American University Business Law Review

Volume 13 | Issue 2 Article 2

2024

From White Noise to Sound Decisions: Overcoming Noise in Corporate Law

Maria Lucia Passador
marialucia.passador@unibocconi.it

FROM WHITE NOISE TO SOUND DECISIONS: OVERCOMING NOISE IN CORPORATE LAW

MARIA LUCIA PASSADOR*

This article explores the realm of noise, which is characterized by the lack of discernible patterns and unpredictable nature, distinguishing it from biases in terms of features, implications, and solutions. After examining the integration of behavioral economics into legal matters, the article delves into the application of this framework in the context of corporate law.

Studying noise into corporate law offers valuable insights into specific areas. Needless to say, this paper sheds light on the legal practice of corporate law, encompassing aspects such as contractual matters, M&A due diligence, and corporate governance. Understanding the complexities of corporate transactions is particularly crucial for legal practitioners in effectively navigating the intricate landscape of corporate law. Then, it reveals some key mechanics of the board of directors, taking into account how noise levels fluctuate in the presence of a superstar CEO. When recognizing the influence of noise in these contexts, corporate decision-making processes can be better understood and potentially improved. Furthermore, delving into the study of noise allows for a comprehensive understanding of its influence on legal precedents and the potential distortions it may introduce into the system. This encompasses the consolidation of both precedents issued by courts and those within the practices of law firms based on industries, regulatory requirements, and references to past offerings. By examining

* Assistant Professor of Corporate and Financial Markets Law at Bocconi University; Visiting Scholar at the Max Planck Institute Luxembourg and Research Associate, Centre for Blockchain Technologies at the University College London. The author is very grateful to Itiel Dror, Jacek Dybinski, Robin Morgan, Sandro Romano and Tom Vos for insightful comments and suggestions. The paper has benefited substantially from discussions with the participants at the Bocconi-Oxford Junior Corporate Law Workshop, at the 2023 Annual Meeting of the American Society of Comparative Law, and at the Guest Forum of the Max Planck Institute Luxembourg.

the effects of noise on precedents, legal professionals can gain deeper insights into the dynamics of corporate decision-making.

Drawing from the theories of Kahneman, Sibony, and Sunstein, I present methods for reducing noise through the implementation of decision hygiene techniques and mediating assessments protocols, while also examining the extent of the potential role of artificial intelligence in addressing these challenges in corporate law and governance.

The paper concludes with three significant insights. Firstly, regulatory bodies must navigate various legal fields to effectively regulate and enforce compliance across industries. Understanding the interplay between noise and biases is essential for ensuring fair and efficient best practices. Secondly, corporate law stakeholders must recognize the multifaceted effects of noise and take steps to silence it in their decision-making processes. Recognizing the implications of noise enhances the care, attention to detail, integrity, and effectiveness of corporate environments. Furthermore, while AI demonstrates commendable capabilities in addressing biases and excels in data processing to mitigate noise, making it a particularly well-suited tool for tackling challenges related to noise, maybe even surpassing its effectiveness in addressing biases, it is crucial to consistently acknowledge the superiority of human judgment in making decisions.

By presenting a few behavioral economics insights, this article aims at inviting readers to broaden their intellectual horizons, engaging scholars, legal professionals, and those interested in corporate governance to explore corporate law from an innovative lens.

I. BREAKING THE SILENCE, DEFINING NOISE

"Wherever there is judgment, there is noise – and more of it than we think."[1]

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The principles of fairness and impartiality are deeply ingrained in the fabric of U.S. society. From the legal system to public institutions, the pursuit of justice and equality is touted as a cornerstone of our ideals.[2] Numerous legal sources and frameworks serve as guiding lights to ensure that decisions are made in a fair and unbiased manner. Fairness is everywhere. In the realm of legal principles, the U.S. Constitution takes center stage, emphasizing due process, equal protection, and the right to a fair trial. Constitutional amendments, such as the Fourth, Fifth, and Sixth Amendments, provide protections against unreasonable searches and seizures, self-incrimination, and ensure the right to a speedy and public trial.[3] It can be likened to a symphony of fairness, with judicial opinions, rulings, and institutional policies joining the chorus.

However, beneath the surface of these well-intentioned principles, biases and noise lurk, subtly influencing decisions and compromising the abovementioned values.

Biases — defined as systematic errors that can arise in certain circumstances — permeate various aspects of U.S. society.[4] For instance,

1. DANIEL KAHNEMAN ET AL., NOISE: A FLAW IN HUMAN JUDGMENT 3–5 (William Collins ed., 2021) [hereinafter KAHNEMAN ET AL., NOISE].

2. *See* John Rawls, *Justice as Fairness: Political Not Metaphysical*, 14 PHIL. & PUB. AFFS. 223, 235 (1985) (citing JOHN RAWLS, A THEORY OF Justice (1971)) ("[E]ach person possesses an inviolability founded on justice that even the welfare of society as a whole cannot override." Rawls' concept of the "veil of ignorance" serves as a philosophical tool to understand how governments and societies can strive for greater equality and justice. Although policymakers cannot literally be ignorant of their own identities and positions when making decisions, creating just policies requires them to set aside their personal interests and consider what is fair for everyone.); David F. Levi, *What Does Fair and Impartial Judiciary Mean and Why Is It Important?*, DUKE L. BOLCH JUD. INST. (Nov. 5, 2019), https://judicialstudies.duke.edu/2019/11/what-does-fair-and-impartial-judiciary-mean-and-why-is-it-important/. *See also* Michael Legg, *The COVID-19 Pandemic, the Courts and Online Hearings: Maintaining Open Justice, Procedural Fairness and Impartiality*, 49 FED. L. REV. 161, 165–66 (2021) (quoting Robert French, former Chief Justice of Australia, on the importance of judicial impartiality); *cf.* Andrew Higgins & Inbar Levy, *What the Fair Minded Observer Really Thinks About Judicial Impartiality*, 84 MOD. L. REV. 811, 813 (2021) (implying that the courts care about their public reputation for impartiality).

3. *See* Peter N. Thompson, *Fair and Impartial Jury— Catch As Catch Can*, 31 ST. LOUIS U. L.J. 191, 191 (1987) (providing a historical view on the evolution of a jury); *see also* Joni Hersch & Jennifer Bennett Shinall, *Fifty Years Later: The Legacy of the Civil Rights Act of 1964,* 34 J. POL'Y ANALYSIS & MGMT. 424, 427 (2015); CHRISTINE J. BACK, CONG. RSCH. SERV., R46534, THE CIVIL RIGHTS ACT OF 1964, 1 (2020);

forensic science, as well as the medical field, is not immune to bias.[5] Research has shown that doctors may unknowingly display implicit biases, impacting the quality of care provided to patients from diverse backgrounds.[6] These biases can lead to disparities in diagnoses, treatments, and overall health outcomes. Similarly, bias is evident within the criminal justice

CHRISTINE J. BACK, CONG. RSCH. SERV., THE CIVIL RIGHTS ACT OF 1964: ELEVEN TITLES AT A GLANCE (2020).

