WHITE PAPER

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The mystery of the missing sustainability factors

Why it is time to integrate ESG into probability of default models

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Introduction

The legendary fictional detective Sherlock Holmes builds his reputation on looking beyond what is immediately obvious. He solves crimes that mystify or deceive the police, using rigorous attention to detail and shrewd big-picture thinking. When others marvel at his unique – and unorthodox – powers of deduction, he points out that the information on which he bases his logic is available to anyone. What puts him a step ahead of the rest are his openness to examining every possible influencing factor and his skill at weighing up these various clues.

"Non-financial factors can and do influence a business's true PD – but established PD models systematically overlook important clues that could help solve the case."

In turn, it seems that including ESG factors in PD models would generate positive impacts not only for banks, but also for many other stakeholders, from banking clients and employees to society at large. Ultimately, over time, widespread adoption of this approach would help to enable the economic conditions needed to realize a more sustainable future.

In the real world, forensic science and other advances might well have put Holmes out of work by now. There is, however, an important lesson to be learned from his approach. Nowadays, information is more abundant and more readily accessible than ever before. But we as a society have yet to fully – and responsibly – harness its potential. In other words, as Holmes might see it, information is everywhere, but the right information is not always applied in the right way.

One area in which there is scope for improvement is that of probability of default (PD) models. Used by banks to assess a potential borrower's likelihood of failing to pay back a loan, these models are traditionally based largely on the most obvious clues: financial criteria. In recent years, however, a growing body of evidence has emerged to support the view that other information – namely, what we might consider environmental, social, and governance (ESG) factors – can also have a not-insignificant bearing on a client's credit risk, and in particular on its PD.

A snapshot of internal and external ESG-related risks for companies

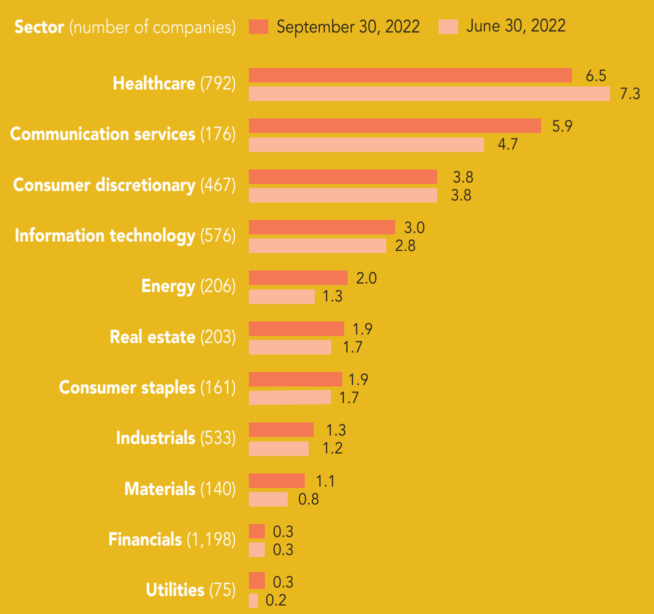
In this white paper, we first examine the status quo in PD estimation and some possible criticisms thereof, before exploring how a more holistic method – taking ESG factors into account – can help resolve them. We discuss the benefits of revamping PD models with ESG inclusion and consider the process and challenges involved in implementing these updated models in practice.

A critical look at PD models

Probability of default (PD) is the likelihood of a client being unable to repay its loan in a given period of time. Under Basel regulations, that period is defined as one year; the International Financial Reporting Standards call for an additional PD estimate that takes into account the whole lifetime of a loan.

The PD models that are used to assess commercial banking clients have historically been centered on financial indicators; factors that are clearly extremely pertinent for a business loan.

