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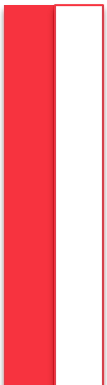
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ESG performance and trade credit terms: evidence from European firms

Viviana Franco Teixeira

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2026



FACULDADE DE **ECONOMIA**

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Biographical note

Born and raised in Viana do Castelo, Viviana Teixeira began her academic journey at the School of Economics, Management and Political Science at the University of Minho in 2021, where she pursued a Bachelor's degree in International Business. She chose this path to combine three of her interests: numbers, economics and languages. Throughout her undergraduate studies, her growing interest in the quantitative and financial aspects of business led her towards a more specialised field of study.

In 2024, she continued her academic path by pursuing a Master's degree in Finance at the School of Economics and Management of the University of Porto. This transition allowed her to deepen her knowledge of financial theories and develop her interest in financial markets.

Alongside her academic journey, Viviana has devoted 18 years to trampoline gymnastics, an experience that has played an important role in her personal development and fostered discipline, perseverance and commitment. Her connection with gymnastics eventually extended beyond her experience as an athlete, leading her to become a gymnastics coach and to guide and support younger athletes.

Throughout her academic journey, she has also worked as a mathematics tutor, an experience that has strengthened her communication and responsibility. Her journey reflects a continuous pursuit of knowledge and growth guided by the belief that every challenge is an opportunity to become better.

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Abstract

Environmental, social and governance (ESG) performance has become increasingly relevant to how firms are perceived and evaluated by their stakeholders. While the financial implications of ESG have been repeatedly studied, its potential role in firms' relationships with suppliers remains underexplored. This is particularly relevant for trade credit decisions, since it is an important source of short-term financing. This study investigates whether firms with stronger ESG performance obtain longer credit payment maturities from their suppliers.

This analysis is conducted using an unbalanced panel of 291 non-financial firms from Portugal, Spain, France and Italy over the period of 2019 to 2024. Data is obtained from LSEG Workspace, and the fixed-effects estimator was employed to examine the relationship between ESG performance and trade credit, measured primarily through payable turnover days. The analysis considers both aggregate ESG performance and its environmental, social and governance dimensions separately, while controlling for firm-specific financial characteristics.

The empirical results do not provide statistically significant evidence that overall ESG performance is associated with longer payment periods to suppliers. Similarly, no statistically significant relationship is identified between the social and governance dimensions and trade credit. The findings provide evidence of a negative association between the environmental performance and payable turnover days.

Keywords: ESG performance; trade credit; suppliers; accounts payable; environmental performance; corporate finance.

JEL-Codes: G32; M14; G30.

Resumo

O desempenho ambiental, social e de governação (ESG) tem recebido uma importância crescente na forma como as empresas são percecionadas e avaliadas pelos seus stakeholders. Embora as implicações financeiras do ESG tenham sido amplamente estudadas, o seu potencial papel nas relações das empresas com os seus fornecedores permanece pouco explorado. Esta questão é particularmente relevante no contexto das decisões relativas ao crédito comercial, uma vez que este constitui uma importante fonte de financiamento de curto prazo. Assim, este estudo investiga se as empresas com um melhor desempenho ESG obtêm maiores prazos de pagamento de crédito por parte dos seus fornecedores.

A análise é realizada com base num painel não equilibrado de 291 empresas não financeiras em Portugal, Espanha, França e Itália durante o período de 2019 a 2024. Os dados foram obtidos através do LSEG Workspace, tendo sido utilizado o estimador de efeitos fixos para analisar a relação entre o desempenho ESG e o crédito comercial, medido principalmente através dos dias de pagamento a fornecedores (payable turnover days). A análise considera tanto o desempenho ESG agregado como, separadamente, as suas dimensões ambiental, social e de governação, controlando simultaneamente por características financeiras específicas das empresas.

Os resultados empíricos não apresentam evidência estatisticamente significativa de que o desempenho ESG global esteja associado a condições de crédito comercial mais favoráveis. De forma semelhante, não é identificada nenhuma relação estatisticamente significativa entre as dimensões social e de governação e o crédito comercial. Os resultados sugerem que o desempenho ambiental está negativamente associado com os dias de pagamento a fornecedores.

Palavras-chave: desempenho ESG; crédito comercial; fornecedores; dívidas a fornecedores; desempenho ambiental; finanças empresariais.

JEL-Codes: G32; M14; G30.

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List of acronyms

AP – Accounts Payable

CSR – Corporate Social Responsibility

E – Environmental

ESG – Environmental, Social and Governance

EU – European Union

FE – Fixed Effects

G – Governance

OECD – Organisation for Economic Co-operation and Development

PTD – Payable Turnover Days

ROA – Return on Assets

S – Social

TA – Total Assets

TC – Trade Credit

VIF – Variance Inflation Factor

1. Introduction

Recently, environmental, social and governance (ESG) concerns and their performance have become an important determinant of a firm's reputation, stakeholders' trust, and access to capital. ESG provides information about how firms manage environmental risks, their relationships with employees and other stakeholders, and the quality of their governance practices. As a result, ESG information started to be incorporated into investment and financing decisions.

Previous research examining the implications of ESG for firms' access to equity and debt financing argues that higher ESG performance has generally been associated with lower perceived risk, better reputation and stakeholder trust, suggesting that sustainability information can offer signals about the company's long-term prospects and risk profile (Goss and Roberts, 2011; Lins et al., 2017; Barth et al., 2022).

At the same time, a firm relies on a set of financing sources to support its operations; among them is trade credit, which represents a fundamental form of short-term financing. Trade credit refers to a financing arrangement in which suppliers allow buyers to purchase goods or services and settle the payment at a later date (Ferris, 1981). Hence, trade credit is particularly important for firms facing barriers to access bank financing and represents a great part of firms' short-term financing decisions (Petersen and Rajan, 1997; Nilsen, 2002).

The role of trade credit goes beyond being a source of financing. Unlike financial institutions, suppliers interact directly with their customers through repeated transactions and thus may have access to information that is not easily available to banks. Suppliers can use this information to assess the creditworthiness of their customers and determine whether to extend credit and under which conditions. Petersen and Rajan (1997) argue that suppliers display informational advantages in assessing their customers and rely both on financial and non-financial information when making trade credit decisions.

However, trade credit reflects not only suppliers' willingness to extend credit but also the firms' demand for supplier financing. From the supplier side, suppliers may adjust the amount and terms of credit offered according to their assessment of the creditworthiness and risk of a customer. From the demand side, each firm has a different need for trade credit

depending on its financial conditions and access to alternative sources of financing. Therefore, even in the hypothesis that ESG performance reduces the risk perceived by suppliers and increases their willingness to provide credit, the amount of trade credit ultimately observed may also depend on the firm's demand for such financing.

Against this background, the reliance on information beyond traditional financial indicators raises the possibility that ESG performance may also be a relevant determinant of suppliers' credit decisions. ESG can provide information about characteristics that may be relevant to a supplier's assessment of a customer. Strong environmental practices may indicate better management of environmental and regulatory risks, and sound social performance reflects the quality of relationships with employees and other stakeholders. In turn, governance practices may provide information about the managerial quality, reliability of corporate decision-making and transparency. From this perspective, ESG performance could serve as a source of non-financial information useful to suppliers when assessing customer risk.

Suppliers may face risks that diverge from those of traditional finance creditors. When a supplier extends credit, it is exposed to the possibility that the customer is unable to meet the payment obligations but may also be exposed to supply chain and operations disruptions, reputational problems or regulatory issues that compromise the commercial relationship. ESG performance may therefore be a means of information about risks that are not captured by traditional financial indicators.

Recent empirical research has examined this possibility, although the evidence remains relatively recent and context dependent. Studies have reported a positive association between ESG performance and firms' access to suppliers' credit (Tian and Tian, 2022; Luo et al., 2023; Mathath and Kumar, 2024; Heo, 2024). European evidence has also begun to emerge, with studies indicating that corporate social responsibility and ESG performance are associated with better trade credit terms (Rivera-Franco et al., 2025; Palacín-Sánchez et al., 2026). These findings suggest that information provided by ESG performance may extend beyond relationships with investors and lenders and may also be relevant within firms' supply-chain relationships.