4. *Cf.* JENNIFER L. EBERHARDT, BIASED: UNCOVERING THE HIDDEN PREJUDICE THAT SHAPES WHAT WE SEE, THINK, AND DO (Viking, 2019); Elif Kartal, *A Comprehensive Study on Bias in Artificial Intelligence Systems: Biased or Unbiased AI, That's the Question!*, 18 INT'L J. INTELLIGENT INFO. TECH. 279, 281 (2022); Chanelle J. Howe & Whitney R. Robinson, *Survival-Related Selection Bias in Studies of Racial Health Disparities: The Importance of the Target Population and Study Design*, 29 EPIDEMIOLOGY 521, 521 (2018); Michael J. Peel, *Addressing Unobserved Selection Bias in Accounting Studies: The Bias Minimization Method*, 27 EUR. ACCT. REV. 173, 173 (2018); Pim Klamer et al., *Research Bias in Judgement Bias Studies — A Systematic Review of Valuation Judgement Literature*, 34 J. PROP. RSCH. 285, 285 (2017); Kenneth F. Schulz et al., *Empirical Evidence of Bias: Dimensions of Methodological Quality Associated with Estimates of Treatment Effects in Controlled Trials*, 273 JAMA 408, 408 (1995); NANCY D. BERKMAN ET AL., THE EMPIRICAL EVIDENCE OF BIAS IN TRIALS MEASURING TREATMENT DIFFERENCES VI (2014).

5. Itiel E. Dror & Jeff Kukucka, *Linear Sequential Unmasking— Expanded (LSU-E): A General Approach for Improving Decision Making as well as Minimizing Noise and Bias*, 3 FORENSIC SCI. INT'L: SYNERGY 1, 1 (2021).

6. Sometimes implicit bias might happen as a consequence of unconscious attitudes and beliefs, which try to be measured through the IAT phenomenon. Anthony Greenwald and his colleagues developed the IAT phenomenon in the late 1990s as a means of measuring the strength of associations between different concepts and attributes. The IAT typically presents participants with a series of tasks that require categorizing different stimuli, such as words or images, into specific categories. For example, one task might involve categorizing words as either "good" or "bad," and another task might involve categorizing the races of people as either "Black" or "White." Its key aspect is that it measures the speed of response and accuracy in categorizing items when they are paired in different combinations. The underlying assumption of the IAT is that people who have stronger associations between certain concepts and people (e.g., Black individuals and negative traits) will respond more quickly and accurately when the pairing of concepts aligns with their implicit biases. The IAT measures the strength of these associations by comparing response times and accuracy across different combinations of categories. It is important to note that the IAT has faced some criticism and controversy. Critics argue that the test's validity and reliability can be influenced by various factors, such as cultural biases, individual differences, and the context in which it is administered. Nonetheless, the IAT has been widely used in research to explore implicit biases related to race, gender, age, and other social categories. It has contributed to our understanding of unconscious biases and the ways in which they can impact perception, behavior, and decision-making. *See* Anthony G. Greenwald et al., *Measuring Individual Differences in Implicit Cognition: The Implicit Association Test*, 74 J. PERSONALITY & SOC. PSYCH. 1464, 1464 (1998); MALCOM GLADWELL, BLINK: THE POWER OF THINKING WITHOUT THINKING 37 (Penguin 2006).

system, where the scales of justice should be balanced for all.[7] Even unconscious biases, whether in law enforcement, jury selection, or judicial decision-making, can inadvertently perpetuate these inequalities, undermining the principle of equal justice under the law.

While biases have garnered attention and scrutiny,[8] the concept of noise has only recently come to the forefront of discussion. Noise refers to widespread, accidental errors that can taint decision-making processes across various domains. These errors — which can arise unexpectedly (even when individuals face similar circumstances and incentives and, thus, would be expected to consistently make rational choices) — have the potential to introduce distortions in such processes. Hence, it is of utmost importance to

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7. Richard H. McAdams, *Present Bias and Criminal Law*, 2011 UNIV. ILL. L. REV. 1607, 1614–15 (2011); Andrew Hopkins, *Class Bias in the Criminal Law*, 5 CONTEMP. CRISES 385, 385 (1981); SpearIt, *Implicit Bias in Criminal Justice: Growing Influence as an Insight to Systemic Oppression*, *in* THE STATE OF CRIMINAL JUSTICE 2020, 167 (Am. Bar Ass'n 2020), https://ssrn.com/abstract=3645536; Danny Osborne et al., *Stereotypicality Biases and the Criminal Justice System*, *in* THE CAMBRIDGE HANDBOOK OF THE PSYCHOLOGY OF PREJUDICE 542 (Chris G. Sibley & Fiona Kate Barlow, eds., 2017); *see also* Moa Lidén, Confirmation Bias in Criminal Cases 12 (Sept. 28, 2018) (Ph.D. dissertation, Uppsala University) (on file with Uppsala University Library) (defining confirmation bias).

8. *See* Itiel E. Dror, *Cognitive and Human Factors in Expert Decision Making: Six Fallacies and the Eight Sources of Bias*, 92 ANALYTICAL CHEMISTRY 7998, 7998 (2020) (identifying six misconceptions commonly held by experts regarding cognitive bias). One such fallacy is the belief that cognitive bias is solely an issue of ethics and personal integrity pertaining only to corrupt individuals. Another misconception suggests that cognitive bias is a result of incompetence, implying that experts who fail to perform adequately are the ones susceptible to it. Furthermore, there is a notion that experts, due to their impartiality and competence, are immune to bias and remain unaffected. Another fallacy involves the belief that technological advancements such as automation or artificial intelligence can guarantee protection against human biases. Additionally, some experts acknowledge bias in their peers but fail to recognize it within themselves, maintaining a sense of personal impartiality. Lastly, there is a mistaken belief that experts possess the ability to acknowledge and control bias within themselves, assuming that they are less affected by it than others.

Then, the discussion examines eight sources of bias, which have been organized into three distinct categories. The first category encompasses factors relating to the specific case and analysis, which include considerations of data quality, reference materials, and contextual information. The second category involves factors that pertain to the individual conducting the analysis, encompassing elements such as their past experiences, base rates, organizational influences, education and training, and personal characteristics. Lastly, biases can also arise from the cognitive architecture and inherent human tendencies that impact all individuals. These factors have the potential to influence various aspects of the analytical process, including the nature of the data (e.g., methods employed for sampling and data collection, treatment of noise), the resulting outcomes (e.g., decision-making in terms of testing strategies, analysis techniques, and determination of when to conclude testing), and the ultimate conclusions drawn (e.g., interpretation of results).

distinguish noise from agency problems,[9] as the former pertains to inadvertent errors, while the latter encompasses conflicts of interest or moral hazards that arise when an entrusted party (the agent) makes decisions on behalf of another party (the principal). Agency problems involve deliberate actions or conflicts that have the potential to undermine the integrity of a decision-making process.

So, while noise is often unpredictable and lacks a discernible pattern, which introduces significant variations and distortions, biases display predictable patterns, which might have made their in-depth study easier in the past. To better illustrate the distinction between the two, various insightful analogies can be drawn to sports scenarios where athletes strive for accuracy and aim for specific targets. Thinking about a basketball player shooting free throws, he must release the ball with the right amount of force and aim it accurately towards the hoop. In this context, bias can be likened to consistently releasing the ball with the same amount of force but consistently missing in a specific direction. If the player continuously shoots with slightly too much force, shots may consistently miss to the right of the hoop: this represents a systematic error or tendency to deviate from the desired outcome in a specific way. Noise can instead be compared to shooting free throws with varying force and direction on each attempt, leading to shots that are dispersed randomly and densely around the hoop, rather than consistently missed in one specific area. Similarly, a golfer trying to hit a hole-in-one on a golf course should land the ball directly into the hole. The golfer's swing is akin to adjusting a camera's focus and achieving precision is of utmost importance. Here, bias can be likened to consistently hitting the ball with the same amount of force but consistently veering off in a particular direction, while noise can be compared to hitting the ball with varying force and direction on each swing.[10] To further grasp the concept of

9. As mentioned in *Behavioral Law and Economics*, this is even more relevant in light of the fact that, over time, economic analysis has significantly influenced corporate law, with many legal experts adopting a contractual perspective. EYAL ZAMIR & DORON TEICHMAN, BEHAVIORAL LAW AND ECONOMICS 358 (Oxford Univ. Press, 2018) (discussing corporate law, securities regulation, and perspective). Frank Easterbrook and Daniel Fischel argued that corporate law should resemble contract law, providing default rules that accommodate the preferences of most parties while allowing for contractual flexibility, and then one of the central concerns in corporate law became the agency problem, involving the conflict of interest between management or controlling shareholders and other stakeholders, such as minority shareholders. This conflict became especially relevant in corporations with dispersed ownership, where management control is strong, and issues like managerial entrenchment and excessive compensation arise. In corporations with controlling shareholders, the focus shifts to the risk of value extraction from the company to benefit those in control.