Median market signal 1-year probability of default by US sector (%)



Data compiled October 13, 2022
Includes publicity traded U.S. companies and investment firms that primarily trade on the Nasdaq, NYSE or NYSE American. Probability of default scores calculated using S&P Global Market Intelligence's Market Signal probability of default model, which is based primarily on volatility of share prices, taking into account country and industry-related risks. S&P Global Ratings does not contribute to or participate in the creation of credit scores generated by S&P Global Market Intelligence. Industries are classified according to the Global Industry Classification Standard of S&P Global Market Intelligence.
Source: S&P Global Market Intelligence.

A typical PD model might focus on the borrower's income and turnover over the past three years, for instance. But other factors are often brought in to round out the picture, such as the business sector: companies in retail and hospitality might lose points, while those in traditionally less risky sectors like food and legal and compliance might be awarded a more favorable score.

Fed with all this information, the lender's model will estimate the PD over a certain timeframe as a percentage – and as this figure rises, so does the risk margin added to the loan's interest rate. When this reaches a certain threshold, the bank will consider the risk too high to provide a loan.

A broader perspective

So far, so straightforward. But the limitations of traditional PD models are becoming ever clearer.

First, financial factors may seem to be the obvious primary indicators of a borrower's PD, but there is a mounting awareness that other non-financial factors can and do influence a business's true PD – or, in other words, that established PD models systematically overlook important clues that could help solve the case.

It is worth noting that banks already often factor management considerations into their credit decisions. For instance, a bank might look to the size of the company's management team, the experience of its members, and the presence of a supervisory board. Similarly, there is the company's history to consider. All else being equal, a hundred-year-old enterprise has a lower credit risk than a start-up, because it has proven itself to be a resilient business over the years, and a bank will often take this into account when deciding whether or not to offer a loan. However, these considerations are not explicitly included in the PD models used today.

Meanwhile, of course, society is facing up to the climate crisis – and to the need to deliver profound long-term change in support of a more sustainable future. Ensuring that the necessary funds for this are distributed to the right players is nothing short of essential for success. The good news? Incorporating previously overlooked factors into PD models can not only improve the accuracy of lenders' PD estimates, but also support the creation of the more sustainable financing landscape we need. Let us now explore the rationale for such an approach in more depth.

"Being able to identify companies whose sustainability credentials give them a lower PD will in turn enable a bank to reduce its own risk."

The case for embedding ESG

The buzz around ESG in recent years has been impossible to ignore. Companies around the world and across all sectors have adopted new methods, new approaches, and even entirely new business strategies in response to the growing pressure for more sustainable corporate operations and outputs. Banking may have a lower environmental footprint than some other industries – such as oil and gas, manufacturing, aviation, and so on – but with ever-greater attention on the question of how to finance more sustainable solutions, banks still have a crucial role to play in supporting the sustainability transition.

Today, spurred on by the 2020 European Banking Authority guidelines on loan origination and monitoring, banks are starting to consider ESG factors – such as the borrower's carbon footprint, water consumption, treatment of employees, or human rights record – in credit decisions, but only at the origination of the contract. As previously discussed, however, these types of ESG factors have not yet been widely adopted in PD models.

A selection of ESG factors

ENVIRONMENTAL

- Carbon emissions
- Deforestation
- (Hazardous) waste
- Water consumption
- Raw material sourcing
- (Renewable) energy use
- Biodiversity
- Product carbon footprint

SOCIAL

- Health and safety
- Data privacy and security
- Employee development
- Human rights
- Product safety and quality
- Community support
- Supply chain standards
- Diversity, equity, and inclusion

GOVERNANCE

- Management and supervision
- Remuneration
- Tax strategy
- Business ethics
- Transparency
- Shareholder rights
- Bribery and corruption
- Compliance

Not only is this problematic from a sustainability standpoint, as it means quantitative recognition of sustainability issues is missing from the lending process, but there is growing evidence to suggest that it is also strategically unwise. In fact, there are several reasons – driven by both internal and external forces – why banks should strongly consider revising their PD models to embrace an ESG perspective on a borrower's likelihood of default.