However, the relationship between ESG performance and trade credit is not as straightforward. ESG has three different components that reveal different types of information to suppliers. As a consequence, suppliers may not place the same importance

on all ESG components.

This raises the question of whether ESG information is relevant to suppliers' credit decisions and if stronger ESG performance can translate into more favourable trade credit terms. Furthermore, given the distinct information conveyed by the environmental, social and governance dimensions, it is also relevant to consider whether some dimensions are more associated with trade credit than others.

2. Literature review

2.1. Trade credit

Trade credit is a short-term loan linked to the purchase of goods and services, which arises when suppliers allow customers to delay payment beyond the delivery date (Ferris, 1981). Other definitions define trade credit as an implicit financial contract between a supplier and the buyer in which the supplier provides goods today in exchange for payment at a later date, acting as a lender (Schwartz, 1974).

Credit rationing can persist in equilibrium because of adverse selection and moral hazard. Stiglitz and Weiss (1981) give insights into information asymmetry and credit rationing. The authors suggest that increasing interest rates do not always benefit loan markets because they may attract riskier borrowers and give an incentive for risky behaviours, reducing the expected returns for lenders. This will make lenders, such as financial institutions, prefer to withhold credit instead of raising rates, resulting in situations where creditworthy borrowers are denied loans despite their willingness to pay higher rates.

Non-banking financing mechanisms, such as trade credit, can emerge when traditional credit markets fail. For instance, Biais and Gollier (1997) formally show that asymmetric information between banks and firms can lead to credit rationing, and financially viable firms may be denied bank loans. According to them, trade credit reduces this problem because suppliers hold private information about buyers achieved through their continuous and ongoing commercial interactions. The extension of trade credit could act as a signal of creditworthiness, aiding firms in accessing bank financing that would otherwise not be available. The authors assume that trade and bank credit act as complements since trade credit helps to reduce informational frictions.

The relationship between trade credit and bank credit is an important topic in corporate finance. Nilsen (2002) provides evidence that trade credit can be a substitute for bank lending when firms are facing financial constraints, in particular, small firms and firms without access to public debt markets.

Evidence from emerging market crises shows that trade credit initially rises when banks tighten lending terms, but decreases when all credit sources dry up, indicating that trade credit

and bank loans can act as substitutes temporarily and depending on broader credit conditions (Love et al., 2007).

SMEs without strong banking relationships rely more on suppliers, highlighting the importance of relationship-based financing (García-Teruel and Martínez-Solano, 2010).

Other authors defend a complementary view of trade credit and bank credit. Non-financial firms with bank access can serve as intermediaries, channelling funds from formal financial markets to other firms through trade credit (Demirgüç-Kunt and Maksimovic, 2001). In this sense, trade credit can partly make up for the limitations in formal financial intermediation by allowing firms to obtain financing indirectly through their suppliers. Fisman and Love (2003) similarly argue that trade credit can provide an alternative source of funds when financial institutions are less developed, showing that industries with greater reliance on trade credit tend to experience higher growth in countries with weaker financial institutions. This perspective underlines that trade credit does not necessarily substitute for bank financing. Instead, the two forms of financing can be complementary when financially stronger firms potentially extend credit to other firms through commercial relationships.

Petersen and Rajan (1997) find empirical evidence on the determinants of trade credit, demonstrating that trade credit acts as a substitute for bank financing, particularly for small firms or firms facing credit constraints. The authors believe that suppliers have informational advantages over financial institutions that come from the suppliers' ability to monitor buyers through repeated transactions and the compromise of future deliveries.

Cuñat (2007) highlights the ability of suppliers to discipline customers through the commercial relationship. Besides having an informational advantage over financial institutions, suppliers can threaten to interrupt future deliveries when customers fail to meet their payment obligations. This provides suppliers with a protection mechanism that may not be equally available to other creditors. Suppliers can also act as liquidity providers, helping customers cope with temporary liquidity shocks.

Starting with the informational advantage approach, Burkart and Ellingsen (2004) refine this theory by highlighting the role of asset illiquidity in trade credit. The authors demonstrate that suppliers extend credit related to goods, rather than cash, because that kind of credit is harder for borrowers to divert, reducing moral hazard compared to bank loans. Their model

shows that trade credit and bank credit can be complements or substitutes depending on the borrower characteristics. Building on the informational advantage theory, they link the supplier advantage to the unique characteristic of trade credit, which is the illiquidity of the assets.

Brennan et al. (1988) developed a model where suppliers with market power optimally offer trade credit to customers with more elastic price demand, segmenting the market without lowering cash prices. Thus, trade credit terms work as non-price competitive tools that expand demand among all buyers without diluting cash prices from less price-sensitive customers.

Suppliers grant larger credit to buyers on whom they are financially reliant, thus dependent firms prefer trade credit even when they are financially weak (Wilner, 2000).

Transaction cost theories of trade credit emphasise that extending credit reduces the costs of exchange between sellers and buyers by alleviating the timing and management of payments. Ferris (1981) proposes that trade credit separates the exchange of goods from the exchange of money, allowing firms to coordinate payment timing more efficiently, therefore reducing transaction costs associated with uncertain delivery and frequent cash transactions. Emery (1984) complements the previous approach by demonstrating that in imperfect financial markets, where firms borrow at higher rates than they can earn with deposits, suppliers can lend excess liquidity to customers at a rate between bank deposits and loan rates, reducing the cost of financing transactions.

Long et al. (1993) propose that trade credit works as a quality guarantee and signalling mechanism instead of being just a response to financing constraints. According to this approach, buyers cannot totally assess the quality of goods before having them, especially complex or specified products. Extending trade credit allows buyers to verify the product quality before payment, reducing their perceived risk. On the other hand, the willingness of a supplier to concede delayed payments serves as a signal of high product quality, encouraging purchases. As a result, products with higher quality are associated with longer trade credit terms.

2.2. ESG in credit markets

In the last couple of decades, environmental, social and governance (ESG) performance has emerged as a critical factor influencing financial contracting and credit markets. Firms with better ESG practices are seen as lower risk borrowers, as ESG performance signals effective risk management, operational resilience and long-term strategic orientation (Albuquerque et al., 2019; Barth et al., 2022). Empirical studies show that higher ESG scores are associated with lower corporate credit spreads and CDS spreads, signalling that debt investors perceive better ESG firms as less likely to default (Barth et al., 2022; Bonacorsi et al., 2024).

Barth et al. (2022) argue that ESG gives information about risk management quality, which is a factor considered by creditors when pricing corporate debt. According to the authors, higher ESG ratings have a greater reduction on perceived default risk, thus being associated with lower credit spreads. To complement this view, Bonacorsi et al. (2024) finds that ESG captures non-financial risk factors, adds explanatory power and has incremental predictive power beyond the traditional financial ratios, improving the default risk prediction. This paper provides a perspective of ESG as not only a signal, but also as a quantifiable risk factor.

In terms of credit ratings, Chen et al. (2025) show that European banks with higher ESG scores tend to have higher credit ratings, with the environmental component having a particularly stronger influence. It reinforces the previous view that ESG is a risk signal and a factor in financial contracting. Chodnicka-Jaworska (2021) also finds that ESG performance is positively correlated with higher ratings, especially for governance and environmental dimensions. However, the author states that ESG is only partially included by rating agencies, and the effect varies by sector.

A previous study, from 2011, demonstrates that firms with stronger social responsibility pay less interest on loans compared to firms facing social responsibility concerns. CSR can act as a screening mechanism and reduce the perceived risk for lenders (Goss and Roberts, 2011).

2.3. Suppliers' credit assessment and credit terms

Trade credit is not extended automatically; it reflects an assessment by suppliers of their customers' creditworthiness and expected payment behaviour and the customers' characteristics and demand for an extended period for payment. Prior literature demonstrates

that suppliers act as informed creditors, using transactional and relational information to evaluate risk and determine the contract features, such as payment periods or cash discounts. Unlike banks, suppliers can observe buyers continuously through commercial interactions, allowing them to make assessments based on previous transactions (Petersen and Rajan, 1997; Ferris, 1981).

Ferris (1981) proposes that trade credit exists to reduce transaction costs associated with frequent payments. Instead of payment for every order, buyers accumulate obligations and pay periodically. From the supplier's perspective, credit terms are structured around operational efficiency, not only risk.

