ESG DERIVATIVES AND FACTORING SUSTAINABILITY IN INVESTMENT MANAGEMENT

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ABSTRACT

Recent heightened concerns on climate change have been reflected in the financial markets. In addition to the 2021 United Nations Climate Change Conference (COP26) being hosted in Glasgow later this month, there have been other instances of extreme weather. According to the projections of several industry experts, the market for sustainable finance expanded by almost 30 percent in 2020. Environmental, social, and governance ("ESG")-related derivatives have been available for a few years, but this hitherto niche market is booming. This increase lends credence to the notion that derivatives play a crucial role in the promotion of ESG objectives on financial markets and the transition to a global green economy. This essay examines the fundamental applicability of Derivatives to ESG Implementations. It has been examined how Hedging and Risk Management can be applied to Corporate Governance, Climate Risk Management, Environmental Stability, and Promoting Social Justice. ESG Derivatives play a significant part in ESG promotion as a whole and can act as a mission-critical tool for reaching the UNSDG 2030 targets. The ethical aspect of ESG Derivatives is a major topic that should be studied in future research.

Keywords: Derivatives, ESG Derivatives, ESG CDS, Carbon Credits, RIN, ISDA.

INTRODUCTION

Sustainability is a pressing priority for both current and future generations. To promote long-term ecological, social, and governance balances, it is necessary to avoid hurting the environment or depleting natural resources. Furthermore, massive sums of money are necessary to affect the transition to a more sustainable economic system (in clean energy, mobility and so on). Businesses' ability to weather economic, political, and social storms is dependent on their ability to properly manage ecological, governance, and social risks. Traditional investment criteria are insufficient to manage these risks because of the environment's lifetime, its resources, and the consequences of climate change, as well as a lack of transparency on performance against these standards.

As a center for a variety of investment strategies, the financial markets may play an important role in promoting sustainability and encouraging more responsible use of natural resources. Given that it is one of the world's largest markets and a vital component of the international monetary system, the derivatives market will play a crucial role in this shift. Since the 2007-2008 financial crisis, this market has been subject to stringent regulation, making it both safer and more accessible.

Derivatives are one of the most important financial instruments in Modern day investment and Capital market world (Kumar, 2022c). Derivatives are primarily a hedging instrument, but it is being used for market speculations, structuring complex financial Products, deducting market information and many other different ways. Climate risk poses a serious financial risk,

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and this risk needs mitigation. Capital Market players tend to think if Derivatives can be used to hedge ESG (Environment Social and Governance) Risk, Climate Risk and de-risk the sustainability goals.

The objective of the review work is to study and analyze the details of ESG Derivatives available at our disposal and do a cross-vetting of how ESG Derivative are being used currently and potentially can be used in future for ESG risk mitigation.

More and more companies in recent years have adopted sustainability frameworks that include key performance indicators (KPIs) that can serve as a foundation for structuring financial instruments that are explicitly tied to sustainability goals. We find that these Key Performance Indicators may be utilized for various financial products, such as ESG (Environmental, Social, and Governance) derivatives, in addition to green and social sustainable finance instruments. These derivatives can help propel an organization's sustainability strategy or facilitate the achievement of environmental goals. In 2019, the first sustainability-linked derivative was traded, and since then, market players have engaged in a wide range of ESG-related derivatives and products. Here, we try to account a primer on the several ESG variants available. We will do a survey of both OTC and Exchange traded ESG Derivatives.

REVIEW OF SELECTED LITERATURE

Derivative financial instruments are good tools for managing risks. They let market participants protect themselves against currency, credit, interest rate, and other common financial risks, as well as those that are now coming up because of climate change.

Plans are being made to move toward a low-carbon economy. For this process to take place, it takes a lot of money and the right way to move capital and risk around. Derivatives help by reducing the risks that green investments often have. So, derivatives help the finances of the European Green Deal. The European Union has been trying for a long time to develop in a way that is good for the economy, society, and the environment (e.g., article 3.3 of the Treaty of the European Union).

According to the European Commission (2018), one of the main goals of the new Capital Markets Union (CMU) 2.0 project is to make it easier for public and private investors to help move the economy toward a low-carbon, circular, and resource-efficient model (European Commission, 2018).

Acharya & Bisin (2014); Loon & Zhong (2014) demonstrated the significance of governance by analyzing the value of collateral in over the counter (OTC) derivatives and the consequential rise in the influence of transparency and governance.

Bernanke (1990) explored the role of variation margin (VM) and the collateral transferred during the life of a contract, representing daily changes in the market value of the deal and its significance in enhancing fairness and decreasing counterparty credit risk in order to further improve governance.