Some juicy carrots

The first reason why this new approach should appeal to banks is that there is a mounting body of research showing that a business's ESG performance influences its business performance – and therefore its creditworthiness.

One European study, for instance, points out the negative correlation between environmental performance and regulatory, reputational, financial, and event risk, concluding that "integrating environmental criteria into the assessment of a company's default risk […] should improve existing credit models."[1] Another argues that a company's superior ESG performance "is regarded as risk-reducing […] only if it is recognized by the environment" – that is, if the company is located in a country that also performs well on ESG issues.[2]

[1] Hock et al., 2020, "The effect of environmental sustainability on credit risk." *Journal of Asset Management.*

[2] Stellner et al., 2015, "Corporate social responsibility and Eurozone corporate bonds: The moderating role of country sustainability." *Journal of Banking and Finance.*

Research in the USA, meanwhile, finds that firms with high ESG performance have "a significantly lower probability of corporate credit default," and points to a particularly negative association between ESG and PD in the energy, financial, and IT sectors.[3] Moreover, researchers variously find that a company's proactive environmental practices can be linked to a lower cost of debt [4], that ESG scores include valuable information about a firm's downside risk,[5] and that firms with high ESG performance were more resilient to the turbulence of the 2008–09 financial crisis.[6] There is also evidence that undertaking a higher proportion of carbon-neutral lending lowers a bank's credit risk.[7]

It is important to note that this remains an emerging area of research. More external data are needed to add weight and nuance to the view that ESG factors have a bearing on a borrower's credit risk, especially when it comes to both breaking down E, S, and G factors into more detail and showing the impact of ESG on risk over the short-term horizon typically used by banks' PD models. Given the information available, however, it is already clear that taking a client's ESG credentials into account during PD analysis will make banks' estimates more accurate. Being able to identify companies whose sustainability performance gives them a lower PD will in turn enable a bank to better manage its own risk and provide loans at more favorable interest rates.

Of course, data related to these factors should complement, not replace, the financial data already being fed into the model.

Banks that can give the right weighting to these different criteria stand to profit from a clearer, more accurate picture of a borrower's true PD. After all, like any good detective, a shrewd bank should consider all the available information before drawing conclusions about a case. This, then, is the primary 'pull' force for change. But today's global context also provides a significant 'push' for credit providers to embed ESG into their PD models.

> ***"Banks that lead the way will gain an advantage not only from a modeling point of view, but also from a reputational boost."***

Some sharp sticks

On the regulatory side, authorities are ramping up the introduction of new legislation and directives that require banks to improve information disclosures on their ESG-related activities and impacts, with the aim of enhancing transparency around sustainable finance and preventing greenwashing. As a result, many banks need to up their game when it comes to supporting, and reporting on, sustainability. Updating their PD models to include data related to ESG issues is one way to do this – and to help ensure timely compliance with new and forthcoming regulations.

Relevant legislation

2020
EBA: Guidelines on loan origination and monitoring

2021
EU: Sustainable Finance Disclosure Regulation

2023
EU: Corporate Sustainability Reporting Directive

20??
EU: Corporate Sustainability Due Diligence Directive

20??
USA: Enhancement and standardization of climate-related disclosures

[3] Aslan et al., 2021, "Are sustainable companies more likely to default? Evidence from the dynamics between credit and ESG ratings." *Sustainability.*
[4] Bauer & Hann, 2010, "Corporate environmental management and credit risk." *Working paper, Maastricht University.*
[5] Lins et al., 2017, "Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis." *The Journal of Finance.*
[6] Umar et al., 2021, "Carbon neutrality, bank lending, and credit risk: Evidence from the Eurozone." *Journal of Environmental Management.*

"Embedding ESG factors in PD models is a potentially powerful mechanism for starting to open up more transparent two-way communications."

After all, as one study concludes, "if banks promote green financing, it will push corporates to adopt more sustainable and pro-ecological business models."[8] Institutional lending is a key source of funding for many businesses, so if PD models start to consider more ESG-related criteria, it follows that non-sustainable enterprises will be incentivized to rethink their strategies or risk not being able to secure the loan they want.