Trade credit terms work as a financial screening device under symmetric information. Cash discounts or payment deadlines allow suppliers to price liquidity and credit risk without explicitly charging interest. Financially strong buyers are more likely to pay early and take discounts, while riskier buyers are likely to delay payment and borrow implicitly at higher rates. Suppliers learn about buyers' creditworthiness over time and adjust trade credit terms accordingly (Smith, 1987; Ng et al., 1999).

The main determinants of trade credit include firm size, liquidity, profitability, and growth opportunities. For instance, more liquid and profitable firms rely less on trade credit, and trade credit terms are in part influenced by sector characteristics (García-Teruel and Martínez-Solano, 2010).

To reinforce the view that trade credit terms are not just influenced by the customers' financial condition and reliability, Giannetti et al. (2011) show that trade credit contracts are related to the characteristics of the goods and services exchanged and of the firms involved in the transaction. More specifically, suppliers of differentiated goods and services usually extend more credit than suppliers of standardised products and firms that buy more services often receive lower trade credit and for longer maturities.

In the same line of thought, Klapper et al. (2012) find that larger and more creditworthy buyers tend to receive longer payment maturities from smaller suppliers, and early payment discounts are usually offered to riskier buyers.

These results suggest that trade credit terms are systematically influenced by buyer

characteristics as well as supplier characteristics. Therefore, the conditions under which trade credit is provided cannot just be understood from the perspective of the financing needs of the buyer and the suppliers' perceived creditworthiness of the customer.

Fabbri and Klapper (2016) show that suppliers extend more credit terms to powerful buyers even if those buyers are not financially constrained, suggesting that trade credit is not only about risk, but it is also about strategy, such as customer retention and competition.

Liberti and Petersen (2019), although not focusing exclusively on trade credit, introduce the distinction between soft and hard information in credit decisions. Hard information includes statements and credit scores, and soft information comes from relationships, trust, and repeated interactions. This framework applies specifically to suppliers, who usually rely on soft information obtained through daily business interactions.

Even though most of the literature focuses on the benefits of trade credit for buyers, there are also costs imposed on suppliers. Evidence shows that slower payments by large buyers lead to lower investment by suppliers. Trade credit involves consequences for both sides of the commercial relationship (Murfin and Njoroge, 2015).

2.4. Empirical evidence

Recently, some literature has started to relate information conveyed by firms' ESG performance to trade credit terms received from suppliers.

There is a substantial amount of studies that test the impact of ESG scores on trade credit financing in China. Most studies reveal that firms with better ESG score receive more trade credit from suppliers (Tian and Tian, 2022; Xu, 2022; Luo et al., 2023; Wang, 2023; Lian et al., 2025).

Lian et al. (2025) also show that the effect of ESG performance on trade credit terms is stronger for firms with low supplier and customer concentration and firms facing higher financing constraints. The study concludes that ESG helps firms obtain trade credit from both customers and suppliers.

Additionally, Mathath and Kumar (2024) find that improved ESG disclosure leads to an increase in payable turnover days in Indian firms. Heo (2026), on the other hand, in OECD

countries, finds that only better environmental dimension performance secures more trade credit.

Empirical studies from Europe find a positive relationship between CSR and trade credit among European listed firms (Rivera-Franco et al., 2025).

More recently, a study from Palacín-Sánchez et al. (2026) examined European STOXX 600 firms across 17 European countries and found that higher ESG performance is positively associated with trade credit use. The authors used accounts payable relative to total assets as the dependent variable and ESG scores from Refinitiv Eikon as an explanatory variable. Another important finding of this study is the proposal that the relationship between ESG performance and trade credit varies according to the institutional environment.

2.5. Literature gap and research contribution

Recent empirical studies document a positive relationship between ESG performance and trade credit financing, but the evidence is largely concentrated in China, and a few studies in India and OECD countries.

Although there is a recent study with a European sample, there is limited evidence focusing on firms from Southwestern European economies such as France, Spain, Italy and Portugal. Furthermore, recent time periods are understudied on this subject, raising the need to provide updated evidence on the relationship between ESG performance and trade credit.

Discovering which dimension of ESG most affects trade credit is also not researched within Europe or individual European countries.

3. Research questions

Suppliers have an essential position in firms' short-term financing by extending credit through contractual payment terms. Unlike financial institutions, suppliers are constantly exposed to their buyers through repeated transactions and are more able to assess buyer risk using financial but also non-financial information (Petersen and Rajan, 1997; Emery, 1984). Recent studies indicate that ESG performance is a relevant source of non-financial information for creditors. Theoretical evidence indicates that firms with better ESG performance are seen as less risky because engagement in ESG practices is associated with improved internal controls and lower exposure to risk (Albuquerque et al., 2019). In credit markets, this leads to lower borrowing costs and higher credit ratings (Goss and Roberts, 2011). Suppliers, supposing they are informed creditors, are likely to incorporate ESG information into their credit assessments of customers.

Empirical evidence supports this view. Recent studies find that firms with higher ESG scores receive more trade credit financing from suppliers (Tian and Tian, 2022; Luo et al., 2023; Mathath and Kumar, 2024). Based on this theoretical evidence, this study proposes that firms with higher ESG scores receive more favourable trade credit terms from suppliers. Therefore, hypothesis one is formulated:

H1: Firms with higher ESG scores have higher PTD.

This leads us to the main research question of this study: Do high ESG scores influence firms' trade credit terms from suppliers?

Prior research suggests that the environmental, social and governance dimensions may have different implications for the creditors. Suppliers may attribute different weights to each dimension depending on the type of risk they perceive and the institutional sector in which the firms operate.

Among the three dimensions, the environmental pillar is expected to affect trade credit decisions the most. Environmental performance is often associated with lower regulatory risk and better operational efficiency. In the European Union, which is highly regulated, poor environmental performance may lead to fines, legal sanctions or disruptions in production. This expectation is supported by Heo (2026), who finds that environmental performance is

the main driver influencing trade credit in OECD countries, suggesting that suppliers may be particularly sensitive to environmental risk. Accordingly, the following hypothesis is formulated:

> **H2a**: Firms with higher environmental performance have higher PTD, and this dimension is expected to have the strongest association with trade credit among the three ESG dimensions.

Social performance provides suppliers with information about firms' relationships with employees, customers, and other stakeholders. Strong social performance may suggest lower reputational and stakeholder risk. However, compared with environmental performance, these effects may be less connected with the extension of trade credit. Empirical evidence, particularly from emerging markets, demonstrates that social performance contributes to greater access to trade credit, although its effect is often weaker than environmental and governance factors (Luo et al., 2023). Therefore, the next hypothesis is proposed:

> **H2b**: Firms with higher social performance have higher PTD, although the association is expected to be weaker than that of the environmental performance.

Effective governance can signal transparency, stronger internal controls and better management and decision-making. Nevertheless, governance mechanisms are generally less related to operational and regulatory risks arising from the firms' activities. Therefore, although governance performance is expected to be positively associated with trade credit financing, its relationship is expected to be weaker than that of the environmental pillar. Given the theoretical importance of governance for credit relationships, the last hypothesis to be tested is the following:

> **H2c**: Firms with higher governance performance have higher PTD, although the association is expected to be weaker than that of the environmental performance.

These three hypotheses lead to the secondary research question of this study: *Is the environmental dimension the one that has the strongest positive association with the trade credit payment period?*

4. Methodology and sample

4.1. Methodology

This study investigates whether a firm with higher ESG performance will optimise its trade credit terms from suppliers. To test this relationship, a panel data dataset is used to leverage both cross-sectional variation between firms and the variation within firms over time (Hsiao, 2014).

The fixed-effects model is one of the panel data estimators available. Wooldridge (2020) claims that the fixed-effects estimator controls for all unobservable firm-specific characteristics that remain constant over time by using only the within-firm variation in the data.

To determine the most appropriate panel estimator, Wooldridge (2020) proposes the Hausman specification test, which evaluates whether the unobserved firm-specific effects are correlated with the explanatory variables by comparing the fixed-effects and random-effects estimators. In this study, the Hausman test rejects the null hypothesis of no systematic differences between the estimators, suggesting that the fixed-effects model is the appropriate estimator for the empirical analysis.