10. KAHNEMAN ET AL., NOISE, *supra* note 1, at 3–5 (applying the analogy to target

noise, its application within the medical domain proves enlightening, whereby physicians examining the same patient may provide disparate opinions upon interpreting a single radiograph. Similarly, within the legal sphere, disagreement may arise in scenarios such as the allocation of fingerprints to one suspect over another.[11]

The concepts of bias and noise also differ from that of imperfect information. While related, each are distinct in their capture of information quality and how it influences decision-making or comprehension. Like intertwining rivers, bias, noise, and imperfect information flow together, occasionally converging, yet each channeling unique aspects that shape our understanding and choices. In fact, imperfect information refers to a

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shooting in that, while bias entails the consistent inability to hit the center of the target, noise is characterized by shots dispersed randomly and densely throughout a uniform area surrounding the target, thereby impeding accuracy); *see, e.g.*, Vidya S. Athota et al., *Overcoming Financial Planners' Cognitive Biases through Digitalization: A Qualitative Study*, 154 J. BUS. RSCH. 1 (2023) (stating bias and noise both pertain to the effects of behavioral or cognitive biases on markets); Fenella Carpena et al., *The ABCs of Financial Education: Experimental Evidence on Attitudes, Behavior, and Cognitive Biases*, 65 MGMT. SCI. 346, 346 (2019); Mario Kienzler, *Value-based Pricing and Cognitive Biases: An Overview for Business Markets*, 68 INDUS. MKTG. MGMT. 86, 86 (2018); Ravindra Jain et al., *Behavioral Biases in the Decision Making of Individual Investors*, 14 IUP J. MGMT. RSCH. 7 (2015); Jinesh Jain et al., *Evaluation of Behavioral Biases Affecting Investment Decision Making of Individual Equity Investors by Fuzzy Analytic Hierarchy Process*, 12 REV. BEHAV. FIN. 297, 297 (2020); Jinesh Jain et al., *Behavioural Biases Affecting Investors' Decision-Making Process: A Scale Development Approach*, 45 MGMT. RSCH. REV. 1079, 1079 (2022); Marcin Rzeszutek et al., *Investors' Expertise, Personality Traits and Susceptibility to Behavioral Biases in the Decision Making Process*, 9 CONTEMP. ECON. 337, 337 (2015); Rasoul Sadi et al., *Behavioral Finance: The Explanation of Investors' Personality and Perceptual Biases Effects on Financial Decisions*, 3 INT'L J. ECON. & FIN. 234, 234 (2011); Chabi Gupta, *Knowledge or Personality: An Empirical Analysis of Behavioural Finance and Investor Cognitive Biases*, 12 INT'L J. CYBER BEHAV., PSYCH., & LEARNING 1, 1 (2022); James Scott et al., *Behavioral Bias, Valuation, and Active Management*, 55 FIN. ANALYSTS J. 949 (1999).

In other words, noise influences personal and collective choices by using a systemic methodology. Unlike biases that generate individual errors, noise is a statistical phenomenon that relates to the undesired variability of decisions in the presence of certain conditioning factors. FRANCESCO VELLA, DIRITTO ED ECONOMIA COMPORTAMENTALE 56 (Il Mulino, 2023). Among the types of difficult identification, there is also that of occasional noise, often influenced by mood or the intrinsic variability of brain functioning (or rather, "the efficiency of endogenous neural processes that govern memory function," *see* KAHNEMAN ET AL., NOISE, *supra* note 1, at 92). It is important to emphasize that biases often generate noise themselves. The substitution bias, which assigns incorrect weight to facts, the prejudice bias, which underestimates certain facts or distorts their consideration, and the excessive coherence bias, which assigns greater weight to initial impressions and less to contradictory ones, all lead to noise when their effect depends on the context or when there are differences between various biases (so-called different prejudices).

11. KAHNEMAN ET AL., NOISE, *supra* note 1, at 91. *See* VELLA, *supra* note 10, at 58 (discussing the results of the audit noise processes).

situation where the available information is incomplete, lacking in accuracy, or not entirely reliable. It implies that decision-makers or individuals do not have access to all relevant data or face uncertainties about the accuracy or completeness of the information. Imperfect information can arise due to various factors, including limited data availability, information asymmetry, or intentional manipulation. Hence, dealing with imperfect information requires making decisions or forming judgments based on the best available information, while acknowledging the potential limitations and uncertainties.

While there may be an initial appearance of similarity, it is important to recognize that biases, noise, and imperfect information differ fundamentally, with biases referring to the tendency of individuals to interpret or process information in a subjective or distorted manner, noise referring to random or irrelevant factors interfering with the desired signal, and imperfect information encompassing a broader scope of limitations, including incomplete, inaccurate, or uncertain data.

Hence, biases — which arise from subjective factors, independent of the quality of available data — can persist even in the presence of complete and accurate information, as imperfect information highlights limitations within the information itself, regardless of individual biases. It signifies a scenario where data is incomplete or inaccurate, hindering a comprehensive understanding of the subject at hand.

Furthermore, imperfect information and noise differ in various aspects too, including their nature, causes, intentionality, and predictability. Imperfect information primarily concerns the quality and reliability of the available information, which can be influenced by factors such as limited data availability, information asymmetry, or intentional manipulation. In contrast, noise refers to accidental errors and random variations in decision-making, as it arises from unintentional cognitive biases, psychological factors, or random fluctuations in judgment or behavior. Imperfect information can be influenced by limited data availability, information asymmetry, or intentional manipulation, whereas noise arises from unintentional cognitive biases, psychological factors, or random fluctuations in judgment or behavior. As to its nature, imperfect information refers to a situation where the available information is incomplete, lacking in accuracy, or not entirely reliable, signifying a gap between the ideal state of having complete and accurate information and the actual state where the information is imperfect, while noise describes accidental errors or random variations that can affect decision-making processes, as well as deviations from rational decision-making that are not driven by deliberate actions or conflicts. Noise introduces distortions or biases in decision-making, but unlike intentional manipulation or conflicts of interest, it arises unintentionally. Looking at their causes, imperfect information can stem from limited data availability,