While greater openness can increase liquidity, according to Pagano & Roell (1996), Boehmer et al. (2005); Goldstein et al. (2007); Edwards et al. (2007), it can also increase dealer competition Duffie (2009); Nystedt (2004). According to Hendershott & Madhavan (2014), the effectiveness of electronic venues in facilitating trade in OTC markets has a favorable effect on dealer rivalry, resulting in better pricing while preventing knowledge leakage.

Several published works propose derivatives as a means to channel investments toward sustainability. Described the growing significance of derivatives as hedging mechanisms over

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the past three decades. This is proof that the function of derivatives in the global financial markets has steadily risen. The usage and availability of derivatives—a tool to manage exposures and hedge risk-can boost investment activity, supply and demand, and insulate more fragile or liquid assets from fluctuating market circumstances.

Allayannis & Mozumdar (2000) investigated how organizations with sustainable projects and significant research and development (R&D) expenditures have a greater propensity to hedge with derivatives and so raise the required capital by lowering financial constraints.

When external capital is expensive or difficult to get (e.g., bank financing of a long-term renewable energy or organic agriculture venture), enterprises may have an incentive to hedge via derivatives, according to Froot et al. (1993).

Weather Derivatives

While derivatives are commonly used to manage or hedge risk in financial markets, they can also play a crucial role in assisting businesses to manage financial risks related to environmental, social, and governance (ESG) issues. The weather derivative is a sort of derivative that has received significant interest over the past two decades and has expanded rapidly to aid with climate change adaptation. Hess et al. (2002); Jewson & Brix (2005); Jones (2007) note that the market was stimulated during the El Nio winter of 1997-1998 when many enterprises faced the potential of substantial earnings losses due to an abnormally mild winter of 2007.

Currently, the market continues to play an important role. According to Eumetsat (2016), around 25-30% of the global economy is affected by meteorological conditions in terms of GDP. According to Damm et al. (2014); Balatbat et al. (2012), organizations whose business largely depends on the weather (e.g., power providers, ski resorts) employ weather derivatives to hedge against the risk of extreme weather.

Cui & Swishchuk (2015) demonstrated that preventative measures are more economical than typical insurance plans and disaster relief. In particular, a weather derivative provides a direct payment based solely on the weather index value, in contrast to an insurance contract whose holder can only claim a loss after producing proof of losses directly caused by a weather occurrence.

Tang & Jang (2016) further on how the use of weather derivatives eliminates the need for the corporation to prove that the loss was caused by the weather and the potential that the payout could be impacted by inaccurate financial statements.

Commodities, Energy and Power

According to Till (2009), the most common way for institutional investors to gain exposure to commodities is through the trading of derivatives on underlying commodities. One of the most prevalent ways to speculate on future commodity prices or gain exposure to this market is through the use of commodity futures. Amenc et al. (2018) conducted research with the goal of explaining the relationship between speculative hedge and oil prices conducted an in-depth investigation of the question of whether or not the crude oil market is fundamentally driven, or whether it is driven more by speculation. Triulzi et al. (2009) carried out research that was essentially identical to ours. According to Weiner (2009), there is a significant connection between speculation and the market for crude oil, and the market is driven more by sentiments than it is by fundamentals.

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ESG Factors in Commodities or Energy: A Load-Balancing Activity

IPIECA (2020) investigates the investment and activity initiatives undertaken by businesses in Brazil and South Africa with the goal of achieving sustainability. It is often an additional cost to manufacturing, such as limiting the carbon footprint or expense allocation towards reducing SO2 (sulphur dioxide) from the byproduct, and other initiatives may also incur this cost. An exhaustive study on the effects of carbon on the oil and gas industry was conducted by Voisin & Lamotte (2006). Their findings indicated a not-so-prominent positive return on investment, but they also suggested that the impact may take time and that the window of study should be significantly expanded (two years in that research). Meade (2006) and his colleagues found results that were almost identical to ours. Forrest et al. (2006) presented a comprehensive ESG framework as a suggestion for the enterprises that produce energy. A critical review of the regulation to promote ESG integration in the oil and gas sector's upstream and downstream processes was carried out along with an examination of a number of potential alternatives. Potter (2007) conducts research on behalf of UBS to explore environmental, social, and governance (ESG) concerns in oil sands and deep-well producers.

ESG OTC DERIVATIVES

Like standard Financial Derivatives, ESG derivatives also be divided into two categories: ESG OTC Derivatives and ESG Exchange Traded Derivatives.

