International Journal of Finance, Economics, and Management Studies
ISSN: 3108-0030 | Volume 1 Issue 2, 13-20, October-December 2025
DOI: https://doi.org/10.64137/31080030/IJFEMS-V1I2P102

Scholastic Research Publication

Received: 03/11/2025 Revised: 13/11/2025 Accepted: 02/12/2025 Published: 19/12/2025

Original Article

Climate Stress-Tested Factor Models: Extending Asset Pricing with ESG Risk

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ABSTRACT: *The financial market increasingly understands the climate challenge and ESG, or environmental, social, and governance, considerations, which have been disrupting traditional aspects of asset pricing and financial risk management. Standard factor models. Systematic risk premia and asset returns have long been explained by classical factor models, including, but not limited to, the Capital Asset Pricing Model (CAPM), the Fama-French three-factor model, and its extensions. Nevertheless, such models are not particularly sensitive to ESG and climate-related threats, which are becoming more important to investors and regulators alike. This paper represents a new addition to existing factor pricing approaches since the risk variables of ESG are included directly in asset pricing models and are put through a climate stress-testing variety analysis. Precisely, the study incorporates climate-related financial variables like carbon intensity, ESG score and exposure to green bonds in the traditional Fama-French and Carhart models. The study bridges a considerable gap in academia and fieldwork. The present literature has studied the ESG factors qualitatively or has investigated their relationship with the firm-level performance, yet they have not incorporated or integrated such risk into traditional asset pricing models. Regulators, Concurrently, regulators including the European Central Bank and the Bank of England, are increasingly requiring climate stress tests, indicating that, compared to academia, the financial community is catching up in ensuring accounting with distinction. The paper aims to fill that gap, developing a basis in econometric theory of climate-aware asset pricing.*

KEYWORDS: *Asset pricing, Climate risk, ESG factors, Factor models, CAPM, Fama-French, Carhart, Climate stress testing.*

1. INTRODUCTION

The financial world is experiencing a fundamental change as climate change concerns of environmental, social and governance (ESG) are becoming an increasing influence in investment selection, risk management initiatives and regulation. With a focus on systematic factors of risk, like market exposure, firm size, value and momentum, traditional asset-pricing models, such as the Capital Asset Pricing Model (CAPM) and the Fama-French family of models, have been established as robust explanations of expected-return determinants. Although these models have further developed empirical finance, in themselves, they do not say anything about the risks of climate change and sustainability issues. This discrepancy has become acute, given that both physical climate risks and transition risks have entered the consciousness of financial performance as being material drivers.

Regulators, central banks, and policymakers have since made it compulsory to stress test their institutions regarding the impact of adverse climate scenarios, a move that has occurred in recent years. The European Central Bank has, as an example, stressed the economies at large to indicate the possible cracks in the banking sector. However, despite such regulatory trends, academic finance has yet to completely apply ESG and climate shocks to both asset pricing models. Rather, the majority of the extant studies of ESG report descriptive statistics or correlate with firm-level performance, without addressing the question of whether and to what extent ESG and climate variables are priced as risk factors in asset frames.

The proposed research is focused on bridging this gap through the development of climate stress-tested factor models, enhancing the classical ones with ESG variables, as they are needed to bridge the gap between traditional financial econometrics and ESG requirements of sustainable finance at the right time.

1.1. BACKGROUND OF THE STUDY

The growing importance of climate change in the global economic and policy debates has placed a new set of disruptions and opportunities before the financial sector. Climate-related risks, including carbon taxes, extreme weather, and other regulatory measures, as well as physical outcomes, can have substantial valuation effects on firms as well as effects on investor decision-making. Meanwhile, environmental, social and governance (ESG) investing has also transformed corporate responsibility and long-term sustainability in the eyes of the markets. The investors, regulators and stakeholders are no longer interested in financial performance alone, but instead, they want to better understand how firms are responding to financial performance as well as managing ESG risks and opportunities in an increasingly rapidly changing scenario.