imbalance of knowledge among parties, intentional manipulation of information by individuals or organizations with a vested interest in shaping the decision-making environment, whereas noise is caused by accidental errors or random fluctuations in judgment, caused by cognitive biases that lead individuals to deviate from rational decision-making, psychological factors that impact judgment and behavior, or external factors that introduce variability into decision-making processes. In terms of intentionality, imperfect information can be the result of intentional actions (deliberately withholding or manipulating information to gain a strategic advantage or influence the decision-making process) leading to an environment where decision-makers are deprived of accurate or complete information, while noise, by its very nature, is unintentional and accidental. The latter, as the paper's title suggests, can be seen as random variation or "white noise" that impacts decision-making, introducing inconsistencies or errors without any particular agenda. Last but not least, it is worth noting that imperfect information may demonstrate a certain degree of predictability, with recognizable patterns or trends stemming from known biases, historical data, or regularities in the information that decision-makers can consider while making informed judgments despite the imperfect nature of the information, but noise tends to be unpredictable and lacks a discernible pattern. Noise introduces an element of uncertainty and variability that can impede the consistency and rationality of decision-making. It can arise unexpectedly and significantly influence decision-making in ways that are challenging to anticipate or manage. Imagine a basketball player on the court, trying to make the right play. The information they have about their teammates' positions and the opponent's defense represents imperfect information, while the loud and distracting crowd can be considered noise. Imagine a basketball player on the court, trying to make the right play. In this metaphor, imperfect information corresponds to the limited visibility and awareness a player has on the court, while noise corresponds to the distracting crowd volume, namely the loud cheers, jeers, and chants from the crowd can create an atmosphere that can affect the player's concentration and decision-making. Both imperfect information and noise present challenges to the player's performance, but they come from different sources and have distinct characteristics: dealing with the former requires the player to rely on their knowledge of the game and their teammates' tendencies, while managing the latter involves staying focused and blocking out distractions to make clear-headed decisions on the court. Similarly, the abovementioned radiologist analyzing an X-ray image of a patient's chest can be affected by similar problems. Imperfect information is akin to the limitations of the image's quality or resolution, while noise corresponds to the presence of artifacts. Both can pose challenges to the interpretation, but they arise from different sources and have their own characteristics: dealing with the former requires

making the best diagnosis based on the available but imperfect image, while managing the latter involves identifying and disregarding the artifacts to focus on the genuine abnormalities for an accurate assessment.

The concepts introduced in the previous discussion inevitably bring to the reader's minds the notion of rationality, which encompasses a spectrum ranging from perfect rationality to imperfect rationality. This topic has been extensively explored in the specific context of corporate law, which is the focus of my analysis here, as it serves as the fundamental basis for the entire legal framework. In fact, the neoclassical approach assumes the rationality of agents within the system as an underlying and implicitly accepted premise, forming the crux of corporate law.[12] Therefore, it is essential to briefly acknowledge this connection.

The notion of absolute "neoclassical rationality"[13] clearly faces an undeniable limitation in the fact that human actors within the system frequently make decisions that are inherently subjective in nature and may only be satisfactory rather than optimal. This subjectivity stems from the inherent limitations of human cognition, stringent decision-making deadlines, the availability and quality of information.[14] Thus, the idea of

12. Christine Jolls et al. , *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1471 (1998)*; see also* ZAMIR & TEICHMAN, *supra* note 9, at 356, (recognizing that behavioral corporate finance has provided evidence of consistent deviations from the Efficient Market Hypothesis (EMH), suggesting that prices in well-functioning markets can differ from a firm's fundamental value. One assumption challenged by these studies is the belief that market participants can profit through arbitrage when assets are mispriced. Factors such as liquidity constraints, transaction costs, and risk associated with arbitrage can limit the ability of sophisticated actors to exploit mispricing. As a result, cognitive phenomena like loss aversion and anchoring can significantly influence asset pricing, explaining a market phenomenon that traditional rational choice theory struggles to explain. Given the potential for systematic deviations in market pricing, managers who are aware of these anomalies may try to exploit them through corporate policies. For instance, they may time equity issuances based on perceived overvaluation or undervaluation of stocks, manage earnings to exceed expectations, or pay dividends to cater to investors' psychological biases).

13. *See generally* Robin Maialeh, *Generalization of Results and Neoclassical Rationality: Unresolved Controversies of Behavioural Economics Methodology*, 53 QUALITY & QUANTITY 1743 (2019) (discussing differing viewpoints on "neoclassical rationality"); Mario J. Rizzo, *Rationality — What?: Misconceptions of Neoclassical and Behavioral Economics*, *in* THE CAMBRIDGE HANDBOOK OF CLASSICAL LIBERAL THOUGHT 191, 192 (Todd Henderson ed., Cambridge Univ. Press, 2018); Alexandr Soukup et al., *The Concept of Rationality in Neoclassical and Behavioural Economic Theory*, MOD. APPLIED SCI., Nov. 2014, at 1; Milan Zafirovski, *Classical and Neoclassical Conceptions of Rationality—Findings of an Exploratory Survey*, 37 J. SOCIO-ECON. 789 (2008).

14. Herbert A. Simon, *A Behavioral Model of Rational Choice*, 69 Q. J. ECON. 99, 99 (1955) (discussing the concept of "economic man," rationality, and the limitations of human cognitive capacities in decision-making); *see also* GERD GIGERENZER, SIMPLY

limited and constrained rationality,[15] which falls short of the (potentially unattainable) ideal of neoclassical rationality, better captures the reality of human decision-making within the legal system.[16]

The principles of behavioral economics, including the understanding of biases and noise, shed light on the imperfections of rational decision-making,[17] where the term "rational" is often associated with an image of

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15. Simon, *supra* note 14, at 99.

16. *See generally* GUIDO CALABRESI, THE FUTURE OF LAW AND ECONOMICS (2016) (believing that there is no need to consider behavioral economics to explain legal phenomena, since traditional economic theory, after all, already does so by applying the rent-seeking model); *see also* Peter T. Leeson, *Do We Need Behavioral Economics to Explain Law?*, 48 EUR. J. L. & ECON. 29, 29 (2019).

17. It is crucial to acknowledge that factors like selective attention and selective memory play a pivotal role in assessing the credentials of candidates, taking into account details such as their surname or the university they attended. These factors play a pivotal role in the evaluation process, as they can inadvertently influence the perception of a candidate's qualifications. For instance, hiring managers may unconsciously display a heightened focus on candidates possessing recognizable surnames or prestigious university affiliations, leading to an implicit bias in favor of such individuals, even if their actual skills and experiences are comparable to other candidates. Similarly, the phenomenon of selective memory can also impact assessments, as interviewers might subconsciously recall positive or negative experiences associated with particular surnames or universities, thus inadvertently influencing their evaluation of candidates. Such biases, often stemming from stereotyping and preconceived notions, can have a profound effect on the fairness and objectivity of the evaluation process. By acknowledging and actively mitigating these biases, employers can endeavor to ensure a just and equitable assessment that prioritizes candidates' true qualifications, skills, and experiences, rather than relying on superficial markers such as surnames or institutional backgrounds. *See* JIM GUSZCZA ET AL., DELOITTE, HR FOR HUMANS: HOW BEHAVIORAL ECONOMICS CAN REINVENT HR 104 (2016), https://www2.deloitte.com/us/en/insights/deloitte-review/issue-18/behavioral-economics-evidence-based-hr-management.html.

This assessment process often creates a generalized impression of aspiring directors associated with a predetermined numerical evaluation scale employed in decision-making. Unfortunately, such evaluations, or more precisely, the predictive judgments involved, give rise to different forms of noise. Interpersonal noise arises due to discrepancies among evaluators, while intrapersonal noise occurs when a single evaluator assigns scores on different occasions. DANIEL KAHNEMAN, THINKING FAST AND SLOW 412 (Farrar, Straus & Giroux eds., 2011) (referencing the Chicago approach, explaining "how a rational agent with a strong preference for intense and immediate gratification may make the rational decision to accept future addiction as a consequence"); KAHNEMAN ET AL., NOISE, *supra* note 1, at 73 (discussing how level noise exists due to variations in severity among individuals, while structural noise reflects the intricate attitudes of judges in specific cases. The sum of the two noises (level and structural), each squared, equals the square of the systemic noise.).

greater deliberation, more calculation, and less warmth. By examining these imperfections, the study of noise challenges neoclassical rationality by emphasizing deviations from perfect rationality, unpredictability in decision-making, and ultimately suggesting these departures can result in suboptimal choices and affect rationality.