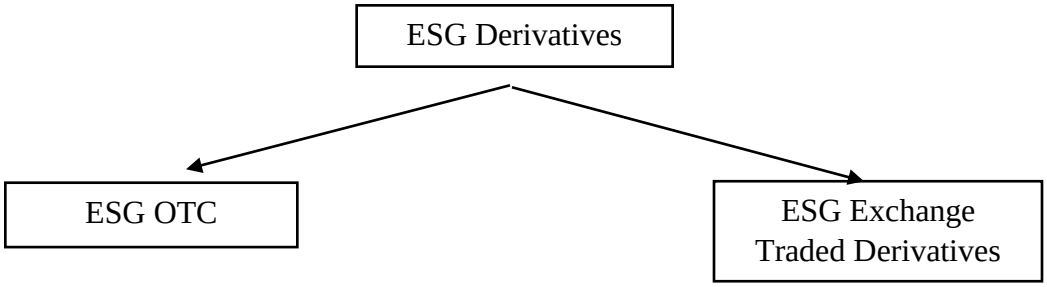

FIGURE 1
TYPES OF OTC DERIVATIVES

Companies are actively seeking methods to manage their sustainability footprint in response to mounting regulatory pressure and public scrutiny. A growing ESG finance sector has increased the importance of derivatives in achieving sustainability targets. Derivatives pertaining to environmental, social, and governance (ESG) encompass a wide variety of instruments, including forwards, futures, and swaps. There are five distinct categories of ESG-related derivatives (depicted in Figure 1&2), with the three shown here being the most important at the present time.

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FIGURE 2
TYPES OF ESG DERIVATIVES (SOURCE: ISDA ESG DERIVATIVES)

Sustainability Linked Derivatives

Financial instruments that include a corporate counterparty's promise to meet specified sustainability performance criteria are called sustainability-linked derivatives. The corporation is eligible for a discount on the hedging instrument from the bank if it meets its sustainability performance criteria during the term of the derivative. In the event that the goals are not attained, a premium is tackled on. As a rule, the premium received by banks is put toward environmentally responsible endeavors. Highly adaptable, sustainability-linked derivative transactions let investors use their own key performance indicators (KPIs) to set and track their own personal sustainability benchmarks. For market players, sustainability-linked derivatives mean a financial reward for boosting their environmental, social, and governance (ESG) performance. A good example is the sustainability-linked cross currency swap that Enel did in July 2021 Kumar, (2022b) to protect themselves from fluctuations in the value of the US dollar relative to the euro and interest rate risk.

Emission Trading Derivatives

Trading carbon offsets, emission trading futures, renewable energy and renewable fuels derivatives, and so on all contribute to achieving sustainable business models. The revenues from ESG-related derivatives are designated for specific ESG-related uses, unlike sustainability-linked derivatives. To minimize emissions of greenhouse gases, for instance, a market-based strategy known as emissions trading can be used. It consists of a restriction on pollution and tradable instruments that allow their holders to release a certain amount of each greenhouse gas. Spots, forwards, futures, and options contracts based on emission permits are all available for trading on exchanges and over-the-counter marketplaces. The industry is split between required compliance systems and emission reduction initiatives that rely on customer interest Kumar (2022d).

Renewable Energy and Fuel Derivatives

ESG-related derivatives also include renewable energy and renewable fuel hedging agreements, which help market players manage the risks associated with variability in renewable energy generation. Credit derivatives that are based on environmental, social, and governance factors can attract more funding for green energy initiatives. Power purchase agreements (PPAs), REC futures, wind index futures, and low carbon fuel standard futures are all good illustrations (Kumar, 2022e).

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ESG Credit Derivatives (ESG-CDS)

When a counterparty's financial results might be influenced by climate change or, more indirectly, if results are affected due to replacement of a certain product/service, ESG-related CDS instruments can be used to manage the credit risk of the counterparty. It's possible, for instance, that short-haul flights in the airline business may be supplanted by rail travel. The increased belief that corporations with strong ESG ratings demonstrate minimal credit risk is likely to enhance demand for CDS products tied to ESG (Kumar, 2022a).

ESG screening can be used by CDS contract reference organizations. According to a growing body of data, organizations with high ESG ratings display decreased credit risk. Companies that do well on ESG criteria are increasingly regarded as having the ability to generate greater returns and lower risk than companies without these aims. IHS Markit introduced in May of 2020 the iTraxx MSCI ESG Screened Europe Index, a wide European corporate CDS index created using ESG criteria. The index consists of a collection of CDS contracts on firms that fulfill a variety of industry, controversial, and ESG risk criteria. It employs a three-step screening process based on MSCI ESG research, which includes a value-based screen, a controversy-based screen, and an ESG-ratings-based screen. The index began trading with a five-year tenor in June 2020. As a comprehensive sector-diversified index, the iTraxx MSCI ESG Screened Europe Index can be used as a macro instrument to obtain exposure to or hedge ESG business risk throughout Europe. Due to similarities in the ESG screening technique applied to the iBoxx bond indices, the iTraxx MSCI ESG Screened Europe Index might likewise serve as an effective hedge for bond portfolios tracking future iTraxx MSCI ESG indices. The iTraxx MSCI ESG Screened Europe Index may also be utilized by buy-side businesses seeking long exposure (protection selling position) to ESG companies. Due to the index's similarity to and high correlation with the broader iTraxx Europe Index, sell-side trading counterparties can utilize the iTraxx Europe Index to hedge their protection buyer positions. In September 2020, LCH CDS Clear began clearing the iTraxx MSCI ESG Screened Europe Index and its component single names for members and clients. In addition to mitigating counterparty risk, clearing promotes higher liquidity in this product, offers considerable margin and operational benefits, and supports the industry-wide emphasis on sustainability.