The use of firm-specific effects is also supported by the recent literature about the relationship between ESG performance and trade credit. These studies estimate firm fixed-effects regressions when analysing the effects of ESG performance on the credit terms given by the suppliers. Additionally, following those empirical studies, year fixed effects are included in the model to capture macroeconomic shocks, changes in ESG reporting practices and institutional developments that may affect all firms during a given year (Luo et al., 2023; Tian and Tian, 2022; Heo, 2026; Lian et al., 2025).

In addition to examining the impact of the overall ESG score on trade credit terms, this study extends the analysis by investigating the individual effects of the environmental, social and governance pillars. This approach seeks to identify if there is a component that contributes most to firms' access to supplier financing (Heo, 2026; Mathath and Kumar, 2024).

4.2. Sample

4.2.1. Data collection and cleaning

The data used in this study were obtained from LSEG Workspace, one of the main financial databases providing standardised accounting, market and ESG information for publicly listed firms. Annual ESG and firms' financial statement information were the goal of this search, thus making LSEG Workspace the right source to extract the data to examine the relationship between ESG and trade credit.

The initial sample comprised 1,204 publicly listed non-financial firms headquartered in Portugal, Spain, France and Italy. The study was initially meant to focus on the Iberian Peninsula, given their geographical proximity and similar institutional environments. However, the number of observations available for Portugal and Spain alone was insufficient to ensure meaningful statistical results. Hence, the sample was expanded to France and Italy, which share comparable legal, institutional and economic characteristics as European economies, thus increasing the sample size while maintaining regional comparability. More specifically, all four countries are members of the European Union and the euro area, operating under a common European regulatory framework and sharing the same currency. This provides a relatively consistent institutional setting for analysing the relationship between ESG performance and trade credit, particularly given the importance of the European sustainability regulation. Furthermore, all four economies have developed financial systems in which firms have access to both bank financing and trade credit. Although differences in country-specific economic and institutional conditions remain, the inclusion of France and Italy provides a greater sample while preserving a reasonable degree of comparability across the countries considered.

Following most literature in corporate finance, firms that operate in the financial sector were excluded from the sample to avoid potential biases from sector-specific characteristics. These institutions are subject to different and specific accounting standards, capital requirements and regulatory frameworks that influence both their financing decisions and balance sheet structure, making them not comparable to firms operating in non-financial industries.

The initial sample comprised the period from 2014 to 2024. However, an assessment of data availability revealed that ESG information was very incomplete during the early years of the

sample, resulting in a considerable number of missing observations. To preserve a sufficient number of firms for the empirical analysis, the study period was therefore restricted to 2019 to 2024. However, even in that period, there were many firms which had missing ESG values; thus, firms with less than 3 years of ESG observations were excluded from the sample.

To preserve a higher number of observations, the final dataset is an unbalanced panel with firms remaining in the sample even if observations are unavailable for some years. The final sample consists of 291 publicly listed firms over the period of 6 years.

More than 75% of the initial sample was eliminated, raising concerns about selection bias, where the remaining firms could be the largest and have better ESG disclosure.

Table 1 shows the comparison between the 291 firms remaining in the sample and the firms that were dropped due to the lack of ESG observations. The final selection appears to favour larger firms, given that firms retained in the final sample exhibit, on average, higher total assets than firms excluded due to insufficient observations. Consequently, the findings should be interpreted in the context of firms with relatively greater reporting and data availability and may not fully apply to smaller firms.

The distribution across countries is similar between the two groups, but differences are more evident across industries. The final sample has a relatively high representation of firms from the Energy and Utilities sector, whereas Real Estate and Information Technology show particularly low retention rates. The findings of the study may not be generalised to the industries that are less represented in the final sample.

Table 1 - Comparison between firms in the final sample and dropped firms.

The comparison of size is measured by the mean, median and standard deviation of dropped firms (excluded from the sample due to missing observations) and firms in the final sample. The comparison of country and industry is measured as the number of firms that were dropped and the number of firms that were kept in the final sample. In parentheses is the weight of firms dropped or kept in each country/sector.

Comparison	**Dropped firms**	**Final sample**
Number	913 (75.83%)	291 (24.17%)
Size		
Mean	18.05	21.83
Median	17.97	21.76
Standard deviation	1.92	1.88
Country		
France	424 (75.44%)	138 (24.56%)
Italy	264 (75.43%)	86 (24.57%)
Portugal	26 (68.42%)	12 (31.58%)
Spain	199 (78.35%)	55 (21.65%)
Industry		
Consumer Staples	40 (66.67%)	20 (33.33%)
Consumer Discretionary	146 (76.04%)	46 (23.96%)
Communication Services	95 (77.24%)	28 (22.76%)
Energy	11 (47.83%)	12 (52.17%)
Health Care	84 (75%)	28 (25%)
Industrials	169 (69.83%)	73 (30.17%)
Information Technology	138 (85.19%)	24 (14.81%)
Materials	46 (66.67%)	23 (33.33%)
Real Estate	158 (92.40%)	13 (7.60%)
Utilities	26 (52%)	24 (48%)

4.2.2. Dependent variable

Trade credit is an important source of short-term financing, enabling firms to acquire goods and services from suppliers while deferring the payment to a later date.

Existing literature uses various measures for trade credit, and this study measures it through payable turnover days, which represents the average number of days a firm takes to settle its obligations with the suppliers. The variable is commonly calculated as the ratio of accounts payable to the cost of goods sold multiplied by 365 days. Since the LSEG Workspace database had very few companies with COGS available, the variable was replaced by cost of revenues, which is a very close measure of a firm's operating costs associated with generating sales.

The denominator used for PTD requires particular attention. Ideally, purchases from suppliers would be used, as they most directly reflect the transactions underlying trade credit. However, information on Cost of goods sold (COGS), which is the closest proxy for these purchases, is not consistently available for the firms in the sample. Cost of revenues is employed because it provides broader information and more consistent coverage across the sample. Nevertheless, the use of cost of revenues should be interpreted as an approximation for the measure of purchases financed through trade credit.

However, cost of revenues represents the cost associated with generating firms' revenues and may include components that do not correspond to purchases from external suppliers, and not all purchases are necessarily made through credit. Additionally, the composition of this measure can vary according to the firms' industry. For instance, for manufacturing and retail firms, cost of revenues is more closely related to the acquisition of inventories and raw materials. In contrast, service companies may have a cost structure more focused on labour costs, subcontracted services and other operating costs that do not necessarily generate accounts payable to suppliers. This is a limitation of measuring PTD with cost of revenues.

The use of PTD is consistent with the corporate finance literature, where it is frequently used as a measure of trade credit management (Mathath and Kumar, 2024).

To ensure robustness of results, the analysis will be further complemented with an alternative measure of trade credit financing, calculated by accounts payable divided by total assets. This

proxy is predominantly applied and serves as a robustness check for the baseline results based on PTD (Luo et al., 2023; Tian and Tian, 2022; Heo, 2026; Palacín-Sánchez et al., 2026). The use of this alternative trade credit measure is intended to mitigate the measurement concerns associated with using the cost of revenues in the construction of Payable turnover days. Unlike PTD, this measure is less sensitive to differences in firms' cost structures across industries.

4.2.3. Explanatory and control variables

The main explanatory variable in this study is the Refinitiv ESG Score, obtained from LSEG Workspace. It is a measure of a firm's environmental, social and governance performance with a score ranging from 0 to 100. According to Refinitiv's methodology, higher scores indicate stronger ESG performance and more commitment to sustainable business practices. Following the existing literature, this analysis uses one-year lagged ESG scores to mitigate concerns regarding reverse causality and simultaneity by ensuring that the firms' ESG performance precedes the observed trade credit outcome (Tian and Tian, 2022; Luo et al., 2023; Heo, 2026).

In addition to the aggregate ESG score, this study separately examines the environmental, social and governance pillar scores. This analysis provides an assessment of whether the relationship between ESG performance and trade credit is driven by a particular component. Heo (2026) and Mathath and Kumar (2024) conduct a similar approach.

In order to isolate the effect of ESG performance on trade credit, the empirical model includes a set of firm-specific control variables.

The first control variable is firm size, measured by the logarithm of total assets (Luo et al., 2023; Tian and Tian, 2022; Heo, 2026; Lian et al., 2025). Larger firms generally benefit from greater bargaining power, stronger supplier relationships and lower perceived credit risk, allowing them to get more favourable trade credit conditions.