Within the present framework, it is crucial to distinguish bias and noise; although both can be classified as phenomena affecting decision-making processes, they entail distinct implications and necessitate diverse remedial approaches.

First, the implications of bias are often associated with fairness, accuracy, and inclusivity, while the implications of noise are related to consistency and reliability. When biases are present, they can lead to unfair treatment and discrimination, favoring certain individuals or groups over others; distort the interpretation of information, compromising the accuracy of decisions, potentially creating outcomes that do not align with the true merits of a situation; create barriers that hinder the inclusion of marginalized or underrepresented groups, perpetuating inequalities and limiting equal opportunities. On the other hand, noise introduces inconsistency, which undermines the reliability of decisions, undermining the trust and certainty that decision-makers seek in their processes. As a result, it becomes crucial to identify and minimize sources of noise to improve the reliability and confidence in the accuracy of decision-making.

Second, while some solutions may address both bias and noise to some extent, there are specific strategies that are more applicable to one or the other. Solutions for addressing bias typically involve raising awareness, improving data quality and diversity, and implementing corrective measures.[18] These may include diversity and inclusion initiatives, bias

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Additionally, evaluative judgments, such as determining whether to award a bonus based on meeting a turnover threshold, introduce further unjustifiable noise. Those subject to evaluative judgments expects them to reflect the values of the system, rather than those of individual evaluators. KAHNEMAN ET AL., NOISE, *supra* note 1, at 51–52. Even though we can use Gauss' least squares, a rigorous mathematical method, to measure and quantify the error in predictive judgments, we are unable to measure or calculate the error in evaluative judgments. This inability compromises the credibility of the system. It becomes clear that the potential negative consequences of this unmeasurable error are greater than the benefits that accurate evaluative judgments could provide.

18. *See* Dror, *supra* note 8, at 8003 (claiming that it is crucial to recognize the presence of bias and move beyond the fallacies surrounding its nature, to focus solely on relevant data and to avoid working backward. This principle should be integrated into ongoing training and laboratory procedures, and can be strengthened through external scrutiny, which plays a valuable role in revealing areas of bias. Moreover, according to the author, specific strategies can be employed to address various sources of bias: using blinding and masking techniques to prevent exposure to irrelevant information during

training and education, algorithmic auditing (namely evaluating automated decision-making systems for biases to identify and correct discriminatory patterns), fair data collection (making sure that such methods are inclusive and representative of the population being studied can reduce biases), and "Linear Sequential Unmasking" ("LSU") controlling the flow and order of information, ensuring that decisions are based solely on the evidence and relevant information for the task at hand.[19] Instead, solutions for mitigating the impact of noise revolve around enhancing decision-making processes, making them more reliable and less susceptible to random fluctuations, to ensure greater consistency and resilience. Some approaches that can be employed include the "Linear Sequential Unmasking — Expanded" ("LSU-E"), which overcomes the limitations of LSU (applicable only to comparative decisions and bias reduction) by optimizing the sequence in which information is presented, maximizing the utility of information — resulting in better and more reliable decisions, and providing guidelines for determining the order in which task-relevant information should be presented;[20] standardization of decision-making procedures to

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tasks; implementing methods like Linear Sequential Unmasking (LSU) to control the sequence, timing, and linearity of information exposure, minimizing the potential for bias from reference materials; appointing case managers to screen and regulate the dissemination of information; incorporating blind, double-blind, and proper verification procedures whenever feasible; encouraging the consideration of a range of competing and alternative hypotheses and conclusions, rather than just a reference hypothesis; and embracing a differential diagnosis approach, where all potential conclusions and their probabilities are presented.). *See generally* CHRISTOPHER T. ROBERTSON & AARON S. KESSELHEIM, BLINDING AS A SOLUTION TO BIAS: STRENGTHENING BIOMEDICAL SCIENCE, FORENSIC SCIENCE, AND LAW (Elsevier, 2016).

19. *See* Dror & Kukucka, *supra* note 5, at 2 (illustrating how, in forensic science, for example, the process begins by thoroughly examining and documenting the actual evidence from the crime scene before introducing any suspect reference material. This helps prevent the reference material from biasing the interpretation of the crime scene evidence).

20. *See id*. at 1 (discussing how it can be applied to a forensic investigation involving a suspected arson case. In traditional practices, investigators often receive information about the property, such as its market history or recent insurance changes, before examining the fire scene. However, by implementing LSU-E, the investigative process takes a different approach, as investigators first arrive at the scene without any prior contextual details. They thoroughly examine and document the fire scene, collecting evidence solely based on their direct observations and findings. This initial examination allows them to form an objective impression based solely on the raw data and evidence present. After completing the initial examination, investigators are then provided with relevant contextual information, such as the property's history and insurance records. This additional information guides their subsequent analysis and interpretation of the evidence collected. LSU-E ensures that investigators form their initial opinions based solely on the objective data they observed first-hand before being influenced by potentially biasing contextual information. By following this approach, LSU-E

reduce variability caused by individual decision-makers; calibration; aggregation of multiple independent judgments to minimize the impact of individual noise. For example, diversity training and fair data collection practices primarily target bias, whereas calibration and aggregation techniques are more focused on reducing noise. While some solutions may have overlapping benefits, addressing biases requires strategies that promote fairness, diversity, and awareness, whereas reducing noise requires techniques that enhance consistency and robustness in decision-making processes.

In light of this diversity of implications and solutions, there arises a need to dedicate specific research to noise in corporate law, that aims to complement the existing body of literature with a spotlight on noise and becomes a valuable resource for scholars, legal professionals, and anyone interested in corporate governance.

This paper endeavors to explore the multidisciplinary nature of behavioral economics,[21] with a particular emphasis on corporate law.[22]

Introducing the dual framework of bias and noise into corporate law provides key insights into three discrete areas: (i) the legal practice of

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optimizes the sequence of information. It ensures that forensic experts base their initial conclusions on the raw data, independent of potentially biasing contextual information. This method enhances the transparency, reduces noise, and improves the overall quality and reliability of forensic decision-making during the investigation.).

21. *See* VELLA, *supra* note 10, at 66 (resuming the reasoning behind the Nobel Prize awarded to Kahneman); ZAMIR & TEICHMAN, *supra* note 9, at 201, 237, 281, 325, 355, 433 (discussing property law, contract law, consumer contracts, tort law, and commercial law with a focus on antitrust law, respectively). *See generally* Yoed Halbersberg & Ehud Guttel, *Behavioral Economics and Tort Law*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS 405 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press 2014); Melvin A. Eisenberg, *Behavioral Economics and Contract Law*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS 438 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press, 2014); Tom Baker & Peter Siegelman, *Behavioral Economics and Insurance Law: The Importance of Equilibrium Analysis*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS 491 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press 2014); Tor Avishalom, *The Market, the Firm, and Behavioral Antitrust*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS 568 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press 2014); Ewan McGaughey, *Behavioural Economics and Labour Law* 1 (LSE Legal Studies, Working Paper No. 20, 2014), https://ssrn.com/abstract=2460685; I. GLENN COHEN ET AL., NUDGING HEALTH: HEALTH LAW AND BEHAVIORAL ECONOMICS 1 (Johns Hopkins Univ. Press, 2016).

