

Rating, Credit Decision and Pricing - How Sustainability and Life Cycle Assessments are Changing Credit Practice

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Abstract. Investment decisions by bank customers are increasingly linked to the demand for green investments. Without a meaningful life-cycle costing approach, the danger remains that both bank and customer are exposed to the risk of green washing. The same applies to lending decisions: here, the bank must ultimately assess the business model of the borrower as well as the subject of the loan. Without monetary integration of environmental indicators, the existing rating systems lose their ability to make accurate assessments of creditworthiness. Investment objects like real estate would be assessed with incorrect market values and, accordingly, the lending decision would be based on inadequate data. Based on this, the practice of lending is facing considerable adjustments.

1 Introduction and current challenges

The flood disaster in parts of Germany in 2021 caused by heavy rain shows that inadequate climate protection measures on our “doorstep” will have both human and economic consequences that have the potential to soon outperform the effects of the COVID-19 pandemic. To prevent this, it is important to intelligently link environmental and economic factors. Only if sustainability aspects are included in the valuation of investments, economic mispricing can be avoided. The credit practice is facing far-reaching adjustments.

A climate policy solution to limit physical risks of climate change is so difficult to find because climate is a public good. Nobody can be excluded from the consumption of this product. There is a non-rivalry in consumption. This means that if people live in good climatic conditions, other people do not immediately have access to a less good climate.

These properties of the public good, climate, lead to false incentives for market participants that have been known for many decades. If the individual consumer acts in a financially rational way, a change to a more sustainable lifestyle initially only causes costs

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that are not offset by any direct financial benefit. From an economic point of view, the market players have little incentive to act environmentally. A market failure arises because external effects are not internalized accordingly. The negative effects of economic production and consumption decisions at the expense of third parties have largely remained without financial compensation, although the production and consumption of these products damage the climate through CO₂ and methane emissions. In short: the consequences of climate change are not included in a plane ticket or in the price of meat. In addition to this temporal dimension, the spatial distribution of the effects of one's own actions makes the situation even more difficult. In short: the consequences of one's own actions are shifted in time and space so that they are simply classified as irrelevant.

There are several ways to change this initial situation: First, a change in awareness in society can lead to non-environmental behaviour being disliked. This changes the purely financial rationality in favour of a holistic concept of rationality. As far as can be seen, this process is mainly taking place among the younger generation. To what extent this process will lead to a change in consumption and investment behaviour and how long this process will take to develop environmental effects are difficult to assess.

Second, mandatory government regulations in the form of dos and don'ts can change behaviour. Transferred to the credit decision of banks, for example, more green[†] investments should be made. However, such conditions are in some cases hardly politically enforceable and could be understood as patronizing the population.

Third, environmental (non-environmental) behaviour can be rewarded (punished), e.g., through cheaper (higher) prices. Transferred to the credit decision of banks, for example, non-green investments could only be financed at higher interest rates. This way has the advantage that it can work very quickly. Since January 2021, the new CO₂ tax in Germany has been a state instrument for internalizing external negative effects that arise from CO₂ emissions. This makes gasoline or heating oil more expensive, which should lead to a market equilibrium with lower consumption. The revenue could offset those who suffered from the negative externalities. According to critical studies, however, the current price of 25 euros per ton in 2021 is too low to have a steering effect [1].

A fourth way is through innovations and technical progress, e.g. [10]. However, these must be financed, which also has a direct impact on the credit institution's credit decision. The financial flows are directed in the right direction. That shows the decisive influence of the financial industry on the solution of the climate problem. Even more: By consciously assuming this new role as a consistent financier of sustainable investments, new market opportunities arise for credit institutions by adapting their business models. In this way, new customer groups can be developed, newly designed products lead to higher margins, and new employees can also be found or retained. Institutes that follow this path generate competitive advantages.

2 Banking industry plays a key role

Apparently, the banking industry plays a key role in the transformation process, because the credit decision is ideal for choosing between green and non-green investments. The German and European banking supervisory authorities have been emphasizing this since 2019. The BaFin leaflet on dealing with sustainability risks at the end of 2019 for nationally supervised institutions was followed in November 2020 by the final version of the ECB's "Guide on climate-related and environmental risks" [2].

[†] Green is to be understood as environmentally friendly, assessed using scientifically sound and industry-recognised methods such as life cycle assessment

In these guidelines, the ECB formulates several expectations. Institutions should, for example, incorporate climate and environmental risks into their business strategy and analyse the short-, medium-, and long-term effects on their business model. The risk appetite and risk management framework should also explicitly include climate and environmental risks. The responsibilities for control should be regulated accordingly. The guideline also explicitly mentions the lending process, in which climate and environmental risks are to be included and monitored at all relevant levels. This results in a need for adjustment for the entire credit process. At the banks, instruments for measuring climate and environmental risks must be developed and new data sources must be integrated.

When declaring a credit decision as green, the decisive factor is which objective criteria should apply. The EU taxonomy, which was legally passed on June 22, 2020, is the first milestone. At the end of April 2021, technical evaluation criteria were published for the first two environmental goals of the EU taxonomy "Climate protection" and "Adaptation to climate change" to be able to decide whether an economic activity makes a significant contribution to the environmental goals and whether other goals are negatively affected. The technical assessment criteria contain a total of seven sub-categories for real estate with specifications for new construction and renovation of buildings. For example, new buildings only conform to the taxonomy regarding the goal "Climate protection" if the primary energy demand is at least 10% below the national values of the nearly zero-energy building standard. Alternatively, a renovation measure also conforms to the taxonomy if it leads to a reduction in primary energy demand of at least 30%. [3]

In parallel to the EU taxonomy, a new proposal for a directive on corporate sustainability reporting (CSRD) has been published. This provides an expansion of the reporting obligation to significantly more companies and also includes medium-sized companies. In addition, the sustainability report should be integrated into the annual report and an external audit should be mandatory. From a banking perspective, an expansion of sustainability reporting away from a few qualitatively filled pages towards reliable figures is to be welcomed, as sustainability reports are thus becoming a central data source in the lending process.