Catastrophe and Weather Derivatives

Insurance-like products can include catastrophe and weather derivatives. Both markets have been around for decades and are used to protect against the effects of climate change and other natural catastrophes. Catastrophe derivatives are a type of financial instrument that facilitates the trading of risk associated with natural disasters. These derivatives are sold on over-the-counter marketplaces and provide insurance against catastrophic losses that might occur as a result of events like earthquakes. Catastrophe swaps, developed by the World Bank, allow developing nations to hedge their exposure to natural catastrophes through the international financial system. One such exchange was issued in 2017 for the Philippines. The value of weather derivatives, a type of financial instrument, is based on variables like temperature and wind speed. The food and agricultural industries rely heavily on these derivatives to reduce their exposure to natural disasters and other hazards caused by extreme weather Hendershott & Madhavan (2015).

Companies having credit exposure to certain sectors and financial institutions would

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benefit most from using ESG-related credit derivatives. However, catastrophe bonds and weather derivatives are not included in our definition of sustainability-linked derivatives since they are not directly tied to the environment. This isn't a ground-breaking new product either, nor is it suitable to businesses outside of its core industry Porter & Kramer (2006).

Sustainable derivatives, voluntary emissions trading, and renewable energy and fuel derivatives are all examples of ground-breaking new products. When a company purchases one of these goods, it demonstrates a greater dedication to sustainability. The question of how sustainable these cutting-edge goods are on their own is made more complicated by the absence of sustainability standards for derivatives. A capital relief or other direct incentive for banks to carry out ESG-related derivatives is currently lacking. Thus, the source of any pricing advantage will be determined by market forces.

The cashflows of derivatives transactions may be affected by environmental, social, and governance (ESG) derivatives, hence it is important for corporate treasury to take this into account. Valuation requirements, dispute resolution requirements, and reporting requirements are all examples of the types of regulatory duties that may be imposed. Zanders suggests that company treasurers keep a careful eye on the additional value of certain instruments, as well as the legal, tax, and accounting consequences, as ESG-related derivatives and products are here to stay. The regulatory and valuation implications of this novel class of derivatives will be the subject of Part II of this series, to be published later this year.

Esg Exchange Trade Derivatives

Table 1 shows global exchanges, including Eurex, Intercontinental Exchange (ICE), CME Group, Nasdaq, Chicago Board Options Exchange (CBOE), Euronext, and Japan Exchange Group, have recently launched a series of new equity index futures and options contracts tied to ESG benchmarks in response to the increasing flow of capital into ESG strategies. Despite the fact that liquidity in the majority of these new contracts is still relatively low, demand has been progressively rising. ESG futures and options enable institutional managers to more effectively hedge their ESG assets, implement their ESG investment strategies, and control their ESG funds' capital inflows and outflows. Investing directly in the underlying equities is less cash-efficient than investing in ESG futures and options. ESG index derivatives are based on ESG indices, which are derived from parent benchmarks that specify the universe of firms from which ESG index members are chosen. ESG indices may be constructed using an exclusion approach that enables investors to avoid specific types of exposures while preserving the same risk-return characteristics as the parent benchmark. Exclusions include corporations deemed non-compliant with specific ESG criteria or those implicated in controversies involving weapons, tobacco, or fossil fuels. Alternately, ESG indices may be created to obtain exposure to high ESG ratings, a particular ESG subject, or to achieve a good environmental or social effect. ESG indices may use parts of these methodologies.
Some of the exchange traded Futures and Options are

Table 1
EXCHANGE TRADED DERIVATIVE CONTRACTS

Exchange	Exchange Trade Product
CME	CME E-mini-S&P 500 ESG Index futures
CBOE	CBOE S&P 500 ESG Index options
EUREX	Eurex STOXX Europe 600 ESG-X Index futures / options
EUREX	Eurex STOXX USA 500 ESG-X Index futures