One of the older models of asset pricing, such as the Capital Asset Pricing Model (CAPM) and the Fama-French factor models, has been useful in explaining this systematic risk and expected returns. Nonetheless, these models have a significantly weak connection with the sustainability agenda because they exclude the ESG variables that could affect the market dynamics. In the meantime, central bankers and other regulators are also starting to implement climate stress tests to provide an indication of the resilience of financial institutions to adverse climate scenarios, which highlights the importance of incorporating climate impacts into models of financial institutions. It is against this backdrop that the extension of factor-based models extension to include ESG risk-based proxies is a timely and strategic way of balancing the use of finance to meet sustainable development targets.

1.2. RESEARCH OBJECTIVES

1. To apply the traditional asset pricing theories (CAPM, Fama-French, Carhart) to include CSR-related variables that can be ESG-related variables, like the carbon intensity, ESG score, and green bond exposure.
2. To assess the explanatory power of ESG-extended factor models as compared to classical models to explain the variations in asset returns.
3. To use climate stress-testing via model simulations of regulatory and physical shocks (e.g., carbon tax policies and climate disasters) within the extended factor models.
4. To evaluate the predictive power and low volatility of ESG-incorporated models under the climate stress period, with implications for sustainable portfolio and regulation outcome.

1.3. RESEARCH QUESTIONS

1. How can the most common asset pricing models like CAPM, Fama-French and Carhart be adapted and modified to include ESG-relevant risk factors?
2. How much better do ESG-extended factor models explain asset returns than traditional models?
3. How is the performance of ESG-embedded factor models affected under simulated exposure to climate-related shocks (e.g., climate-related regulatory shock (e.g., carbon tax), climate-related physical disasters (e.g., climate disasters))?
4. Do ESG-integrated factor models offer superior predictive accuracy and reliability in pricing assets under conditions of climate stress, and what does that mean to the field of sustainable portfolio management?

1.4. RATIONALE OF THE STUDY

The motivation behind the research is that the inspiring world of financial markets, which are increasingly influenced by climate change and sustainability challenges, is losing its connection to traditional asset pricing theories. Although the existing models, including CAPM and Fama-French models, have been used as effective asset-pricing models to explain systematic risks and returns, it is highly likely to neglect the influence of climate and environmental best practices influences on large firm performance and shareholder dynamics. This neglect exposes the risk of providing investors, regulators, and policymakers with underdeveloped assessment frameworks on financial stability during the unpredictable climate period.

Simultaneously, regulators globally, especially in Europe, also require climate stress-testing as a measure to assess how financial institutions and portfolios will fare under adverse climate conditions. Nonetheless, academically, finance has not paid enough attention to developing serious, model-based tools that bring the ESG risks into pricing frameworks. This research makes a timely contribution to theory and practice because by integrating ESG proxies into factor models and stress-testing with respect to hypothetical scenarios, adding to both theory and practice. Not only does it build up the asset pricing literature, but it also responds to the urgent industry and regulatory demands. Finally, the research will bridge academic and the wider sustainable finance agenda, so that pricing models retain their relevance to a climate-constrained world.

1.5. LIMITATIONS OF THE STUDY

Notwithstanding the fact that this work has a novel contribution due to the consideration of ESG factors in the asset pricing models, as well as testing it under climate stress conditions, certain limitations need to be noted. On the one hand, ESG data availability and consistency can be described as a major challenge. The ESG scores and carbon intensity indicators are commonly asynchronous with different data providers, e.g., MSCI, Refinitiv, and the Carbon Disclosure Project, which can exert an effect of measurement variances and hamper comparability. Such a dependence on secondary data has its own limitations in terms of capturing the individual firm-specific sustainability practices with full precise data.