The following control variable is profitability, proxied by return on assets. ROA is widely used in the ESG and trade credit literature and is calculated as net income divided by total assets (Luo et al., 2023; Tian and Tian, 2022; Heo, 2026; Mathath and Kumar, 2024; Lian et al., 2025). More profitable firms, which are typically considered financially healthier, may

have easier access to external financing. However, they may also rely less on supplier credit because of their stronger internal cash generation.

Leverage, measured as total debt divided by total assets, is also a control variable for the firms' capital structure and financial risk (Luo et al., 2023; Tian and Tian, 2022; Heo, 2026; Lian et al., 2025; Xu, 2024). Firms with higher leverage generally face greater financial risk and may depend more on supplier financing or receive tighter credit conditions from suppliers.

Firms with stronger liquidity positions are generally more able to meet their short-term obligations, which could influence their demand for trade credit and the suppliers' willingness to extend it. Therefore, the current ratio is used in this study as a proxy for liquidity and is calculated as current assets divided by current liabilities.

Sales growth, measured as the annual percentage change in total revenues, is the final control variable, and it operates as a measure of firms' growth opportunities. Companies that experience rapid growth often need additional working capital to finance operations and may rely more on supplier credit.

4.2.4. Descriptive statistics

Table 2 presents the descriptive statistics for the variables included in the empirical analysis. The sample analysed covers the final 291 firms from France, Italy, Portugal and Spain over the period 2019 to 2024.

The dependent variable, PTD, demonstrates a large dispersion, with an average of 426.66 days but a substantially lower median of 122.68 days, indicating a highly right-skewed distribution. Even more concerning are the extremely large minimum and maximum values, which indicate the presence of outliers that could influence the robustness of results. Negative payable turnover days are not economically meaningful, and excessively large values usually reflect data irregularities or exceptional firm-specific situations; thus, the dependent variable was analysed, and all observations with extreme values were eliminated. More specifically, observations with negative values, which are not economically possible, and observations above the 99^{th} percentile (3136.934), which are extremely high, were eliminated from the sample.

Table 2 - Descriptive statistics of regression variables

Variable	Obs	Mean	Std. dev.	Min	Median	Max
Payable turnover days	1503	426.66	4394.26	-20796.7	122.68	144210.3
ESG (lagged)	1503	61.04	19.07	0.89	64.08	92.69
Environmental pillar (lagged)	1503	60.85	24.36	0.00	66.29	98.64
Social pillar (lagged)	1503	68.70	20.87	0.58	73.17	98.05
Governance pillar (lagged)	1503	49.99	22.56	0.47	51.00	96.23
Size	1503	22.22	1.75	16.87	22.21	26.37
ROA	1503	0.02	0.11	-1.74	0.03	0.74
Leverage	1503	0.32	0.17	0.00	0.31	1.87
Current ratio	1503	1.44	0.98	0.10	1.25	22.60
Sales Growth	1503	0.09	0.42	-0.97	0.06	10.03

Regarding the explanatory variables, the average lagged ESG score is 61.04, indicating that, on average, firms in the sample exhibit a moderately high level of ESG performance. Among the three ESG pillars, the social pillar is the one reporting the highest average score, while the governance pillar records the lowest average.

The average firm in the sample is somewhat profitable, with a logarithm of total assets of 22.22 and a ROA of 2.4%, finances approximately 32% of its assets through debt and exhibits sufficient liquidity to cover its short-term obligations. However, the values of the current ratio and sales growth also have very extreme minimums and maximums, justifying the winsorization of the variables.

All variables included in the analysis were winsorized at the 1^{st} and 99^{th} percentiles to mitigate the influence of extreme observations while still preserving the sample size. This procedure is commonly employed in empirical corporate finance studies to reduce the influence of extreme outliers without discarding valid data, thus improving the robustness of the econometric estimates.

Table 3 - Descriptive statistics of regression variables after winsorization.

Variable	Obs	Mean	Std. dev.	Min	Median	Max
Payable turnover days	1487	192.27	229.57	24.08	122.08	1572.88
ESG (lagged)	1487	61.40	18.72	4.90	64.27	89.92
Environmental pillar (lagged)	1487	61.39	23.81	0.00	66.49	96.98
Social pillar (lagged)	1487	69.16	20.31	6.75	73.56	96.52
Governance pillar (lagged)	1487	50.08	22.50	3.63	51.02	92.25
Size	1487	22.26	1.69	17.75	22.23	25.87
ROA	1487	0.03	0.07	-0.27	0.03	0.23
Leverage	1487	0.31	0.16	0.01	0.31	0.73
Current ratio	1487	1.41	0.72	0.31	1.24	4.26
Sales Growth	1487	0.07	0.22	-0.55	0.06	1.03

Table 3 presents the descriptive statistics after winsorization. It reduces the influence of extreme observations, particularly for payable turnover days (PTD). After the removal of the negative and extreme upper values and subsequent winsorization, the mean decreases substantially, while the median remains almost unchanged, suggesting that the treatment affected the extreme tails of the distribution. The dispersion in control variables is also reduced by winsorization, but they were less affected by extreme observations. Overall, the treatment effectively mitigates the influence of extreme values while preserving the central tendency of the variables, reflected by the stable median values.

For this study, it is also relevant to study the variation in ESG performance, which can be distinguished in cross-sectional (between) and temporal (within) variation. ESG does not usually change much yearly.

Table 4 - Between and within variation of ESG, E, S and G.

Variable	Variation	
	Between	**Within**
ESG	17.7006	5.5769
E	22.4340	6.8659
S	19.0443	6.9088
G	20.7274	8.7490

Table 4 demonstrates that while firms may differ in their ESG performance, the lower within-firm variation indicates that ESG scores and its individual pillar scores tend to remain relatively stable over time.

4.2.5. Econometric preliminary tests and model definition

The preliminary tests performed provide support for the specification of the empirical model. The correlation matrix gives insights into the relationships between the variables. According to table 5, the strongest relationship is between the variables Size and lagged ESG ($r = 0.68$), suggesting a relatively strong positive correlation between the two variables. The remaining correlations are comparatively low; thus, overall, the correlation coefficients do not indicate severe multicollinearity concerns. This conclusion is supported by the Variance Inflation Factor (VIF) test, for which the mean VIF was 1.46 (table 6).

To determine the appropriate estimator for the panel-data analysis, a Hausman specification test was conducted to compare the fixed-effects and random-effects models. The Hausman test rejects the null hypothesis that the differences between the fixed and random-effects estimates are not systematic. Therefore, the fixed-effects estimator is preferred because it provides more reliable estimates in the presence of correlation between unobserved firm-specific characteristics and the explanatory variables.

Table 5 - Correlation matrix with regression variables.

The correlation matrix presents the correlation coefficients of all pairs of variables from the model.

Correlation matrix	PTD	ESG (lagged)	Size	ROA	Leverage	Current ratio	Sales growth
PTD	1.00						
ESG (lagged)	-0.07*	1.00					
Size	-0.15*	0.68*	1.00				
ROA	-0.04	0.05	0.03	1.00			
Leverage	0.11*	0.10*	0.10*	-0.36*	1.00		
Current ratio	-0.09*	-0.19*	-0.27*	0.32*	-0.33*	1.00	
Sales growth	-0.06*	-0.05	-0.04	0.24*	-0.04	0.01	1.00

The previous distinction between ESG performance cross-sectional and temporal variation is particularly relevant for the fixed-effects estimation, which relies on within-firm variation to identify the association between ESG performance and trade credit. As a consequence, the within variation may be insufficient for the FE model to identify a statistically significant relationship.

The last two tests performed had the goal of assessing the presence of heteroskedasticity and autocorrelation. Heteroskedasticity occurs when the variance of the error term is not constant across firms, which can make standard errors of the estimated coefficients unreliable and lead to incorrect statistical inference. The Modified Wald test rejected the null hypothesis of homoskedasticity across firms, indicating the presence of groupwise heteroskedasticity. Similarly, the Wooldridge test rejected the null hypothesis of no first-order autocorrelation, indicating the presence of serial correlation within firms over time. Autocorrelation occurs when the errors for the same firm are correlated over time, and this affects the reliability of the standard errors.

Even though both issues are present, to obtain more reliable statistical inference without changing the estimated coefficients themselves, firm-clustered robust standard errors were employed.

