ultimately all sources of finance contribute to the financing of all assets (Krahnen et al., 2023).

Regulations impose high costs with so-far unclear sustainability effects

The qualitative results of the World Café provide evidence of several effects on financial market participants themselves. First, from the perspective of the financial market firms, understanding, implementing and ensuring compliance with the new regulations ties up a lot of resources within those firms. As a consequence, there is no time for productive engagement with the issue, such as developing investment strategies with a real sustainability impact or (risk) management strategies to integrate sustainability aspects into the traditional triangle of objectives – return, liquidity and security. Second, the new rules actually hinder transformation by focusing on numbers that indicate the current greenness of projects and investments.

As a result, projects that would benefit the transformation are not funded, and investment portfolios are "greened" by divesting from non-sustainable companies. Third, new regulations for financial advisors have complicated the advisory process and have set a too restrictive framework. As a consequence, some advisors are discouraged from selling sustainable financial products.

Others advise their clients not to document their preference for sustainable products so as not to limit their investment choices, but then sell sustainable products as part of the investment strategy.

Our findings on banks and firms complement those of the World Café. Our analysis of credit data does not provide a consistent picture of whether the EU Taxonomy has so far led to the intended redirection of capital flows (Kirschenmann et al., 2025b). In a survey of German firms, we find that the costs of reporting are perceived to be high, especially for non-reporting SMEs in the supply chain (Kirschenmann et al., 2025a). And for reporting firms, our results show that the compliance costs associated with the new regulations are perceived as a risk by banks and capital markets.

In addition to the new reporting requirements, large institutional investors such as insurance companies and pension funds are also heavily regulated in their investments. If these investors are to be increasingly attracted to sustainable projects, the objectives of return, liquidity, security and sustainability must all be considered in the regulatory process and eventually be balanced and weighted by regulation (Kirschenmann and Wambach, 2025).

In addition, the related literature shows that investors from less regulated segments of the financial market buy loans from "brown" companies precisely when climate change receives a lot of media attention and other financial institutions sell such loans (Hackenberg et al., 2024). Different regulation of financial market players can therefore reduce the effectiveness of individual regulations through regulatory arbitrage, increasing financial instability in the worst case.

Overall, the high costs of regulation seem justified only if they make a relevant contribution to mobilizing green investment and ultimately have a positive impact on sustainability. This is not (yet) the case. It remains to be seen whether the Omnibus Simplification Package, a recent proposal by the European Commission to streamline sustainability reporting without sacrificing the EU's sustainability goals, can strike this balance. In any case, policymakers should carefully assess the costs and benefits over the coming years and make any necessary adjustments. At the same time, it is important to start now with a phase of clear and consistent rules to ensure reliability before implementing a science-based evaluation that may lead to further changes.

CREATING AN ENABLING ENVIRONMENT AS THE WAY AHEAD

Policymakers should focus on effective climate policy in the real economy and enabling regulatory frameworks for the financial sector

Financial markets play a key role in the green transition. They finance investments in sustainable products and projects, in research and development of new technologies, and in sustainable infrastructure. However, regulating the financial sector towards sustainable investments is no substitute for an effective climate policy in the real economy. For example, carbon pricing addresses the climate impacts of production in a targeted manner, while the indirect route of financial sector regulation risks weakening the desired impacts and depends on external financing needs and the type of external financing. At the same time, the EU should focus less on detailed regulations and more on creating an enabling environment that unlocks potential, for example by financially educating private investors, developing the capital market or creating a framework for transition finance, to best integrate the financial sector into the green transition. While regulation is important, it is even more important to focus on streamlined and clear rules that do not need to be constantly adapted in order to provide reliability to financial market participants.

REFERENCES

Anderson, A., & Robinson, D. T. (2022). Financial literacy in the age of green investment. Review of Finance, 26(6), 1551-1584.

Azar, J., Duro, M., Kadach, I., & Ormazabal, G. (2021). The big three and corporate carbon emissions around the world. Journal of Financial Economics, 142(2), 674-696.

Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. Review of Finance, 26(6), 1315-1344.

Berg, T., Ma, L., & Streitz, D. (2023). Out of sight, out of mind: Divestments and the Global Reallocation of Pollutive Assets. https://ssrn.com/abstract=4368113.

Bianchi, M. (2018). Financial literacy and portfolio dynamics. The Journal of Finance, 73(2), 831-859.

Ceccarelli, M., Ramelli, S., & Wagner, A. F. (2024). Low carbon mutual funds. Review of Finance, 28(1), 45-74.

Bucher-Koenen, T., Alessie, R., Lusardi, A., & van Rooij, M. (2024). Fearless woman: Financial literacy, confidence, and stock market participation. Management Science (forthcoming).

Bucher-Koenen, T., Janssen, B., Ravanbakhsh, M. & Zhang, Y. (2025a). Household Beliefs, Financial Literacy, and Sustainable Investments, Mimeo.

Bucher-Koenen, T., Doerrenberg, P., Feldhaus, C. & Zhang, Y. (2025b). Carbon Pricing Uncertainty and Sustainable Investments, Mimeo.

Bucher-Koenen, T., & Ziegelmeyer, M. (2014). Once burned, twice shy? Financial literacy and wealth losses during the financial crisis. Review of Finance, 18(6), 2215-2246.

Brückbauer. F. and Kirschenmann, K. (2024). Towards a more realistic view on the market potential of EU securitizations. ZEW Policy Brief No. 24-13.

Brückbauer, F., Kirschenmann, K., Ongena, S., & Theunisz, C. (2025). Does banks' green funding affect their borrowers' environmental performance? Mimeo.

Bun, M., & Cézanne, T. (2025). The green bond market elasticity. Mimeo.

Christensen, D. M., Serafeim, G., & Sikochi, A. (2022). Why is corporate virtue in the eye of the beholder? The case of ESG ratings. The Accounting Review, 97(1), 147-175.

Dorfleitner, G., Utz, S., & Zhang, R. (2022). The pricing of green bonds: external reviews and the shades of green. Review of Managerial Science, 16(3), 797-834.

Döttling, R., & Kim, S. (2024). Sustainability preferences under stress: Evidence from COVID-19. Journal of Financial and Quantitative Analysis, 59(2), 435-473.

Dyck, A., Lins, K. V., Roth, L., & Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence. Journal of Financial Economics, 131(3), 693-714.

European Central Bank (2020). Financial Stability Review. November 2020.

European Fund and Asset Management Association (2024). Household Participation in Capital Markets: Trends, Challenges and Policy Recommendations. January 2024.

European Securities and Markets Authority (2022). Outcome of ESMA Call for Evidence on Market Characteristics of ESG. June 2022.

Filippini, M., Leippold, M., & Wekhof, T. (2024a). Sustainable finance literacy and the determinants of sustainable investing. Journal of Banking & Finance, 163, 107167.

Filippini, M., Leippold, M., & Wekhof, T. (2024b). The impact of sustainable finance literacy on investment decisions. Swiss Finance Institute Research Paper, (24-57).

Gibson Brandon, R., Krueger, P., & Mitali, S. F. (2021a). The sustainability footprint of institutional investors: ESG driven price pressure and performance (Finance Working Paper No. 571/2018). European Corporate Governance Institute.