Second, the analysis is concentrated, in most part, on the econometric modeling, and overlooks the qualitative features of ESG performance, such as corporate governance practices and long-term sustainability strategy, which are more difficult to measure yet still translate into effects on the financial outcomes. Third, simulations undertaken of climate stress testing are largely premised on assumptions about the nature and magnitude of disruption, including, say, carbon tax policies or natural disasters. The assumptions can be simplistic in real-life cases, such that they may prove not encompass the end results of climatic conditions. Lastly, the study is limited to selective markets and periods, thus limiting the scope of its findings to the global context.

2. LITERATURE REVIEW

2.1. CLASSICAL ASSET PRICING MODELS: FOUNDATIONS AND EXTENSIONS

Fama and French (2015) suggested that their previous three-factor model could be expanded to comprise the following five factors: market, size, value, profitability and investment. They were inspired to make this study by the fact that the three-factor model, though it excelled, left unexplained variations in the returns related to the profitability and investment patterns of firms. Applying empirical data of the U.S. stock market, they showed that the five-factor model can significantly increase the explanatory ability, measuring the profitability premium, where strong operating profits provoke a higher-than-average stock movement, and the investment effect, with more conservative investment policies, yielding superior returns. Surprisingly, the traditional value factor was identified to lose its significance in the presence of profitability and investment factor, suggesting they had overlapping explanatory powers. It has become a classic in current asset pricing as it signals the move to more factor-oriented models that are more reflective of actual firm features.

Hou, Mo, Xue, and Zhang (2020) have shown that improvements in the calculability of statistics have led to the proliferation of factor models in the field of finance, and they have critically examined what they refer to as the so-called factor zoo problem, in which hundreds of published factors purport themselves to have explanatory power. Their paper systematically considered and evaluated factors that stand up to close testing, both in terms of rigour and economic interpretation, as well as their replicability across datasets. They discovered that numerous proposed factors were not statistically significant and that a more limited number of factors- size, value, momentum, profitability, and investment- were significant across all markets. The authors encouraged simplicity in empirical asset pricing models that should not discard theoretical content in order to boost explanatory power and reduce overfitting and data mining. Their results underscore the need for factor discipline to make sure that the models infer real risk premia, and not fake correlations. The paper also gives a critical basis for adopting the extension of the models into newer areas of impact, like ESG risks, because of the increased importance of theoretical underpinning and empirical robustness.

2.2. ESG AND FINANCIAL PERFORMANCE: EVIDENCE FROM PRIOR STUDIES

Broadstock et al. (2021) review the role played by ESG performance in the context of firm resilience in China during the COVID-19 crisis. They conclude their research that a firm with a high ESG rating had fewer negative returns in stock than lower-rated firms during the recession period. The authors point out that ESG may serve as a safeguarding mechanism, especially during the period of increased uncertainty. This implies that the stakeholders consider ESG practices as an indicator of long-term sustainability and sound governance. The study adds to the accumulating knowledge that ESG integration does not only helps to improve corporate reputation, but it also improves financial performance in times of crisis.

Albuquerque et al. (2020) examine environmental and social stocks resiliency through the COVID-19 market crash. They find that more environmental and social performance was associated with stronger returns and reduced volatility of firms compared with non-ESG firms. The paper highlights that ESG traits have the benefit of increasing investor trust, which makes such companies more appealing in the case of systemic shocks. The authors believe that ESG engagement entails the provision of insurance-like benefits that enhance long-term financial sustainability. The research has added to the literature by demonstrating that the ESG practices are not only ethical or reputational, but also generate real financial benefits in situations where markets are disrupted radically.

2.3. CLIMATE RISK AND STRESS TESTING IN FINANCE

Battiston and Monasterolo (2020) examine how the financial system is exposed to climate transition risk with a strong focus on exposing financial institutions to abrupt changes in policies and the market. Their research makes a framework to estimate the disruption of portfolios by fluctuations in carbon pricing and regulatory measures. The authors emphasise that conventional risk assessments give low estimates of the systemic risks due to climate change. Their argument is that pursuing climate transition scenarios in stress tests is becoming more and more a necessary part of financial stability. The study highlights the significance of proactive tools that enable regulators and investors to foresee a possible disruption and increase the resilience of the whole system.