22. *See* Kent Greenfield, *The End of Contractarianism? Behavioral Economics and the Law of Corporations*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS AND THE LAW 518 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press 2014) (exploring the implications of challenging rationality assumptions and highlighting the shift towards regulatory agnosticism in behavioral research on corporate governance. As to the board, Section 3 emphasizes the dangers of board homogeneity and the potential for improved board performance through increased diversity.).

corporate law (contractual matters, M&A due diligence, and corporate governance); (ii) the mechanics of the board of directors (also considering how noise levels fluctuate in the presence of a superstar CEO); and (iii) the effects of noise on "precedents" (both in the sense of those consolidated by each law firm's practice and those issued by courts).

The paper proceeds as follows:

Part II discusses the implications of behavioral economics on legal matters, highlighting the potential value of "behavioral corporate governance,"[23] thereby integrating the former into corporate law.

Consequently, Part III identifies the specific areas within corporate law where noise may manifest,[24] explores its broad implications across various aspects, and offers recommendations in the attempt to silence it.

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23. ZAMIR & TEICHMAN, *supra* note 9, at 355 (discussing commercial law, corporate law, securities regulation, and antitrust. The authors recall that Greenfield and Kostant introduced an agency relationship into the Ultimatum game, showing that participants acting on behalf of shareholders made significantly reduced offers. This suggests that the fiduciary relationship between board members and shareholders may drive more rational behavior. They also add that while corporations may exhibit rationality in certain aspects, they are not perfectly rational in all dimensions. Key actors, such as CEOs and boards of directors may display systematic deviations from rationality that influence corporate decisions. This is precisely why the integration of behavioral insights into corporate governance analysis has practical implications, as these insights have influenced legislative debates and judicial decisions. For example, cognitive biases like anchoring and groupthink were cited in a court ruling, highlighting the potential liability resulting from such biases. Overall, understanding behavioral aspects of corporate governance is crucial as it sheds light on decision-making processes and their implications for legal and policy discussions).

24. *See* VELLA, *supra* note 10, at 178–81 (and related footnotes) (noting that the behavioral modalities and cognitive conflict resolution skills have already come under the regulator's purview concerning better corporate governance. When making collective decisions in both general meetings and boards of directors, a delicate balance must be struck between the need to ensure adequate debate, preventing overly conformist or passive attitudes, and the equally important need to achieve necessary cohesion and shared understanding, which are physiologically essential for corporate management. This is where the essential dialogue with cognitive sciences requires shedding light on the factors that influence "how" decisions are made, for which progressively established measures are not lacking, from the diversity of board composition to the presence of a lead independent director, from advisory committees to sector-specific regulations. However, it is sometimes the regulators themselves who ask — and now even impose — regulatory frameworks that go beyond a conception of the human agent that has proven unrealistic). *See generally* Daniel P. Forbes & Frances J. Milliken, *Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups*, 24 ACAD. MGMT. REV. 489, 489 (1999); Gérard Charreaux, *Pour une gouvernance d'entreprise «comportementale»: une réflexion exploratoire - Toward a Behavioral Corporate Governance Theory: An Exploratory View* 1 (Univ. Bourgogne, Working Paper No. 1050601, 2005); Morten Huse, *Accountability and Creating Accountability: A Framework for Exploring Behavioural Perspectives of Corporate Governance*, 16 BRIT. J. MGMT. S65, S65 (2005); Kath Hall, *Looking Beneath the*

Part IV delves into the intricacies of the boardroom, and specifically focuses on (i) how the noise affects directors' fiduciary duties and the entire fairness test; and (ii) the scrutiny faced by superstar CEOs, emphasizing that any noise generated by them can significantly impact a company's reputation and performance due to their heightened visibility.

Part V examines the impact of noise on the dual meaning of the word precedent, and its implications for the widely used precedents both in the daily legal practice, particularly in corporate and financial markets (such as in IPO registration statements or prospectuses) and in the dual worlds of common and civil law. All in all, while "[b]ehavioral analysis does not dictate where corporate law should draw the precise regulatory line, [it] does suggest that when regulation is enacted, it should be founded on sound empirical grounds."[25]

Taking a constructive approach, Part VI elucidates potential methods of reducing noise through (i) the implementation of "decision hygiene" techniques[26] and "mediating assessments protocols"[27] drawing from the general theories of Kahneman, Sibony, and Sunstein, as well as (ii) the contributions of artificial intelligence in addressing these challenges.

Finally, Part VII concludes the paper, summarizing some insights presented throughout.

Surface: The Impact of Psychology on Corporate Decision Making, 49 MANAGERIAL L. 93, 93 (2007); Virginia Bodolica & Martin Spraggon, *Behavioral Governance and Self-Conscious Emotions: Unveiling Governance Implications of Authentic and Hubristic Pride*, 100 J. BUS. ETHICS 535, 535 (2011); Hans Van Ees et al., *Toward a Behavioral Theory of Boards and Corporate Governance*, 17 CORP. GOVERNANCE: INT'L REV. 307, 307 (2009); Szymon Kaczmarek, *Rethinking Board Diversity with the Behavioral Theory of Corporate Governance: Opportunities and Challenges for Advances in Theorizing*, 21 J. MGMT. & GOVERNANCE 879, 879 (2017); John Qi Dong et al., *How Firms Make Information Technology Investment Decisions: Toward a Behavioral Agency Theory*, 38 J. MGMT. INFO. SYS. 29, 29 (2021); Alina G. Andrei et al., *Symbolic Shareholder Democracy: Toward a Behavioral Understanding of the Role of Shareholder Voting in CEO Dismissals*, ORG. SCI. 1, 1 (2022) (examining the impact of expressive shareholder dissent voting on CEO dismissals in German firms and finding that higher levels of dissent increase the likelihood of CEO dismissal. Surprisingly, independent chairs do not show greater responsiveness to dissent, nor does minority institutional investor ownership affect the relationship. However, family chairs are more likely to dismiss the CEO due to symbolic leadership challenges, and this effect is strengthened by family ownership.).

25. ZAMIR & TEICHMAN, *supra* note 9, at 358 (discussing behavioral corporate governance).

26. KAHNEMAN ET AL., NOISE, *supra* note 1, at 236.

27. *Id.* at 312.

II. UNRAVELING THE BEHAVIORAL LEGAL MAZE: A PREMISE

Behavioral economics encompasses a range of legal implications that have the potential to impact various domains of law and policy. These implications arise from a comprehensive understanding of how human behavior influences decision-making processes.[28] By exploring the interplay between psychology, economics, and law, behavioral economics provides valuable insights that can inform the development and refinement of legal frameworks.[29]

One significant legal implication is the application of behavioral economics to regulation and consumer protection.[30] By recognizing the

28. ZAMIR & TEICHMAN, *supra* note 9, at 141–56; *see* COLIN F. CAMERER ET AL., ADVANCES IN BEHAVIORAL ECONOMICS 3 (Princeton Univ. Press, 2004) (compiling essential papers published in behavioral economics since 1990, including foundational contributions and cutting-edge research); Jolls et al., *supra* note 12, at 1471 (suggesting that empirical evidence challenges neo-classical assumptions in economic law analysis. This article proposes incorporating insights on actual human behavior, offering new models and approaches across positive, prescriptive, and normative categories.); Timothy J. Brennan, *The Rise of Behavioral Economics in Regulatory Policy: Rational Choice or Cognitive Limitation?*, 25 INT'L J. ECON. BUS. 97, 97 (2018) (underlining that behavioral economics challenges rational choice theory, gaining attention in academia and regulation. However, it conflicts with explaining puzzling behavior as rational responses and measuring benefits based on revealed preferences. Conventional economics faces challenges in ethical assessment, delegation, and weakness of will in business regulation.); Todd Zywicki, *Introduction to Symposium on Behavioral Law and Economics*, 21 SUP. CT. ECON. REV. 1, 1 (2013).