Meanwhile, of course, public awareness of ESG issues and societal demand for change are both growing. More and more people are realizing that businesses, industries, and sectors must be guided and supported by a more sustainable financing environment – one that promotes responsible business – if they are to realize impactful, long-lasting change. Banks that answer this call can therefore position themselves as an ESG frontrunner in an industry that has been slower than some to adopt sustainability.

By including ESG metrics in PD models, banks can take a more subtle approach to sustainable financing (compared to, for instance, black-and-white measures like sector-based exclusion). They can explain to customers and other stakeholders that the higher default risk of less sustainable companies means these enterprises will face less favorable loan terms and conditions.

"Incorporating ESG in PD estimates has the potential to generate a significant positive impact on people and planet."

Perhaps more importantly, the same measures mean that more sustainable businesses have a better chance of being extended the credit they need to continue their operations. Today, banks might claim they are taking positive action to promote a greener society – perhaps through sustainability-linked discounted products – but with this new approach they can quantify their positive actions more objectively and transparently. Incorporating ESG in PD estimates therefore provides banks with an opportunity to capture important reputational advantages – and what is more, it has the potential to generate a significant positive impact on people and planet.

On the other hand, companies with a higher level of ESG performance that currently struggle to obtain financing from traditional institutions would have a better chance of being given credit by a bank – a much more reliable and straightforward source than (for example) crowdfunding. In the long term, given the size of the financial services industry and its influence on wider society, this could help to realize large-scale change in support of a fairer economy: one that is both less arbitrary in its decision-making and more sustainable in its impacts.

These various benefits (and the clear interplay between them) combine to form a strong argument in favor of embedding sustainability factors into banking models like PD. Nevertheless, when it comes to implementing such a strategy, there are certain practical risks and challenges to which we will now turn our attention.

[8] Umar et al., 2021, "Carbon neutrality, bank lending, and credit risk: Evidence from the Eurozone." *Journal of Environmental Management.*

The PD (re)model: When, where, and how to begin

The 'first-mover advantage' is a well-known concept in business – and it applies here, too, because the sooner a bank begins to incorporate ESG more fully into its PD models, the better. This was not necessarily the case even just a few years ago: a lack of external data to supplement banks' internal data meant that embracing more non-financial considerations in PD estimates would have been a step too far into the unknown.

"Credit providers need to start collecting their own ESG data from (potential) borrowers sooner rather than later."

Now, however, it is time to move. External data are available not only from a study of the literature, but also from the sustainability scores awarded to larger companies by ratings agencies such as Sustainalytics and MSCI, and even Moody's, Fitch, and Standard & Poor's. These ratings are still in their infancy – as agencies continue to work out how best to collect and compare corporate data in the most appropriate way – but banks should still take note of their findings, while keeping in mind their limitations. Of course, smaller enterprises are not eligible for such ratings, which is why credit providers need to start collecting their own ESG data from (potential) borrowers sooner rather than later.

By introducing E, S, and G factors now, even at a low weighting, banks will gain an early opportunity to assess their impact as part of a new PD model and, crucially, collect more internal data specific to their clients. This data – for instance, illuminating the differences between industries or environmental factors – will become extremely valuable over the coming years, helping frontrunner banks improve their models still further and secure a competitive advantage in the future. Banks that trail behind, however, will not only find it hard to catch up from a modeling point of view, but also miss out on the reputational boost previously discussed.

A roadmap for the revamp

The integration process itself should begin with a survey of all the available data, internal and external, and an evaluation of what information still needs to be collected. With this complete, the bank's modeling department and other key stakeholders can make an informed decision on which PD model the bank should revise first, depending on its different portfolios and models.

Then comes the in-depth data analysis and enrichment, followed by the reconstruction of the chosen PD model. Even assuming the bank is building on an existing model and not starting entirely from scratch, the modeling process alone, excluding related product and pricing changes, is likely to take at least nine months (another reason why there is no time to lose).