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EUREX	Eurex EURO STOXX® 50 Low Carbon Index futures
EUREX	Eurex STOXX Europe Climate Impact Ex Global Compact Controversial Weapons & Tobacco Index futures
EUREX	Eurex STOXX Europe ESG Leaders Select 30 Index futures / options
EUREX	Eurex DAX 50 ESG futures / options
EUREX	Eurex EURO STOXX® 50 ESG Index futures / options
ICE	ICE MSCI EAFE ESG Leaders Index futures
ICE	ICE MSCI Emerging Markets ESG Leaders Index futures
ICE	ICE MSCI Europe ESG Leaders Index futures
ICE	ICE MSCI World ESG Leaders Index futures
ICE	ICE MSCI World Climate Change futures
ICE	ICE MSCI World Climate Change futures
ICE	ICE MSCI Europe Climate Change future

Emission Trading on Exchange

Emissions trading, also known as cap-and-trade, emissions trading programs, and allowance trading, is a market-based strategy for decreasing pollution. It is intended to impose a geographical restriction on the quantity of (mainly carbon dioxide) that certain economic sectors can release into the environment.

Emissions trading consists of two essential components: a limit (or cap) on pollution and tradable permits that permit the holder to release a certain amount (e.g., one ton) of the pollutant. With the goal of minimizing total emissions, the limit decreases annually. Participants in the market can exchange emission permits (including offset credits) and derivatives based on emission permits (primarily futures and options). Allowances for emissions can be acquired through centrally managed auctions or from other enterprises with excess allowances. Spot, forwards, futures, and options contracts can be traded on exchanges and over the counter (OTC) marketplaces as secondary contracts. While exchange-traded transactions give higher liquidity, over-the-counter transactions offer better flexibility as contracts may be tailored to a company's specific risk management requirements. To trade swaps, options, and futures, market players utilize ISDA templates for emission permits (i.e., the ISDA US Emissions Annex and the ISDA EU Emissions Annex). ISDA also provides EU emission forms for carbon dioxide permit trading. The ISDA US Emissions Annex addresses sulfur dioxide, nitrogen oxide, and carbon dioxide emissions (under the federal plan) (under the Regional Greenhouse Gas Initiative scheme). Derivatives based on carbon allowances and carbon offsets allow enterprises subject to carbon cap-and-trade schemes to satisfy their commitments and effectively manage their risk. Policymakers rely on price signals from these instruments to evaluate the efficacy of their programs and to secure intended results. Carbon markets exist as both obligatory (compliance) and voluntary (optional) programs. Compliance carbon markets are established and governed by national, regional, or worldwide carbon reduction mandates. Cap-and-trade schemes are nationwide or regional in scope. Depending on the scheme, regulated polluters may receive allowances for free or purchase them at auction. To comply with a particular cap-and-trade regime, a business must either maintain emissions below the yearly limit or acquire additional permits. Each year, businesses must turn in enough permits to cover their total emissions or face hefty fines. If a firm decreases its emissions below the limit, it can either retain the excess credits for future use or sell them to a company that is short on allowances. Outside of compliance markets, the voluntary carbon markets enable people, businesses, and governments to acquire carbon offsets voluntarily. The bulk of

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voluntary credits are acquired by the private sector, whose primary motivation is often corporate social responsibility objectives. In September of 2020, a taskforce driven by the business sector was established to begin scaling voluntary carbon markets to decrease emissions. This effort is comprised of more than forty leaders from six continents with backgrounds across the carbon market value chain. Creating carbon spot and futures contracts is one of the suggestions of the taskforce for establishing a voluntary carbon market, with the goal of more effectively matching producers' products with purchasers' preferences. Importantly, this would give a daily carbon pricing reference for a typical commodity.

These contracts would be resolved physically, traded on exchanges, and cleared by clearing houses. Futures contracts must be fungible to permit trading across all markets and numerous platforms, and they may also be cash settled. Futures contracts would also offer a clear and usable reference price for a supplementary over the counter (OTC) market that would reference various forms of carbon offsets. As is the case in comparable markets, OTC markets for both standard and customized contracts are essential to the success and efficiency of the overall market. Exchange-traded spot and futures contracts, as well as over-the-counter (OTC) contracts, are required to build a mature, fully functional market and preserve the effectiveness of a carbon contract as a hedging instrument.

Carbon Allowances

Table 2 shows a carbon allowance (carbon credit) is a marketable permit or certificate that entitles its holder to emit one ton of carbon dioxide (CO2) or the equivalent amount of another greenhouse gas. A carbon allowance is a license to emit carbon, whereas a carbon offset is a certificate issued for an activity that decreases or eliminates carbon emissions. Carbon offsets can be utilized for both voluntary carbon reduction pledges and compliance under a cap-and-trade system. Other carbon market trading units include removal units, emission reduction units, and certified emission reduction units (CER). Each of these units represents one ton of carbon dioxide. RMUs pertain to carbon stored by a change in land use, such as reforestation. ERUs are produced through a joint implementation method when two nations collaborate on a project to promote the reduction of emissions or the removal of carbon from the atmosphere via a carbon sink. CERs are created through a clean development mechanism project activity, which permits a nation with an emission-reduction or emission-limitation obligation under the Kyoto Protocol to undertake an emission-reduction project in developing countries.
Some of the key Emission trading contracts are listed below:

Table 2
TRADED FUTURE CONTRACTS

Exchange	Contract
CME	CME RGGI C02 allowance futures and options
CME	CME CBL California Carbon allowance futures
CME	CME California Low Carbon Fuel Standard (PRIMA) futures
EEX	EEX EU allowances (EUA) futures and options
ICE	ICE European Union Allowance (EUA) futures
ICE	ICE California Carbon Allowance (CCA) futures
ICE	ICE California Carbon Offset (CCO) futures
ICE	ICE Regional Greenhouse Gas Initiative futures
ICE	ICE Certified Emission Reduction (CER) futures

Renewable Identification Numbers (RIN)

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Renewable Identification Numbers (RINs) are credits used to demonstrate compliance with the Renewable Fuel Standard (RFS) program in the United States. To meet their obligations under the RFS, obligated parties must either produce and mix the required amount of renewable fuels into their transportation fuels or buy enough RINs to cover their obligation. RIN futures contracts for two different types of fuel mixes are available on the ICE exchange. Those products are RIN derivatives that are financially resolved and follow the RIN's market price.

In November of 2020, Nodal and IncubEx have begun trading futures and options on RINs that will be physically delivered. Futures contracts on D3 RINs for cellulosic biofuels, D4 RINs for biomass-based diesel, D5 RINs for advanced biofuels like sugar cane ethanol, and D6 RINs for renewable fuels like corn ethanol will be listed on Nodal when they have been approved by regulators.

Low Carbon Fuel Standard (LCFS)

The Low Carbon Fuel Standard (LCFS) is a Californian initiative to reduce greenhouse gas emissions from the transportation sector by providing financial incentives for the use of low-carbon fuels and other nonconventional fuels. The carbon intensity (CI) of various fuels is measured annually. Producers of fuel who fall below their yearly CI threshold receive credits, while those who produce fuel at or over the benchmark must purchase LCFS credits in order to remain in compliance.

Contracts for LCFS credits generated through a variety of procedures and projects are listed on both the ICE and CME exchanges in the form of the ICE California Low Carbon Fuel Standard Credit (OPIS) futures and the CME's California Low Carbon Fuel Standard (PRIMA) futures, respectively. The LCFS credit futures are financially settled contracts that follow the LCFS credit market price.

Applicability of Esg Derivatives In Esg Risk Management

In recent years, sustainability has emerged as an issue that is more prominently featured and more widely discussed on the agendas of politicians throughout the world and other major groups. There is a rising effort to incorporate environmentally responsible practices into the world's monetary system. In September 2015, the United Nations (UN) released their '2030 Agenda for Sustainable Development,' which included the development of seventeen Sustainable Development Goals (SDGs) to guide global action toward achieving economic, social, and environmental goals (UN, 2015). A few months later, in December of 2015, 196 parties to the Paris Agreement, which included 195 governments and the European Union, ratified the accord to adapt to climate change, create resilience, and limit global warming. These two efforts create the framework for a bright future that assures mental well-being, environmental sustainability, social fairness, social cohesion and societal resilience, and financial success. In other words, this future will be prosperous.

The Environmental, Social, and Governance (ESG) paradigm was developed in response to claims that many companies' emphasis on social responsibility was merely a public relations ploy.

ESG fosters corporate responsibility through the use of measurement since it is based on key performance indicators (metrics). Key performance indicators (KPIs) provide a method for analyzing and validating a company's performance based on a number of predetermined factors.

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With the usage of the derivatives ecosystem, it may be simpler to make KPI judgments, which may also contribute to the advancement of ESG goals in general. The ability to hedge price risk, the facilitation of price discovery, and enhanced transparency, all of which lead to an improvement in the efficacy of the underlying markets, may be its most significant potential benefits.

When applied to the realm of trading, the concept of transparency involves several distinct elements. The first aspect is transparent pricing. Utilizing derivatives facilitates the discovery of forward pricing for markets. Particularly throughout the process of transitioning to a more sustainable future, the markets have a need for information on future pricing. For instance, the pricing function of exchanges might be used to aid with the price of climate-related activities. In fact, the CFTC has advocated for the introduction of a carbon price, and exchanges are in a unique position to aid in achieving this objective. Derivatives on carbon emissions or offsets currently allow for price discovery and greater market liquidity in carbon markets.

Advantages of the derivatives ecosystem, in particular trading markets, in the promotion of ESG objectives include the creation and listing of new ESG-related products for hedging, investment (speculation), and arbitrage; the generation, integrity, and analytics of data, which encourages standardization and governance; and the facilitation of market coordination.