Table 6 - Econometric preliminary tests.

This table presents the preliminary tests employed on the sample. The Variance Inflation Factor (VIF) tests for multicollinearity. Values of mean VIF closer to 1, indicate absence of multicollinearity; if the mean VIF is closer to 10, there is evidence of concerning multicollinearity. The Hausman test assesses which estimator is preferred for the sample in analysis. If the null hypothesis is rejected, the fixed-effects estimator is preferred. The Modified Wald evaluates the presence of heteroskedasticity. If the null hypothesis is rejected, there is evidence of group-wise heteroskedasticity. For the test of serial correlation, the null hypothesis is rejected when there is evidence of first-order autocorrelation.

Test	Null hypothesis	Test result	p-value	Conclusion
VIF		Mean VIF = 1.46		No evidence of multicollinearity
Hausman test	H0: differences are not systematic	$\chi^2(11) = 50.42$	p = 0.000	Reject H0 – fixed-effects estimator is preferred
Modified Wald test	H0: homoskedasticity across firms	$\chi^2(288) = 26726016.12$	p = 0.000	Reject H0 – group-wise heteroskedasticity is present
Serial correlation	H0: no first-order autocorrelation	F(1, 285) = 13.350	p = 0.000	Reject H0 – first-order autocorrelation is present

Based on the theoretical considerations and empirical evidence discussed previously, the model of this study is a panel fixed-effects estimator to examine the relationship between firms' ESG performance and payable turnover days. The model controls for observable firm characteristics that may influence trade credit and includes year fixed-effects to account for macroeconomic or time-specific factors that may affect all firms. The baseline empirical model is specified as:

$$PTD_{it} = \beta_0 + \beta_1 ESG_{i,t-1} + \gamma Controls_{it} + \sum_t \delta_t Year_t + \alpha_i + \varepsilon_{it}$$

Where PTD_{it} represents payable turnover days for firm i in year t, $ESG_{i,t-1}$ is the one year lagged ESG score, the vector $Controls_{it}$ comprises firm size, ROA, leverage, current ratio, and sales growth, $Year_t$ represents the year fixed effects and α_i captures the unobserved time-invariant firm-specific effects.

The coefficient of interest is β_1 because it captures the association between firms' previous year ESG performance and their payable turnover days, conditional on the control variables and fixed effects. This coefficient is expected to have a positive sign, according to the hypotheses in study.

To test the second hypothesis, lagged ESG score is substituted in the main model by each of its lagged individual components' score:

$$PTD_{it} = \beta_0 + \beta_1 E_{i,t-1} + \gamma Controls_{it} + \sum_t \delta_t Year_t + \alpha_i + \varepsilon_{it}$$

$$PTD_{it} = \beta_0 + \beta_1 S_{i,t-1} + \gamma Controls_{it} + \sum_t \delta_t Year_t + \alpha_i + \varepsilon_{it}$$

$$PTD_{it} = \beta_0 + \beta_1 G_{i,t-1} + \gamma Controls_{it} + \sum_t \delta_t Year_t + \alpha_i + \varepsilon_{it}$$

5. Results

5.1. Fixed effects model

Table 7 presents the results of the fixed effects model for each hypothesis in the study. Regression (1) studies the interaction between lagged ESG and payable turnover days, controlling for firm-specific characteristics. In this specification, the coefficient of lagged ESG is negative (-0.7891), indicating that higher ESG scores are associated with lower payable turnover days. This result, although the coefficient is not statistically significant at the 1%, 5% or 10% levels, contradicts the predicted effect of a positive relationship between ESG scores and payable turnover days. Instead, it suggests that higher ESG scores lead to shorter maturities for trade credit payments.

Among the firm-level control variables, current ratio and sales growth have the only statistically significant coefficients, at the 1% and 10% levels, respectively. The result indicates that firms with better short-term liquidity demand less time to pay suppliers. The negative coefficient of sales growth suggests that rapidly growing firms rely on shorter credit periods. Size, ROA and leverage are statistically insignificant.

Despite the lack of statistical significance individually, the model is jointly significant ($F = 3.56$, $p = 0.0001$) at the 1% level; thus, the null hypothesis that all explanatory coefficients are jointly equal to zero is rejected. This means that, when considered jointly, the explanatory variables provide statistically significant information about variations in payable turnover days.

The within R^2 indicates that the model explains only 4.39% of the within-firm variation in payable turnover days. This percentage indicates that most variation in firms' payment practices is due to factors not captured by the variables included in the model.

The estimated value of ρ is 0.8855 in the fixed effects model including the aggregate ESG score. It indicates that approximately 88.55% of the residual variance is attributable to firm-specific effects. This suggests the presence of unobserved heterogeneity across firms.

Table 7 - Fixed-effects regression results.

This table presents the results from the fixed-effects regressions. Payable turnover days is the dependent variable in regressions (1), (2), (3), and (4). Lagged ESG is the main explanatory variable in regression (1), lagged E in regression (2), lagged S in regression (3) and lagged G in regression (4). The sample period is 2019-2024. Robust standard errors clustered at the firm level are reported in parentheses. Statistical significance is reported by * at the 10% level, ** at the 5% level, and *** at the 1% level. Values of Within R^2, F-test and Rho are also reported for each regression.

Dependent variable	**Payable turnover days (1)**	**Payable turnover days (2)**	**Payable turnover days (3)**	**Payable turnover days (4)**
Lagged ESG	-0.7891 (0.7333)			
Lagged E		-1.1206* (0.6126)		
Lagged S			-0.7965 (0.5222)	
Lagged G				0.1756 (0.2939)
Size	2.0307 (22.0434)	2.7091 (21.6541)	2.5727 (21.5763)	-1.2382 (22.2998)
ROA	-30.0548 (166.9188)	-25.5423 (165.5944)	-27.1783 (168.2099)	-22.3282 (168.3054)
Leverage	-47.9767 (68.6537)	-40.0630 (66.7641)	-47.9760 (67.4774)	-38.5379 (67.7912)
Current ratio	-31.9566*** (11.723)	-31.3283*** (11.5945)	-32.1421*** (11.5891)	-32.6917*** (11.6946)
Sales growth	-46.5084* (24.9985)	-48.6124* (24.9222)	-46.5201* (24.9486)	-46.1309* (25.2085)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.0439	0.0515	0.0461	0.0410
F-test	F(11,287) =3.56 (p = 0.0001)	F(11,287) =3.34 (p = 0.0002)	F(11,287) =3.26 (p = 0.0003)	F(11,287) =3.58 (p = 0.0001)
Rho	0.8855	0.8859	0.8857	0.8855

To test the second hypothesis, the total ESG score was substituted with the individual E, S and G components. Regression (2) demonstrates that the environmental pillar is statistically significant (10%), and its negative coefficient suggests a negative association between PTD and the Environmental score. Thus, firms with higher Environmental performance are likely to have shorter payment periods. However, hypothesis H2a predicts exactly the opposite effect. One possible interpretation is that firms with stronger environmental performance may settle their obligations more quickly, resulting in lower payable turnover days.

Regressions (3) and (4) have the social and governance scores as the main explanatory variables, respectively. These two dimensions have no statistically significant effect on payable turnover days. However, their coefficients are negative and positive, respectively, suggesting a negative association between PTD and the social performance of firms, and a positive association between the dependent variable and the governance score.

Although the environmental score does not have a positive effect on PTD, as predicted by H2a, it is the only ESG dimension to have a statistically significant effect on PTD, on the baseline model.

In these three regressions, control variables point to the same conclusion as the first regression (with overall ESG score).

5.2. Robustness check

5.2.1. Accounts payable scaled by total assets

The first robustness check employed was to run the same fixed effects model with a different dependent variable used in similar studies. Wang and Yang, Heo, Tian and Tian, Luo et al. and Palacín-Sánchez et al. use accounts payable over total assets as a dependent variable when studying the relationship between ESG and trade credit. However, this measure does not account for the terms given by suppliers, such as the number of days given to pay for the goods. Instead, it measures the amount of financing given by suppliers. Thus, instead of testing for longer maturities provided by suppliers, the hypotheses are now being tested for larger amounts of credit given by suppliers.

Table 8 presents the regression results with accounts payable over total assets as the new

dependent variable. Everything else in the model remains the same as in the baseline regression.