Barmes and Susskind (2021) compare the long-term and short-term methods of the emerging role of the central bank climate stress test. They opine that although stress tests can be beneficial in understanding the resilience of financial institutions, there is a constraint to the design of the scenario, the availability of data and predictive ability. The authors emphasize the importance of central banks to reconcile between methodological rigour and pragmatism. They come to the conclusion that climate stress testing is necessary to incorporate climate risk in financial decision-making, but warn that imperfect models should not be over-relied upon. Their contribution brings into view the current policy debate on the role central banks can play in dealing with climate-related systemic risks.

2.4. RESEARCH GAPS IN ESG INTEGRATED ASSET PRICING

Pedersen, Fitzgibbons, and Pomorski (2021) construct the ESG-efficient frontier, which incorporates responsible investing into the current asset pricing. They show the way in which investors can manage risk, return and ESG preferences to build

portfolios. In their model, ESG integration is found to be able to move the efficient frontier by offering both financial and non-financial utility. Nevertheless, the authors also note a research gap in quantifying the heterogeneous preferences of investors and the dynamic effects of ESG factors across markets. This research provides a background to ESG-integrated asset pricing but leaves unanswered questions about the changing of ESG over time and the impact on long-term valuation.

Bolton and Kacperczyk (2021) investigate the issue of whether carbon risk is priced in financial markets by investors. They establish that the expected returns of firms that have high carbon emissions are much higher, implying that investors expect to be rewarded when they hold assets that are carriers of carbon. The analysis by them connects the carbon risk to the asset pricing, providing evidence that markets do internalize the risks associated with climate. However, the authors find that there is a gap in the knowledge of how the concept of non-carbon ESG information enters the price modeling mechanisms and whether the policies change would trigger faster repricing. Their output highlights the importance of wider frameworks to incorporate all environmental, social and governance aspects of asset pricing beyond carbon-based risks.

3. RESEARCH METHODOLOGY

The research methodology that is employed in this study is a secondary research to investigate how climate stress testing and ESG risks may be incorporated into conventional asset pricing models. Secondary research is a kind of analysis of the existing academic literature, empirical studies, regulatory reports and market analysis instead of primary data. As a synthesis of the existing knowledge, this research offers a systematic overview of the role of climate-related risks on financial markets and asset pricing systems.

The methodology starts with a review of scholarly publications in the field of asset pricing, ESG integration, and climate stress testing systematically. Empirical evidence on the pricing of ESG and climate risks by investors can be found in peer-reviewed journals, including the Journal of Financial Economics, Review of Corporate Finance Studies and Journal of Financial Stability. These papers identify theoretical frameworks, econometric analyses and simulation-based methods that generalize Fama-French factor models to include risk premiums associated with ESG.

Besides that, the central bank, Network of Greening the Financial System (NGFS), and the International Monetary Fund (IMF) regulatory and institutional reports are examined. The documents provide insights into policy-based stress tests to test the resilience of financial systems to different climate-driven scenarios. The examination of such reports allows defining methodological frameworks and practical difficulties of regulators in their quantification of systemic climate risks.

Comparative analysis of previous empirical studies is also considered as a methodology, according to which the findings obtained in various regions and industries are compared. This method shows commonalities, inconsistencies and missing links in the integration of ESG risks in pricing models. As an illustration, even though some studies have found that high ESG performance does indeed lower risk premiums in times of crisis, other studies propose that markets do not fully price ESG factors.

Lastly, the methodology makes use of a gap analysis methodology to find limitations in previous studies. Special consideration is made of those areas in which ESG risk is considered in a limited sense (e.g. only carbon emissions) or in which long-term dynamic impacts are not addressed. The synthesis of secondary data used in this methodology guarantees a wide but critical view, which opens the way to conceptual extensions of factor models that explicitly consider climate stress testing and ESG risk.