In conclusion, there are several advantages linked with the usage of derivatives markets to advance ESG objectives. Despite this, the use of these instruments has traditionally been linked to a variety of negative effects. In the next section, "Potential Challenges Related to Certain Categories of ESG-Related Derivatives," specifically SLDs (Sustainability Linked Derivatives) are explored as potential impediments that may arise in the near or distant future.

Challenges

It is one of the most difficult tasks for market participants to guarantee that the documentation for their environmental, social, and governance (ESG) products adequately captures any key performance indicators (also known as "KPIs") against which ESG targets are measured. KPIs are used in sustainability-linked derivatives to monitor compliance with the relevant ESG criterion. For instance, a KPI could be the amount of greenhouse gas emitted by a counterparty over a defined period of time or a percentage of a counterparty's energy that is produced by sustainable sources. KPIs are used to monitor compliance with the relevant ESG criterion. As a result, key performance indicators are not only a bespoke but also an essential component of every sustainability-linked derivative. ISDA has just now released a brand new report that bears the title "Sustainability-linked Derivatives KPI Guidelines." ISDA's paper aims to educate market participants about sustainability-linked derivatives and key performance indicators (KPIs), establish a framework of best practices for KPIs and sustainability-linked derivatives, support and promote adequate ESG-related disclosure in order to maintain the integrity of the sustainability-linked derivatives market, and promote the use of ESG-related products in order to assist with the transition to a green economy. One of the biggest challenges of ESG Derivatives is keeping ethical aspects of Derivatives intact with the ESG Derivatives.

CONCLUSION

There has been an increased focus on climate change recently, which has been reflected in the financial markets. This is due in part to the fact that the 2021 United Nations Climate

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Change Conference will be held in Glasgow later this month (also known as COP26), and also to the fact that there have been numerous instances of extreme weather. According to a number of analysts' projections, the market for sustainable finance expanded by about 30 percent in 2020. Derivatives that are linked to environmental, social, and governance ("ESG") objectives have been around for a few years, but this former niche marketplace is growing. This growth lends credence to the notion that derivatives have a significant part to play in the advancement of ESG objectives in the financial markets and the transition to a green economy on a global scale. This paper examines the fundamental applicability of Derivatives in ESG Implementations. The Hedging and Risk Management aspects along with its application to Corporate Governance, Climate Risk Management, Environmental Stability, Promoting Social justice has been explored. It can be concluded that ESG Derivatives has a very critical role to play in overall ESG promotion and it can be a mission critical tool to achieve the UNSDG 2030 goals. Ethical aspect of the ESG Derivatives is a primary area of concern and It should be looked at in the future researches.

REFERENCES

Acharya, V., & Bisin, A. (2014). Counterparty risk externality: Centralized versus over-the-counter markets. *Journal of Economic Theory, 149*, 153-182.

Allayannis, G., & Mozumdar, A. (2000). Cash flow, investment, and hedging. *Investment, and Hedging.*

Amenc, N., Maffei, B., & Till, H. (2008). Oil prices: the true role of speculation. *EDHEC-Risk Publication.*

Balatbat, M., Siew, R., & Carmichael, D. (2012). *ESG scores and its influence on firm performance: Australian evidence.*

Bernanke, B.S. (1990). Clearing and settlement during the crash. *The Review of Financial Studies, 3*(1), 133-151.

Boehmer, E., Saar, G., & Yu, L. (2005). Lifting the veil: An analysis of pre-trade transparency at the NYSE. *The Journal of Finance, 60*(2), 783-815.

Cui, K., & Swishchuk, A. V. (2015). Applications of weather derivatives in the energy market. *Journal of Energy Markets, 8*(1).

Damm, A., Koberl, J., & Prettenthaler, F. (2014). Does artificial snow production pay under future climate conditions?-A case study for a vulnerable ski area in Austria. *Tourism management, 43*, 8-21.

Duffie, D. (2009). How should we regulate derivatives markets?. *Pew Financial Reform Task Force.*

Edwards, A.K., Harris, L.E., & Piwowar, M.S. (2007). Corporate bond market transaction costs and transparency. *The Journal of Finance, 62*(3), 1421-1451.

Eumetsat. (2016), Meteorological satellite conference 2016.

European Commission. (2018). *Financing a Sustainable European Economy*.

Forrest, S., Ling, A., Lanstone, M., & Weghorn, J. (2006). Enhanced energy ESG framework. *Goldman Sachs*.

Froot, K.A., Scharfstein, D.S., & Stein, J.C. (1993). Risk management: Coordinating corporate investment and financing policies. *The Journal of Finance, 48*(5), 1629-1658.