Gibson Brandon, R., Krueger, P., & Schmidt, P. S. (2021b). ESG rating disagreement and stock returns. Financial Analysts Journal, 77(4), 104-127.
Giglio, S., Maggiori, M., Stroebel, J., Tan, Z., Utkus, S., & Xu, X. (2025). Four facts about ESG beliefs and investor portfolios. Journal of Financial Economics, 164, 103984.
Hackenberg, K., Klaus, V., Klingler, S., & Sondershaus, T. (2024). Taking Advantage of Media Attention to Climate Change: CLOs' Trading of Brown Loans. https://ssrn.com/abstract=4344497.
Hartzmark, S. M., & Sussman, A. B. (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. The Journal of Finance, 74(6), 2789-2837.
Hoepner, A. G., Oikonomou, I., Sautner, Z., Starks, L. T., & Zhou, X. Y. (2024). ESG shareholder engagement and downside risk. Review of Finance, 28(2), 483-510.
Ilhan, E., Krueger, P., Sautner, Z., & Starks, L. T. (2023). Climate risk disclosure and institutional investors. The Review of Financial Studies, 36(7), 2617-2650.
Janssen, B. & Zhang, Y. (2025) ESG ratings in retail investment: A sundial in the shade. Mimeo.
Kahn, M. E., Matsusaka, J., & Shu, C. (2023). Divestment and engagement: The effect of green investors on corporate carbon emissions (Working Paper No. 31791). National Bureau of Economic Research.
Kirschenmann, K., Koch, F., & von Schickfus, M.-T. (2025a). The costs and benefits of indirect sustainability disclosure. Mimeo.
Kirschenmann, K., Koch, F., & von Schickfus, M.-T. (2025b). Non-financial disclosure regulation and the bank lending channel. Mimeo.
Kirschenmann, K. and Wambach, A. (forthcoming). Politische Steuerungssysteme für mehr Nachhaltigkeit, in: Sustainable Finance: Die Zukunft nachhaltiger Investments – ein interdisziplinärer Ausblick, Oekom Verlag.
Krahnen, J., Rocholl, J., & Thum, M. (2023). A Primer on Green Finance: From Wishful Thinking to Marginal Impact. Review of Economics, 74(1), S. 1-19.
Krueger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. The Review of Financial Studies, 33(3), 1067-1111.
Morgan Stanley. 2024. "Sustainable Signals: Understanding Individual Investors' Interests and Priorities." Morgan Stanley Institute for Sustainable Investing.
Nofsinger, J. R., Sulaeman, J., & Varma, A. (2019). Institutional investors and corporate social responsibility. Journal of Corporate Finance, 58, 700-725.
Pástor, Ľ., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. Journal of Financial Economics, 142(2), 550-571.
Pedersen, L. H., Fitzgibbons, S., & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. Journal of Financial Economics, 142(2), 572-597.
Riedl, A., & Smeets, P. (2017). Why do investors hold socially responsible mutual funds?. Journal of Finance, 72(6), 2505-2550.
Stroebel, J., & Wurgler, J. (2021). What do you think about climate finance? Journal of Financial Economics, 142(2), 487-498.
Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. Journal of Financial Economics, 101(2), 449-472.
Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. Journal of Banking & Finance, 98, 39-60.
Zerbib, O. D. (2022). A Sustainable Capital Asset Pricing Model (S-CAPM): Evidence from Environmental Integration and Sin Stock Exclusion. Review of Finance, 26(6), 1345-1388.
Zilke, P. (2025). Auctions of green shares: How labels on government bonds can shift investors' portfolios in the same direction. Mimeo.

//

Imprint

Authors: Tabea Bucher-Koenen (ZEW, University of Mannheim), Anna-Lena Herforth (ZEW, University of Mannheim), Karolin Kirschenmann (ZEW, University of Mainz), Monireh Ravanbakhshhabibabadi (ZEW, University of Mannheim)

Publisher: ZEW – Leibniz Centre for European Economic Research
L 7, 1 · 68161 Mannheim · Germany · info@zew.de · www.zew.de/en · x.com/zew_en

President: Prof. Achim Wambach, PhD · Managing Director: Claudia von Schuttenbach

Editorial responsibility: Pascal Ausäderer · pascal.ausaederer@zew.de

Quotes from the text: Sections of the text may be quoted in the original language without explicit permission provided that the source is acknowledged.

© ZEW – Leibniz-Zentrum für Europäische Wirtschaftsforschung GmbH Mannheim

ZEW

Leibniz Association