This is not a simple task, and, as with any kind of remodel, it will incur a high cost. However, remodeling needs to happen every few years anyway, so when it comes to integrating ESG into PD, banks may prefer to keep expenses to a minimum by prioritizing a model that is already up for revision. In the longer term, of course, the arguments in favor suggest that remodeling is a worthwhile investment for banks.

How to incorporate ESG into your PD model

6 STEPS

1. Collect the available data from internal and external sources.
2. Carry out a preliminary assessment of the data and identify any gaps.
3. Choose which PD model to focus on (first), considering need, costs, and existing (re)modeling planning.
4. Perform more in-depth data analysis and enrichment.
5. (Re)build your PD model to take into account your chosen ESG factors and weightings.
6. Monitor the results and use the outcomes to perform iterative improvements to the model.

The second challenge is the need to manage client relationships carefully. Asking a new credit applicant to supply its ESG data is unlikely to cause problems: the business wants a loan, so it will be amenable to handing over the information needed to secure it. For long-established relationships, however, more care is due. A client with an excellent credit record stretching back several decades might not appreciate being asked to provide more data that could affect its existing arrangements. Most importantly of all – and no matter the client – the bank must be able to trust the relationship and rely on the accuracy of the information the borrower provides.

Luckily, as we will discuss in the concluding section of this white paper, this is a challenge that the inclusion of ESG factors in PD models can also contribute to solving.

Finding the balance

Throughout the process, there are two main challenges to watch out for. The first is the risk of overestimating the influence of sustainability factors in relation to the bank's traditional financial criteria. Lenders need to ensure their updated models do not give too much weight to ESG factors in the short term, before they have gathered enough data of their own. Over time, banks should remain ready to adapt their models still further, finding the right balance based on their ongoing learnings.

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A fairer future for financing?

It is clear that looking beyond the financials and embedding ESG clues into PD estimates offers banks much more than just a marketing opportunity. In fact, the evidence suggests that incorporating sustainability factors can directly improve PD models and give banks a better understanding of their borrowers' risks. On top of that, of course, it can channel funding away from less sustainable companies and instead promote more sustainable enterprise, thereby incentivizing clients to improve their ESG performance – for the good of a wide range of stakeholders in a world that is in urgent need of change.

Part of that change should be built on a fairer financial services industry and a more honest banking culture. Today, bank–client relationships are all too often characterized by mistrust and a reluctance to share information openly – whether the borrower is afraid to provide more data or the lender is afraid to discuss the small print of a loan agreement. It is in the best interests of both parties for these relationships to improve: for banks to become true financial partners to clients, who aim to truly support their customers in turn.

Embedding ESG factors in PD models is a potentially powerful mechanism for starting to open up more transparent two-way communications, giving both sides the security to step back and view the business and its context through a lens that offers the dual benefit of both a wider perspective and a sharper picture.

The banking industry has a long way to go before it will have fully embraced ESG in everything from its strategies and technologies to its culture. But like any journey, it will happen step by step, and any credit provider that incorporates sustainability criteria into its PD models will be taking a meaningful stride in the right direction. Because the time has come to look beyond the obvious – and to start piecing together the hidden clues that can help crack the case of sustainable financing.

The secrets to success

1. **The time is now**
   Act fast for an advantage that will last
2. **Do a data deep-dive**
   Gather your intel and put it to work
3. **Patience is paramount**
   Be ready to keep learning and adjusting

Ready to integrate ESG?

At ACE Management Consulting, we use our niche regulatory expertise in the European financial sector to help our clients realize the right solutions with lasting impact.

If you're ready to embed ESG into your business model, we're ready to help you navigate the process from start to finish. Our experts collaborate closely with yours, helping you make informed decisions on strategy, implementation, and beyond – so you can reach your goals sooner, and help your customers do the same.

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