Goldstein, M., Hotchkiss, E., & Sirri, E. (2007). Transparency and liquidity: A controlled experiment on corporate bonds. *Review of Financial Studies, 20*(2), 235-273.

Hendershott, T., & Madhavan, A. (2015). Click or call? Auction versus search in the over-the-counter market. *The Journal of Finance, 70*(1), 419-447.

Hess, U., Richter, K., & Stoppa, A. (2002). Weather risk management for agriculture and agri-business in developing countries. *Climate Risk and the Weather Market, Financial Risk Management with Weather Hedges. London: Risk Books.*

Ipieca (2020), Sustainability reporting guidance for the oil and gas industry.

Jewson, S., & Brix, A. (2005). Weather derivative valuation: the meteorological, statistical, financial and mathematical foundations. *Cambridge University Press.*

Jones, T.L. (2007). Agricultural applications of weather derivatives. *International Business & Economics Research Journal (IBER), 6*(6).

Kumar, S. (2021). Review of geothermal energy as an alternate energy source for Bitcoin mining. *Journal of Economics and Economic Education Research, 23*(1), 1-12.

Citation Information: Kumar, S. (2023). ESG derivatives and factoring sustainability in investment management. *Academy of Marketing Studies Journal, 27*(3), 1-13.

Kumar, S. (2022a). Attribution of health care expense to principal pollutants in green house gas emission: a panel data analysis of us states. *Academy of Accounting and Financial Studies Journal, 26*(6), 1-23.

Kumar, S. (2022b). Critical Assessment of green financing Initiatives In Emerging Market: A Review of India's Green Bond Issuances. *Academy of Marketing Studies Journal, 26*(5), 1-14.

Kumar, S. (2022c). Risk rationalization of OTC derivatives in SOFR (secured overnight funding rate) transition: evidence from linear interest rate derivatives. *Academy of Accounting and Financial Studies Journal, 26*(3), 1-22.

Kumar, S. (2022d). Strategic management of carbon footprint using carbon collectible non-fungible tokens (NFTS) on blockchain. *Academy of Strategic Management Journal, 21*(S3), 1-10.

Kumar, S. (2022e), Central Clearing of Crypto-Derivatives in a Decentralized Finance (DeFi) Framework: An Exploratory Review. *International Journal of Business and Economics, 7*(1), 128.

Kumar, S. (2023a). A review of ESG performance as a measure of stakeholder's theory. *Academy of Marketing Studies Journal, 27*(S3), 1-18.

Kumar, S. (2023b). Exploratory review of esg factor attribution to the portfolio return in Fama-French factor model framework. *Academy of Marketing Studies Journal, 27*(S3), 1-20.

Kumar, S. (2023c). Comparative analysis of carbon foot-print and energy consumption of crypto-mining consensus methodologies. *Academy of Marketing Studies Journal, 27*(2), 1-43.

Kumar, S. (2023d). Impact of Volatile FX Market on Indian masala bond price during Covid 19. *Academy of Marketing Studies Journal, 27*(2), 1-19.

Kumar, S. (2023e). Funding issues and challenges of conventional energy market in the ESG conscious world. *Academy of Marketing Studies Journal, 27*(1), 1-10.

Kumar, S. Review of ESG Derivatives and its application towards the sustainability goals.

Loon, Y.C., & Zhong, Z.K. (2014). The impact of central clearing on counterparty risk, liquidity, and trading: Evidence from the credit default swap market. *Journal of Financial Economics, 112*(1), 91-115.

Meade, C., Morrow, D., Sasrean, D., & Viets, S. (2006). Integrated oil & gas: Sector report. *Innovest Strategic Value Advisors*.

Nystedt, M.J. (2004). Derivative market competition: OTC versus organized derivative exchanges. *International Monetary Fund*.

Pagano, M., & Roell, A. (1996). Transparency and liquidity: a comparison of auction and dealer markets with informed trading. *The Journal of Finance, 51*(2), 579-611.

Porter, M. & Kramer, M. (2006). Strategy and society: The link between competitive advantage and corporate social responsibility. *Harvard Business Review*.

Potter, A. (2007). *Targeting the oil sands*. UBS Investment Research.

Tang, C.H., & Jang, S. (2012). Hedging weather risk in nature-based tourism business: An example of ski resorts. *Journal of Hospitality & Tourism Research, 36*(2), 143-163.

Till, H. (2009). Has there been excessive speculation in the US oil futures market? *Edhec Risk Institute*.

Triulzi, U., D'Ecclesia, R.L., & Bencivenga, C. (2009). Does speculation drive oil prices?.

Voisin, S. & Lamotte, C. (2006). Carbon impact on the oil & gas sector. *Cheuvreux*.

Weiner, R.J. (2009). Speculation and oil price volatility. *EIA Annual Conference. Washington.*

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