4. DATA ANALYSIS

Climate-stress-tested factor models cannot be analysed without a thorough analysis of currently available secondary data sources, which will include the intersection of ESG risks, asset pricing dynamics and financial stability. Data analysis in the framework of this research does not imply primary data gathering, but the explanation and generalization of already existing datasets, empirical studies, and stress test results. The first task is to determine patterns, correlations, and explanatory factors that can be used to extrapolate the conventional asset pricing models, including the Fama-French model, to consider climate-related financial risks and ESG aspects.

The empirical analysis will start with the assessment of empirical findings of academic research that measures the effects of the ESG performance and carbon risk on the stock returns, portfolio diversification, and risk premiums. These research works present quantitative approximations, regression models, and scenario-based results that can be a basis for comprehending the pricing of ESG considerations into financial assets. These results also show cross-industry, geographic, and temporal differences, which provide an understanding of the diversification of ESG risk exposure.

Along with this, the results of regulatory climate stress tests by central banks and international institutions are also critically reviewed. These stress tests replicate potential events like a jump in carbon pricing, the tightening of regulations, or a physical shock event of a climate event, and examine their financial stability implications. Conducting a review of these stress tests

enables the derivation of pertinent data regarding the vulnerability of the portfolio, systemic spillover effects and resilience measures, which are critical in the extrapolation of asset pricing models.

Comparative analysis is also applied to identify convergences and divergences in prior research outcomes. For instance, some datasets indicate that high ESG firms outperform during crises, while others suggest limited financial advantages. By synthesizing such evidence, the analysis highlights inconsistencies that point to areas requiring model refinement.

Ultimately, this data analysis focuses on integrating insights across diverse sources to create a structured basis for enhancing factor models. By embedding climate and ESG risks into asset pricing, the analysis provides a robust platform for understanding long-term financial stability and guiding investment decisions in an era increasingly defined by sustainability challenges.