29. *See* Avishalom Tor, *Foreword Advances in the Behavioral Analysis of Law: Markets, Institutions, and Contracts*, 74 L. & CONTEMP. PROBS. ii (2011); Colin Camerer et al., *Neuroeconomics: How Neuroscience Can Inform Economics*, 43 J. ECON. LITERATURE 9, 9 (2005) (discussing how neuroeconomics integrates brain mechanisms into economic analysis, revealing multiple interacting systems and the influence of emotions and cognition on decision-making. Dual-process models rooted in neuroscience offer greater accuracy than single-process models. The article discusses how brain evidence challenges assumptions in preferences, intertemporal choice, risk, decision-making, and game theory.); Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175, 1176 (1997) (emphasizing the importance of incorporating social scientists' decision-making theories into Law and Economics. Previous theories lacked practical grounding, leading to difficulties in real-world applications. By replacing inaccurate economic assumptions and integrating behavioral insights, the discipline can advance into the next generation.); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 289 (1979) (critiquing expected utility theory and introducing prospect theory as an alternative model for decision making under risk, as it values gains and losses instead of final assets, using decision weights instead of probabilities. The value function is concave for gains, convex for losses, and decision weights tend to be lower than corresponding probabilities, except for low probabilities. Overweighting of low probabilities helps explain the appeal of insurance and gambling.).

30. Among the multiple subjects to which behavioral economics has been applied, without claiming to be exhaustive and in addition to the ones mentioned above, we can

biases and heuristics that affect individuals' choices, policymakers can shape regulations and consumer safeguards to mitigate potential harm. This may involve the introduction of improved warning labels, enhanced consumer disclosures, and other measures that facilitate rational decision-making and safeguard consumers from making irrational or detrimental choices. Behavioral economics further extends its influence to contract law. By shedding light on the cognitive biases[31] that influence contractual

find a wide range of research conducted by various scholars and experts. *See supra* note 21. *See generally* ZAMIR & TEICHMAN, *supra* note 9; Cass R. Sunstein & Lucia A. Reisch, *Automatically Green: Behavioral Economics and Environmental Protection*, 38 HARV. ENV'T L. REV. 127, 127 (2014); Ryan Bubb & Richard H. Pildes, *How Behavioral Economics Trims Its Sails and Why*, 127 HARV. L. REV. 1593, 1594 (2014) (discussing consumer credit and fuel economy); CASS R. SUNSTEIN, HUMAN AGENCY AND BEHAVIORAL ECONOMICS: NUDGING FAST AND SLOW 1 (John Tomer ed., Palgrave 2017); GORAN DOMINIONI, BIASED TRIALS: INSIGHTS FROM BEHAVIORAL LAW AND ECONOMICS 1 (Springer Gabler 2020); MICHELLE BADDELEY, BEHAVIOURAL ECONOMICS AND FINANCE 2–9 (Routledge 2013); Eyal Zamir, *Refounding Law and Economics: Behavioral Support for the Predictions of Standard Economic Analysis*, 16 REV. L. & ECON. 267, 267 (2020); Christoph Engel, *The Impact of Behavioral Economics on the Law: Introduction*, 17 REV. L. ECON. 241, 241 (2021).

See Daniel Kahneman et al., *Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias*, J. ECON. PERSP., Winter 1991, at 193 ("A wine-loving economist we know purchased some nice Bordeaux wines years ago at low prices. The wines have greatly appreciated in value, so that a bottle that cost only $10 when purchased would now fetch $200 at auction. This economist now drinks some of this wine occasionally, but would neither be willing to sell the wine at the auction price nor buy an additional bottle at that price." The "endowment effect" refers to people valuing objects more highly when they possess them compared to when they want to acquire them. It is accompanied by a status quo bias, where individuals prefer maintaining the current state. Both of these anomalies stem from loss aversion, the tendency to find more displeasure in giving up an object than satisfaction in acquiring it.); *see also* Oren Bar-Gill, *Consumer Transactions*, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS AND THE LAW 465 (Eyal Zamir & Doron Teichman eds., Oxford Univ. Press 2014).

31. Cognitive biases are mental shortcuts that individuals use to simplify decision-making: among them, confirmation bias is the inclination to seek out information that confirms preexisting beliefs. *See* Saul M. Kassin et al., *The Forensic Confirmation Bias: Problems, Perspectives, and Proposed Solutions*, 2 J. APPLIED RSCH. IN MEMORY & COGNITION 42, 42 (2013) (addressing the issue of contextual bias and inaccuracies in the field of forensic sciences. It explores how research in psychology has demonstrated that the surrounding context can influence individuals' perceptions, judgments, and behaviors. The article once again cites the high-profile case of Brandon Mayfield and refers to a critique which highlighted the susceptibility of forensic sciences to contextual bias and errors. To mitigate bias in forensic laboratories and minimize its influence in courts, the article proposes the adoption of best practices.).

Another form of bias is that of availability bias, which corresponds to the tendency to rely on easily accessible information rather than seeking out diverse sources of information. *See* Muhammad Salman et al., *The Impact of Heuristic Availability Bias on Investment Decision-Making: Moderated Mediation Model*, 4 BUS. STRATEGY & DEV. 246, 246 (2021) (examining the relationship between heuristic availability bias (HAB)

arrangements, this field prompts a reevaluation of certain contract terms and the regulation of specific practices. Such measures aim to ensure fairness and protect vulnerable consumers by addressing concerns such as hidden fees, and convoluted terms and conditions.

Moreover, behavioral economics emphasizes the concept of nudging, which can play a pivotal role in legal systems. Nudging refers to the practice of subtly influencing individuals' decisions without impeding their freedom of choice.[32] Leveraging insights from behavioral economics, governments can implement policies and interventions that align with inherent behavioral biases.[33] For instance, default options can be strategically set to promote socially desirable behaviors, such as organ donation or retirement savings, unless individuals consciously opt out.[34]

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and investment decision-making (IDM), with a focus on the moderated mediation role of external locus of control (ELC) and risk tolerance (RT) and suggesting that external locus of control enhances the influence of heuristic availability bias on investors' propensity for risk-taking, which subsequently affects their investment decision-making).

32. Cass R. Sunstein, *Nudging: A Very Short Guide*, 37 J. CONSUMER POL'Y 583, 583 (2014) (providing an overview of the concept and practical applications of nudging in policy-making. The article also touches upon the ethical considerations and legal implications associated with nudging.).

33. Behavioral economics has had a significant impact on the development of various legal theories and policies in recent times. For instance, the nudge theory, which originated from the work of behavioral economists, proposes that subtle changes in the environment or the presentation of information can influence individuals to make better decisions. This theory has been integrated into the policies of many legal systems, including the UK government's "Nudge Unit" and the US Consumer Financial Protection Bureau's "Know Before You Owe" initiative. Furthermore, behavioral economics has revealed that people are often influenced by the default options presented to them. As a result, legal systems have incorporated default rules into various areas such as organ donation and retirement savings. For instance, in several countries, individuals are presumed to be organ donors unless they choose to opt-out. Finally, behavioral economics has also affected how punishment is handled in legal systems. *See* Mark A.R. Kleiman & Angela Hawken, *Fixing the Parole System*, ISSUES SCI. & TECH., Summer 2008, at 45 (showing that individuals are more likely to respond to the certainty of punishment rather than its severity); Lana Friesen, *Certainty of Punishment Versus Severity of Punishment: An Experimental Investigation*, 79 S. ECON. J. 399, 399 (2012); Jonathan Klick & Murat C. Mungan, *Discounting and Criminals' Implied Risk Preferences*, 11 REV. L. & ECON. 19, 19 (2015). Hence, some legal systems have shifted their focus from harsher punishments to more certain punishments, such as fines.