3 Economic valuation of an investment object under sustainability aspects

Politicians are pushing the topic of sustainable finance at all levels. Regardless of (or perhaps because of) the COVID-19 pandemic, the original timetable will be adhered to. The EU taxonomy creates legal certainty here. However, it remains to analyse the economic valuation of an investment object under sustainability aspects. Conventional investment calculation methods prove to be insufficient to comprehensively assess all aspects of sustainability. This applies both to the banks' lending decisions and to the evaluation of collateral, e.g., real estate. However, it extends to all investment objects, such as production facilities. Adjustments in relation to the rating, which indicates the borrower's probability of default and thus contributes directly to the pricing of sustainability risks in the sense of the above, are essential.

In addition to industry-specific factors, the sustainability of the borrower or the property to be financed should therefore be considered when making a loan decision through additional quantitative and qualitative individual factors in the rating process. The rating system may need to be expanded regarding the quantitative and qualitative criteria, for example to include a life cycle assessment, as it is already available for real estate valuation.

Together with the Fraunhofer Institute for Building Physics IBP, msg GillardonBSM converts environmental key figures into monetary values: the creditworthiness assessment in the form of ratings and the evaluation of investment objects are thereby significantly improved. The environmental impact of a building is usually quantified using the life cycle assessment method. In general, the life cycle assessment is understood as an environmental part of the sustainability assessment. This evaluates the environmental impact of the manufactured products used on the environment over their entire life cycle, from the extraction of natural resources using the products to the end of their life. The life cycle assessment (LCA) according to DIN EN ISO 14040 10 [4] and DIN EN ISO 14044 11 [5] is a suitable instrument for analysing and evaluating the environmental impact of product systems and can be expanded to include other methodological approaches.

In addition to the contribution to climate change, LCA also addresses other relevant environmental problems such as the formation of summer smog (ground-level ozone, photochemical oxidizing agent formation potential) or the overfertilization of bodies of water. The LCA method is used to systematically record the environmental effects of product systems (actual state) and to use the findings for the targeted development and improvement of products (target state).

In addition, product alternatives can be compared with one another from an environmental point of view to select the environmentally most advantageous alternative for a defined application. The basis is the recording and evaluation of the inputs, outputs, and the potential environmental impacts of a product system during its entire life cycle. For manufacturing companies, LCA plays an increasingly important role as the basis for political decision-making processes or for marketing and provides important quantitative and transparent information. In addition, in some countries and industries, binding specifications for environmental indicators are relevant for procurement procedures. This affects the purchase of construction products in public tenders for construction and infrastructure. In addition to the application of established and standardized methods, new methodological approaches for mapping and evaluating sustainability are actively being developed.

In the construction industry, there are specific guidelines and detailed instructions for creating LCAs at product level. Environmental product declarations are standardized in accordance with DIN EN ISO 14025 12 [6]. LCA is an essential part of this, and quality assurance is carried out by independent third parties. These environmental product declarations form the data basis for the environmental building assessment and cover the life cycle phases according to DIN EN 15804 13 [7]. A step further can be the sustainability certification of a building, like the DGNB system [8]. The following topics are recorded: environmental quality, economic quality, socio-cultural and functional quality, technical quality, process quality and location quality. This includes the three pillars of sustainability as well as other building-specific aspects.

4 Risk measurement with cash flow-at-risk

In addition to the environmental assessment, LCA of a building supports the function of a planning instrument for risk control. A software solution for the environmental evaluation of buildings is already available, the consistent linkage with key figures on economic implications as well as the transfer to a future-oriented evaluation of the investment object is currently carried out by the authors. The cash flow determination of the investment object, here the property, is also based on the phases of the building's life-cycle. The cash flow

calculation is based on a planning calculation and a risk assessment using the cash flow-at-risk model [9].

Individual risk drivers are determined that can lead to the cash flow deviating from the expected value. The simulation of these individual risk factors provides a discrete distribution of all possible cash flow values within the planning horizon. If the quantiles are determined on this distribution according to the value-at-risk approach, the risk can be quantified with the cash flow-at-risk. Examples of risk drivers that influence the cash flow in real estate valuations are easy to find like construction costs, rental income and the development of the price of the property. These are subject to fluctuations depending on the environmental design of the property. This results in a statement like: With a probability of (e.g.) 99 percent, the cash flow in the planning period will not be less than € xy million.

5 Conclusion

Our market economy system must internalize sustainability effects as quickly as possible, i.e., that the prices of the goods produced cover the entire value chain including the disposal and recycling costs that may only arise in the future (“life cycle costing”). This is also a key message for the banking industry. Security investment decisions by bank customers are increasingly linked to the demand for green and impact investments. Impact investing refers to investments that, in addition to financial returns, also aim for a measurable social and ecological impact. Without LCA, the risk remains that both the bank and the customer are exposed to green washing and that the impact to solving social and environmental problems may be much smaller than originally claimed. The same applies to credit decisions: Here, the bank ultimately must assess the business model of the borrower and the subject of the loan. Without the monetary integration of environmental indicators, the existing rating systems lose their ability to carry out appropriate credit checks. Investment objects and collateral are given incorrect market values as shown. Wrong decisions are made when lending is granted (lending yes / no) and risk premium is awarded because sustainability risks are not or only insufficiently considered. As shown in detail, the economy depends on scientific expertise. LCA plays a key role as it provides the environmental part of the sustainability assessment comprehensively.

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