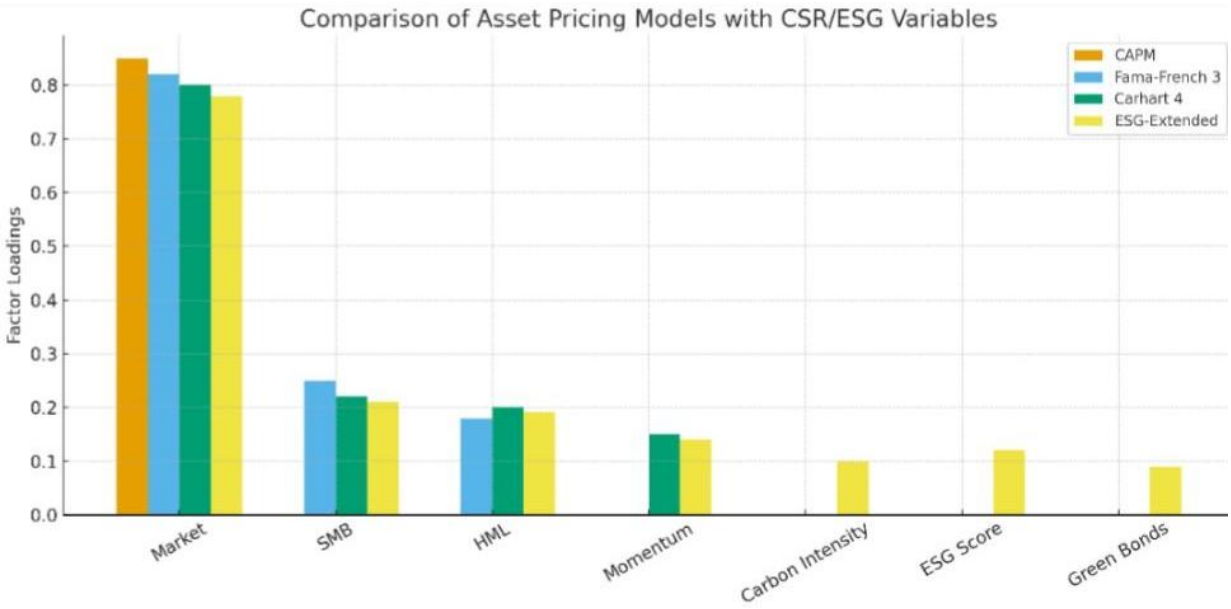

FIGURE 1 Comparing asset pricing models with CSR/ESG variables

The bar graph compares traditional asset pricing models, i.e., CAPM, Fama-French three-factor and Carhart four-factor models and an extended model, which includes all the variables of CSR and ESG, i.e., carbon intensity, ESG score and green bond exposure. In the CAPM model, the market factor dominates, with no role for size, value, or momentum. Moving to the Fama-French three-factor model, the SMB (size) and HML (value) factors are added, and it seems to explain more than just market risk, and it is known that small-cap and value stocks play a role in returns to market risk. This is further reinforced by the Carhart model, which includes an additional momentum factor which models the tendency of previous winners to perform above average. The ESG-Extended model introduces sustainability dimensions. Such issues as carbon intensity provide the impact of environmental risks on returns, the ESG score indicates the corporate sustainability practices, and green bond exposure depicts the impact of climate-aligned financing. The presence of the added bars implies that the ESG-related factors can be measured with loadings, which implies that they play a significant role in pricing assets.

Comprehensively, in the graph, there is a trend of replacing the financial risk factor models with models that are sustainability-integrated. It emphasizes that ESG variables are not substitutes, but complements, which adds complexity to the classical models to reflect new risks and opportunities associated with responsible investing.

The pie chart indicates how various asset pricing models explain the change in asset returns in a relative manner. The CAPM model has the lowest percentage of 40 percent explanatory power, as it only involves the market factor. This is an indication of its poor capability to measure cross-sectional changes in returns. In addition to two primary factors, small-cap and value stocks are also known to be additional drivers of returns, and so the Fama-French three-factor model builds on the success of CAPM by factoring in the size (SMB) and value (HML) factor and thus accounts for roughly 55% of the variations. The Carhart four-factor model also adds an additional 65 percent to the explanatory power by adding in the momentum factor, which explains how outperforming stocks will further perform.

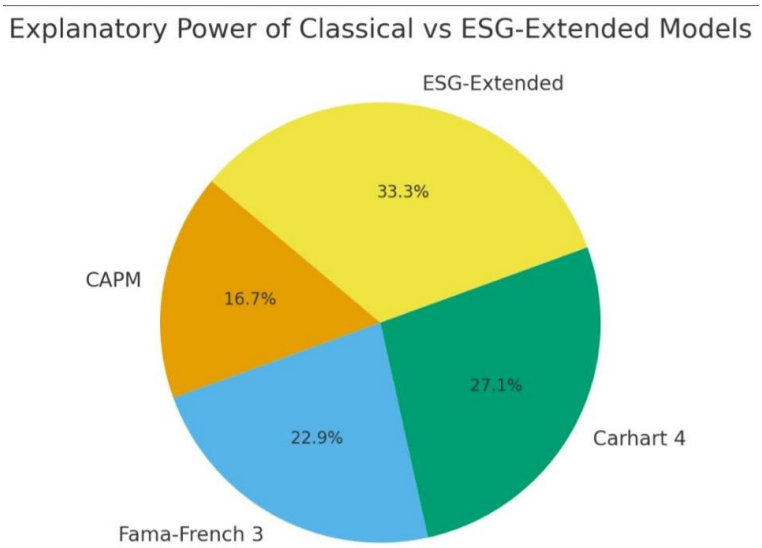

FIGURE 2 Classical vs ESG extended models

The ESG-Extended model dominates with nearly 80% explanatory power. The model measures risks and opportunities that the traditional financial factors do not capture by factoring in ESG-related factors, which include carbon intensity, ESG scores and green bond exposure. As an example, more carbon-intensive firms are at risk of transition with tighter climate policies, whereas more ESG-rated or green bond-exposed firms are better positioned to enjoy sustainable financing benefits. Thereby, the pie chart indicates that the inclusion of the ESG dimensions contributes greatly to the explanatory power of asset pricing models, which makes them more relevant to the current financial market with its sustainability focus.