Table 8 - Regression results of fixed-effects model with AP over Total Assets as the dependent variable.

This table presents the results from the fixed-effects regressions. AP/TA is the dependent variable in regressions (5), (6), (7), and (8). Lagged ESG is the main explanatory variable in regression (5), lagged E in regression (6), lagged S in regression (7) and lagged G in regression (8). The sample period is 2019-2024. Robust standard errors clustered at the firm level are reported in parentheses. Statistical significance is reported by * at the 10% level, ** at the 5% level, and *** at the 1% level. Values of Within R^2, F-test and Rho are also reported for each regression.

Dependent variable	**AP/TA (5)**	**AP/TA (6)**	**AP/TA (7)**	**AP/TA (8)**
Lagged ESG	-0.0000 (0.0001)			
Lagged E		-0.0000 (0.0001)		
Lagged S			0.0001 (0.0001)	
Lagged G				-0.0001 (0.0001)
Size	-0.0105 (0.0105)	-0.0105 (0.0105)	-0.0109 (0.0105)	-0.0105 (0.0105)
ROA	-0.0303 (0.0320)	-0.0302 (0.0319)	-0.0299 (0.0320)	-0.0310 (0.0320)
Leverage	-0.0787** (0.0356)	-0.0785** (0.0355)	-0.0780** (0.0357)	-0.0792** (0.0356)
Current ratio	-0.0165*** (0.0027)	-0.0165*** (0.0027)	-0.0165*** (0.0028)	-0.0165*** (0.0027)
Sales growth	0.0150*** (0.0044)	0.0149*** (0.0044)	0.0150*** (0.0044)	0.0151*** (0.0044)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.1556	0.1557	0.1561	0.1566
F-test	F(11,287) =11.26 (p = 0.0000)	F(11,287) =11.26 (p = 0.0000)	F(11,287) =11.22 (p = 0.0000)	F(11,287) =11.21 (p = 0.0000)
Rho	0.9510	0.9510	0.9509	0.9511

Regression (5) reports the association between lagged ESG and accounts payable scaled by total assets. The coefficient on lagged ESG remains statistically insignificant and negative, although its magnitude is close to 0. Therefore, there is no evidence that firms with a high ESG performance receive a larger amount of trade credit; thus, hypothesis H1 is not supported in this sample and period.

The change to a new dependent variable improves the explanatory power of the model, demonstrated by a within R^2 of 15.56%.

Among the control variables, leverage is statistically significant at the 5% level and has a negative association with trade credit financing. The negative coefficient of leverage suggests that suppliers might restrict credit to riskier companies, even though those firms are the ones in need of more trade credit financing. The current ratio is statistically significant at the 1% level, and the result indicates that firms with better short-term liquidity tend to rely less on supplier financing. The positive and statistically significant (1%) coefficient of sales growth suggests that rapidly growing firms rely on larger amounts of trade credit financing. Following the baseline model, size and ROA remain statistically insignificant.

The results from regression (6) differ from the conclusion provided by regression (2). The main explanatory variable remains lagged E, but the change to a new dependent variable made the coefficient statistically insignificant, although still negative. The negative coefficient suggests that a better environmental score is associated with less credit conceded by suppliers.

Regressions (7) and (8) report a positive association between lagged S and trade credit financing and a negative association between lagged G and trade credit financing, respectively. That represents a change in the sign of the coefficients compared to the baseline regression results. It suggests that firms with better social scores rely on larger amounts of trade credit, and firms with better governance scores, in contrast, receive smaller amounts of credit from suppliers. However, the coefficients are not statistically significant.

Consequently, there is no evidence that better individual ESG scores are associated with higher amounts of trade credit financing; thus, hypotheses H2a, H2b and H2c are not supported in this study. There is also no evidence that the environmental score has a greater influence on trade credit.

5.2.2. Country-Year fixed effects

This study uses a sample composed of firms from four different countries. These countries may have been affected by shocks that are not uniform in all countries. Therefore, to account for potential shocks and other time-varying factors that may affect firms differently across countries, the baseline estimation is re-estimated including country-year fixed effects.

The inclusion of the country-year fixed effects produces results that are broadly consistent with those obtained from the baseline regression. There were some slight changes in the magnitude of the estimated coefficients, but these differences do not alter the main conclusions of the analysis.

Regression (9) reports the same conclusion as regression (1); with country-year fixed effects, lagged ESG scores are still associated with shorter payment periods to suppliers. However, there is no evidence of this association being statistically significant at conventional levels. Additionally, the within R^2 increases slightly when country-year fixed effects are included.

Regression (10) reports that with country-year fixed effects, lagged E is still negatively and statistically significantly (10%) associated with payable turnover days. This evidence is in accordance with the findings of the baseline regression and contradicts what is predicted by the hypothesis H2a.

Regressions (11) and (12) demonstrate that the findings of the baseline model regarding the association between social scores and governance scores and payable turnover days are robust to controlling for country-year fixed effects.

The findings about the control variables are consistent with the baseline model; the current ratio and the sales growth report a negative and statistically significant association with payable turnover days.

Overall, the results indicate that the main findings are robust to controlling for country-specific time effects.

Table 9 - Fixed-effects regression results with country-year fixed effects.

This table presents the results from the fixed-effects regressions, accounting for country-year effects. Payable turnover days is the dependent variable in regressions (9), (10), (11), and (12). Lagged ESG is the main explanatory variable in regression (9), lagged E in regression (10), lagged S in regression (11) and lagged G in regression (12). The sample period is 2019-2024. Robust standard errors clustered at the firm level are reported in parentheses. Statistical significance is reported by * at the 10% level, ** at the 5% level, and *** at the 1% level. Values of Within R^2, F-test and Rho are also reported for each regression.

Dependent variable	**Payable turnover days (9)**	**Payable turnover days (10)**	**Payable turnover days (11)**	**Payable turnover days (12)**
Lagged ESG	-0.7356 (0.7195)			
Lagged E		-1.0606* (0.6101)		
Lagged S			-0.7369 (0.5078)	
Lagged G				0.1394 (0.3129)
Size	7.0376 (22.2871)	7.2901 (22.0194)	7.2529 (21.8866)	4.1892 (22.6504)
ROA	-35.5461 (166.4882)	-30.9196 (165.1648)	-32.9571 (167.8074)	-29.4750 (167.3801)
Leverage	-59.6370 (69.3954)	-49.9568 (68.0328)	-59.3907 (68.4513)	-51.2620 (68.7208)
Current ratio	-33.5519*** (12.1894)	-32.7859*** (12.0455)	-33.6634*** (12.0300)	-34.2969*** (12.1404)
Sales growth	-46.8040* (24.9724)	-48.6030* (24.9204)	-46.8213* (24.9416)	-46.4632* (25.1382)
Firm fixed effects	Yes	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes	Yes
Within R^2	0.0546	0.0612	0.0564	0.0520
F-test	F(26,287) =2.76 (p = 0.0000)	F(26,287) =3.15 (p = 0.0000)	F(26,287) =2.63 (p = 0.0001)	F(26,287) =2.40 (p = 0.0003)
Rho	0.8885	0.8886	0.8887	0.8881

6. Conclusion

The increasing importance of ESG considerations in corporate decision-making together with the crucial role of trade credit as a source of short-term financing for firms raises the question of whether firms' ESG performance can influence their access to supplier financing. Although previous research has examined the relationship between ESG performance and trade credit, the evidence is relatively concentrated in specific geographical contexts and time periods. Therefore, this study investigates whether better ESG performance leads to longer payment periods obtained from suppliers, focusing on firms from Portugal, Spain, France and Italy over the period from 2019 to 2024.

Using a fixed effects panel model, with the payable turnover days as the dependent variable and ESG score as the main explanatory variable, the results do not provide statistically significant evidence that ESG performance affects firms' trade credit. Although the coefficient of lagged ESG is negative, suggesting that firms that perform better in terms of ESG have shorter maturities to pay suppliers, its effect is not statistically significant at conventional significance levels. In turn, the first hypothesis, which proposed that firms with higher ESG scores receive longer payment maturities from suppliers, is not supported by the evidence from this study. The absence of a statistically significant result could be partly explained by the limited within-firm variation in ESG performance

The analysis that assessed whether the individual environmental, social and governance components have different effects on trade credit also led to a different conclusion. Although two of the individual dimensions' coefficients are not statistically significant, the environmental score coefficient is negative and statistically significant. A negative association between the environmental pillar and the length of the period defined to pay suppliers contradicts what is predicted by hypothesis H2a.