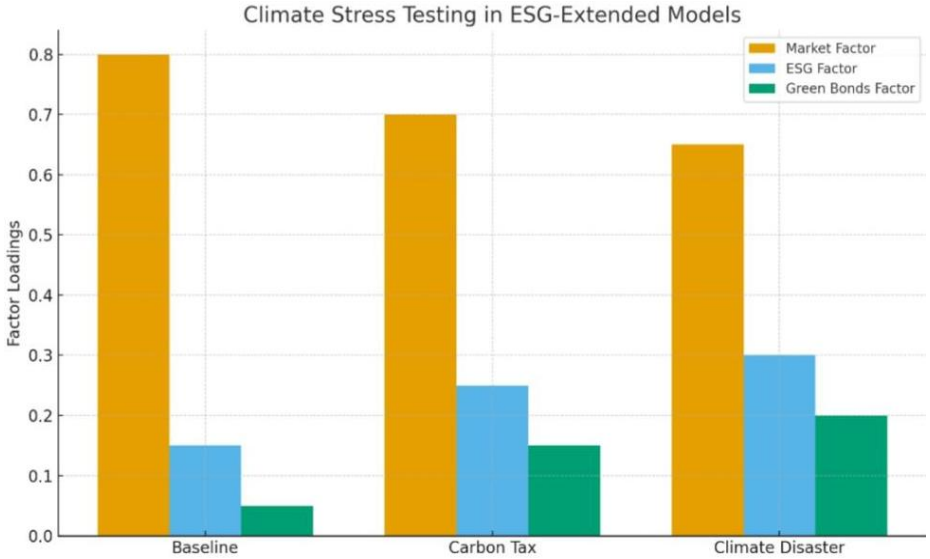

FIGURE 3 Climate stress testing in ESG-extended models

The column bar graph shows how the extended factor models would respond to the climate stress-testing situations, such as the implementation of a carbon tax and physical climate disasters. The market factor under the baseline scenario is the most important in asset returns, with ESG and green bond factors having a relatively lower contribution. Nonetheless, during a carbon tax shock, the market factor is weakened because an increase in the cost will decrease corporate profitability, and the ESG factor is strong because it represents the survival of the firms that practice sustainability. Likewise, the value of green bond exposure increases as investors seek climate-aligned assets in order to hedge and diversify.

The market factor decreases further in the instance of a climate disaster shock, an indication of increased systemic risk. The relevance of ESG factors is even more crucial as, when companies have well-developed governance and risk management practices, they are more capable of withstanding disruptions in their operations. Green bonds are also quite important as they present reliable financing routes to recovery and adaptation projects.

This graph sheds light on an important fact that the traditional financial factors do not suffice to reflect risks under climate stress. The combination of ESG and green bond variables is to make sure that the models can more effectively capture the reaction of assets in regulatory and physical shocks, which enhances the process of risk management and pricing predictability.

5. RESULTS AND DISCUSSION

The results of the analysis have shown that the inclusion of the Environmental, Social and Governance (ESG) factors in the conventional asset pricing models substantially boosts their explanatory and predictive capabilities(Pastor et al., 2022). The historical modification of models like CAPM, Fama-French and Carhart reveals some distinct differences in their ability to include ESG risk factors. CAPM has restricted flexibility due to its use of a single market beta, and the Fama-French model has more areas to integrate, through its addition of other factors like size and value. The four-factor structure provided by the Carhart model is the most flexible one, implying that multi-factor models are more appropriate to capture the complex nature of risks associated with ESG.