These findings differ from most of the existing literature, which, in general, reports a positive relationship between sustainability performance and trade credit. The most recent study, by Palacín-Sánchez et al. (2026), identifies a positive relationship between ESG performance and trade credit among European listed firms and shows that this relationship varies according to the institutional environment.

There are numerous factors that may contribute to these differences. First, the present study

focuses on a small sample of European countries, while much of the previous evidence is concentrated in China or uses broader international samples. Differences in the institutional environments, supplier relationships and financing systems could be some of the factors that affect the suppliers' decision to concede credit. Second, the time period covered by this study is a relatively recent period, which likely reflects the growing development and adoption of ESG disclosure practices.

The robustness analysis provides further support for the conclusion of the baseline model. The use of country-year fixed-effects does not change the main conclusion of the baseline models.

Re-estimating the fixed-effects models using accounts payable relative to total assets as an alternative measure for trade credit financing does not change the main finding when it comes to ESG, social performance and governance. In fact, the coefficient of the lagged ESG remains statistically insignificant, as do the coefficients of the two individual ESG components. On the other hand, the coefficient of the environmental score is now also statistically insignificant. This robustness test finds no evidence that better ESG, E, S or G performance is associated with larger amounts of trade credit.

However, the alternative specification provides evidence regarding some of the conventional determinants of trade credit financing. Leverage and the current ratio are negatively and significantly associated with trade credit financing, suggesting that firms with higher short-term liquidity tend to rely less on supplier financing. In contrast, sales growth is positively and significantly related to trade credit financing, indicating that firms experiencing more growth can rely more on large amounts of trade credit to manage their financing needs. In contrast, the baseline regression (using PTD) demonstrates that high-growth firms need shorter maturities to pay their obligations to suppliers. Due to the difference in interpretation of results from the two measures of trade credit employed, these two explanations can co-exist since a firm might ask for a large amount of financing from suppliers but have the capacity to pay it within a short period of time.

The findings from the present study contribute to the existing literature by providing additional evidence on the relationship between ESG performance and trade credit in a recent European setting. Rather than confirming the previous evidence of a positive relationship, the results do not identify the same significant positive relationship. This

contributes to a better understanding of the relationship, reflecting that ESG performance may not be a universal determinant of trade credit, and the relationship may depend on factors such as the characteristics of the firms, countries and institutional environments considered.

Nevertheless, some limitations should be acknowledged. First, this analysis is based only on firms from four European countries, limiting the generalisation of the findings to other contexts. Second, the availability of ESG information restricts the sample composition and period, resulting in an unbalanced panel. Finally, even though the empirical strategy controls for firm and year fixed effects and a set of firm-specific characteristics, the results cannot fully exclude the influence of other unobserved factors.

To address these limitations, future research could extend the analysis to a larger European sample and examine how the relationship between ESG performance and trade credit changes across different institutional environments. Examining interactions between ESG performance and firms' financial constraints could help provide more information about the conditions under which ESG becomes a determinant for supplier financing. Ultimately, further research could explore whether the importance of ESG for trade credit financing has shifted over time as ESG disclosure has become more global and standardised.

In general, this study does not find sufficient evidence to conclude that higher ESG performance leads to better access to trade credit among this sample. Nonetheless, the empirical evidence should not be interpreted as evidence that ESG is not meaningful to suppliers' trade credit decisions. By examining a recent sample of companies from Portugal, Spain, France and Italy and considering the overall ESG score and its individual components' scores, this study provides insights on an emerging research area and emphasises the need to continue investigation into how non-financial information is incorporated into supplier financing decisions.

Appendices

Appendix A – Variable description

Table 10 - Description of variables extracted from LSEG Workspace.

Variable name	Refinitiv variable name	Description
Accounts Payable	Accounts Payable	Amounts owed to creditors or suppliers for materials and merchandise acquired or for services provided within the normal operations of business (EUR).
Cost of revenues	Total cost of revenues	Represents all costs of goods and services (EUR).
Current assets	Total Current assets	Represents the sum of prepaid expenses, receivables and loans after deduction of provisions for doubtful accounts, cash and short-term investments, the value of assets from discontinued operations, fair value of short-term financial instruments or contracts whose value is derived from some other financial measure, total of all stocks and inventories and other current assets (EUR).
Current liabilities	Total Current liabilities	Represents the sum of a company's short term liabilities (due within one year) (EUR).
Debt	Total Debt	Represents the total value of all borrowings reported by the company. Includes short term and long term debt (EUR).
ESG	ESG Score	Overall company score based on the self-reported information in the environmental, social and corporate governance pillars (range: 0 to 100).
E	Environmental Pillar Score	Measures a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. Reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value (range: 0 to 100).

S	Social Pillar Score	Measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. Reflects the company's reputation and the health of its license to operate, which are key factors in determining its ability to generate long term shareholder value (range: 0 to 100).
G	Governance Pillar Score	Measures a company's systems and processes, which ensure that its board members and executives act in the best long term interests of its shareholders. Reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value (range: 0 to 100).
Net income	Net income after minority interest	Represents total net income/loss reported by the company after provision for income taxes, equity in earnings, after-tax adjustments, discontinued operations, extraordinary items and minority interest, but before other adjustments to net income, preferred dividends and other distributions (EUR).
Total assets	Total Assets	Represents the total assets reported by a company, or, when total assets are not reported, the sum of total current assets and total non-current assets (EUR).
Total revenue	Total Revenue from business activities	Represents total consolidated revenue of a company (EUR).

Appendix B – Descriptive statistics by country

Table 11 - Descriptive statistics of the baseline model variables by country.

Variable	Obs	Firms	Mean	Std. dev.	Median
France					
Payable turnover days	735	138	629.37	6271.12	112.21
ESG (lagged)	735	138	61.75	20.07	66.04
Environmental pillar (lagged)	735	138	63.67	24.92	70.18
Social pillar (lagged)	735	138	68.35	21.69	73.56
Governance pillar (lagged)	735	138	50.53	23.67	51.99
Size	735	138	22.56	1.76	22.59
ROA	735	138	0.02	0.13	0.03
Leverage	735	138	0.31	0.17	0.30
Current ratio	735	138	1.45	0.77	1.27
Sales Growth	735	138	0.07	0.49	0.05
Italy					
Payable turnover days	405	86	227.08	236.42	148.99
ESG (lagged)	405	86	57.30	18.94	59.65
Environmental pillar (lagged)	405	86	52.22	23.94	53.85
Social pillar (lagged)	405	86	64.08	20.56	66.98
Governance pillar (lagged)	405	86	51.44	21.52	52.35
Size	405	86	21.63	1.74	21.60
ROA	405	86	0.03	0.08	0.03
Leverage	405	86	0.33	0.18	0.31
Current ratio	405	86	1.38	0.70	1.25
Sales Growth	405	86	0.11	0.32	0.08
Portugal					
Payable turnover days	68	12	116.71	81.19	94.04
ESG (lagged)	68	12	65.29	12.37	65.78
Environmental pillar (lagged)	68	12	67.93	15.96	70.55
Social pillar (lagged)	68	12	72.74	15.09	73.87
Governance pillar (lagged)	68	12	50.51	21.18	51.61
Size	68	12	22.46	1.02	22.39
ROA	68	12	0.04	0.04	0.04
Leverage	68	12	0.39	0.13	0.36

Current ratio	68	12	1.09	0.51	0.96
Sales Growth	68	12	0.07	0.20	0.06
Spain					
Payable turnover days	295	55	267.04	426.79	131.47
ESG (lagged)	295	55	63.43	17.17	66.04
Environmental pillar (lagged)	295	55	64.05	22.20	69.40
Social pillar (lagged)	295	55	74.97	18.57	79.39
Governance pillar (lagged)	295	55	46.54	21.12	47.77
Size	295	55	22.13	1.64	22.09
ROA	295	55	0.03	0.08	0.03
Leverage	295	55	0.32	0.19	0.31
Current ratio	295	55	1.60	1.61	1.24
Sales Growth	295	55	0.10	0.38	0.05

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