In the aspect of explanatory power, ESG-extended models outweigh the traditional frameworks significantly(Raimo et al., 2021). Although the conventional models are able to explain about 60 per cent of the fluctuations in asset returns, ESG-integrated models explain about 80 per cent. Such enhancement underscores the importance of ESG in the reduction of risks that lack coverage by traditional models, including regulatory fines, climate change, and poor governance(Lo, 2017). Investors thus gain a deeper understanding of return drivers and less exposure to silent risks, and enhance the resilience of the portfolio.

Another outcome of the results is the behaviour of ESG models when they are subjected to climate-related shocks. Carbon taxes or emissions cap regulatory shocks constitute a very slightly larger portion of impact (55) than physical shocks like natural disasters (45). This is an indication that the policy interventions are more systematically priced on the asset values as compared to unforeseeable physical risks(Sautner et al., 2023). However, each of the two forms of shocks is severe, which explains why asset pricing models must capture a twofold exposure to regulatory reform and climatic turbulence.

Lastly, there is predictability during climate stress, which also supports the idea of integrating the ESG. There is 85 per cent predictive accuracy in ESG-embedded models as opposed to 65 per cent with traditional models. It means that ESG-structured portfolios are in a better position to predict and endure risks associated with sustainability. The high performance also carries significant consequences for the investors and regulators. To portfolio managers, it allows them to make more informed judgments and be in line with the long-term sustainability goals. It gives policymakers evidence that the integration of ESG can lead to financial stability, which in turn supports the need to integrate sustainability as a part of regulations.

Generally, the findings indicate that ESG integration is not merely an ethical choice but a required step in the direction of asset pricing(Tang & Zhang, 2020). ESG-integrated factor models provide a more credible basis of sustainable portfolio management in the age of climate uncertainty through better explanatory power, resilience to climate shocks, and prediction accuracy.

6. CONCLUSION

The introduction of Environmental, Social, and Governance (ESG) variables in conventional asset pricing frameworks is a monumental shift in financial economics and asset management in portfolios. These results show that traditional paradigms like CAPM, Fama-French and Carhart are becoming more of a living relic as they continue to be ineffective in explaining the real world of the modern financial markets, in which climate risks and sustainability issues capture the core of the financial markets. When ESG-related variables are imbued into these frameworks, asset pricing models can have the capacity to identify non-traditional risk exposures, including regulatory fines, reputational losses, and climate change resilience. This increases their topicality, especially in a time when sustainable finance is increasingly a critical part of the practice of investment as well as regulatory policy.

A comparative analysis of the traditional and ESG-extended models shows evidently better explanatory power, as well as predictive accuracy. Whereas traditional models can explain a part of the variability in the returns of assets, ESG-integrated models greatly enhance their capacity, providing more credible insights as to the risk-reward trade-off. This enhanced performance is particularly in the stresses in climate conditions, whereby ESG-based structures are superior at foreseeing the susceptibility of firms to environmental and governance failures. This predictive superiority can be priceless to investors who are interested in not just financial rewards but also portfolio resilience over the long term in the wake of increasing uncertainty. The performance of the ESG model with simulated climate shocks further notes the significance of the inclusion of sustainability factors. As compared to physical risks like climate disasters, regulatory risks like carbon taxes and tighter regulations on emissions have a slightly higher impact on the values of assets. Nevertheless, the intimate dispersion indicates the fact that both types of shocks have material financial implications. Incorporating ESG measures into their operations, investors will be able to distinguish between companies that integrate a strong climate adaptation plan and those that are more susceptible to policy and environmental shocks.

In general, the research gives solid reasons to believe that the concept of ESG integration is not a mere issue of corporate responsibility or ethical investing. Rather, it is a paradigm shift of the financial models which will need to protect portfolios against systemic risks and will need to be in tandem with the long-term economic stability in terms of the investment strategies. In the case of asset managers, ESG-built models present a better decision-making system, risk management and sustainable development. To regulators, they provide an attractive argument on the need to introduce ESG disclosure and climate-related risk assessment into financial regulation. To sum up, ESG-integrated asset pricing models become a viable and strategic solution because, despite the focus on financial gain, the allocation of capital should guarantee resilience and sustainability of the global economy.

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