34. Haoyang Yan & J. Frank Yates, *Improving Acceptability of Nudges: Learning from Attitudes Towards Opt-in and Opt-out Policies*, 14 JUDGMENT AND DECISION MAKING 26, 29, 32–34 (2019); Oren Bar-Gill & Omri Ben-Shahar, *Rethinking Nudge: An Information-Costs Theory of Default Rules*, 88 U. CHI. L. REV. 531, 531 (2021) ("[F]rom the classic works on 'mimicking' defaults for contracts and corporations to the modern rush to set 'sticky' default rules to promote policies as diverse as organ donation, retirement savings, consumer protection, and data privacy, the optimal design of default

Furthermore, behavioral economics guides policymakers in designing and implementing more effective public policies that align with human behavior, thereby enhancing compliance. This encompasses diverse areas, including taxation, healthcare, environmental regulations, and social welfare programs.[35]

Additionally, the intersection of behavioral ethics and criminal law becomes evident as behavioral economics sheds light on the cognitive underpinnings of ethical decision-making.[36] This understanding can influence our comprehension of criminal behavior, the assessment of intent, and the determination of suitable punishments.[37] By recognizing how behavioral biases interact with various facets of the law, legal systems can develop measures that are more effective in deterring individuals from engaging in unlawful activities.

Needless to say, the legal implications of behavioral economics continue to evolve, and its application may vary across jurisdictions. Therefore, its influence on legal systems and the formulation of laws and regulations must be constantly updated.

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rules has featured as a central regulatory challenge. The key element driving the design is opt-out costs—how to minimize them, or, alternatively, how to raise them to make the default sticky. Much of the literature has focused on 'mechanical' opt-out costs—the effort people incur to select a nondefault alternative. This focus is too narrow. A more important factor affecting opt-out is information—the knowledge people must acquire to make informed opt-out decisions. But, unlike high mechanical costs, high information costs need not make defaults stickier; they may instead make the defaults 'slippery.'").

35. BADDELEY, *supra* note 30, at 161–75; *see* ECONOMIC BEHAVIOR AND TAXATION (James Alm & J. Sebastian Leguizamon eds., Edward Elgar Publ'g, 2016) (detailing specific examples in specific fields); George Loewenstein et al., *Can Behavioural Economics Make Us Healthier?*, 344 BMJ 23–25 (2012), https://www.bmj.com/bmj/section-pdf/187570?path=/bmj/344/7863/Analysis.full.pdf; Hunt Allcott & Sendhil Mullainathan, *Behavior and Energy Policy*, 327 SCI. 1204 (2010); Richard H. Thaler & Shlomo Benartzi, *Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving*, 112 J. POL. ECON. S164 (2004).

36. *See* Alon Harel, *Behavioural Analysis of Criminal Law: A Surv*ey, *in* THE OXFORD HANDBOOK OF BEHAVIORAL ECONOMICS AND THE LAW, 568, 568 (Eyal Zamir & Doron Teichman eds., 2014); GORAN DOMINIONI, *supra* note 30, at 39–51.

37. *See* David Freedman & George W. Woods, *The Developing Significance of Context and Function: Neuroscience and Law*, 36 BEHAV. SCI. & L. 411 (2018) (describing how intent forms and is acted upon, how an individual's cognitive processes shape behavior, and how bio-psychosocial history and neurodevelopmental approaches provide information that has been largely missing from the assessment of intent).

III. DECODING THE DECIBELS: EXPLORING THE INTRICATE INTERPLAY OF NOISE AND CORPORATE LAW

Within the realm of corporate law, there are specific domains in which the presence of noise can be identified.

One such domain is contract drafting and review, which requires careful attention to detail due to potential legal and financial consequences. Customizing templates and seeking feedback from involved parties reduces the likelihood of noise and disputes, ensuring that the final document aligns with their intentions and needs.[38] Other fields susceptible to noise are the due diligence process in mergers and acquisitions and regulatory compliance. Despite the significance of the former in assessing risks and liabilities through the scrutiny of financial statements, contracts, and other legal documents, due diligence can be time-consuming, leading some attorneys to overlook crucial details, neglect pertinent inquiries, or fail to ask the right questions.[39] The latter constitutes yet another arena prone to noise, as the intricate nature of complying with a myriad of federal, state, and local regulations can result in inadvertent violations, complexities or inconsistencies in reporting, or even significant sanctions and reputational damages. Lastly, noise detrimentally affects the environmental, social, and governance ("ESG") field by impairing the consistency of evaluation criteria, eroding trust and reputation, and potentially leading to misguided investment decisions.[40]

Since we cannot assume that the work of behavioral economics is complete, it is now imperative to assess the potential impact it may have on the general corporate matters identified above. This involves finding

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38. *See* Jonathan Klick, *The Microfoundations of Standard Form Contracts: Price Discrimination vs. Behavioral Bias*, 32 FLA. ST. U. L. REV. 555 (2005) (describing harms and economic misalignment that can arise from standard contracts).

39. *See* Stephen Brown et al., *Trust and Delegation*, 103 J. FIN. ECON. 221, 222 (2012) (exploring operational risk in hedge funds using due diligence reports. Using concrete evidence of internal process failures to create a measure for operational risk that aligns with the Basel definition, the authors, to address selection bias, apply an extended version of Heckman's procedure. Operational risk increases the likelihood of poor performance and fund closure but does not affect investors' pursuit of higher returns. The research highlights the importance of verifying information in financial intermediation.); Ronald J. Surz*, The Blob Attacks Investment Manager Due Diligence: Invasion of the Perilous Peer Group Bias*, 62 J. FIN. SERV. PRO. 14 (2008); Patrick Reinmoeller, *Due Diligence and Bias: Dealing with the Unintended Consequences of a Concept's Success*, FIN. MGMT., May 2013, at 55.

40. *See generally* Nafisa Rounok et al., *The Effects of ESG Issues on Investment Decision through Corporate Reputation: Individual Investors' Perspective*, 12 INT'L J. RSCH. BUS. & SOC. SCI. 73 (2023) (investigating the influence of ESG issues on investment decisions and the mediating role of corporate reputation among 599 retail investors in Bangladesh. The findings reveal that ESG issues have a significant impact on investment decisions, mediated by corporate reputation.).

strategies to deal with noise in decision-making within the framework of corporate governance and regulatory compliance. By doing so, we can establish general guidelines that policymakers and legal professionals can follow to reduce the likelihood of noise.

A. *Drafting and Reviewing Contracts*

Delving more in detail on the first item, the contractual matter is a critical aspect of corporate law that requires careful attention to detail. Even the slightest inconsistencies in its language can have severe implications for the parties involved. Furthermore, contracts are often intricate, involving numerous parties, contingencies, and legal concepts, which can increase the probability of noise.

One potential cause of noise in contract drafting and review is the human factor, affecting even experienced attorneys, especially when working under tight deadlines or other pressures, potentially leading to different focuses while drafting and reviewing contracts. By leveraging technology, attorneys can enhance accuracy and consistency, while also saving time and resources, thereby improving efficiency.

Another crucial step is to create ad hoc templates and forms: this enables greater precision and customization, which can help reduce noise. Additionally, customized documents are more likely to accurately reflect the intentions and expectations of the parties, which can decrease the probability of disputes or litigation. In order to empirically evaluate this, one could select a highly conventional clause from a disclosure filing. Initially, one could direct attention to the COVID-19 risk statement and to the uniformity of its language across all similar disclosures in either 2022 or 2021. This analysis should provide a quantitative assessment of variability. Then, it would be beneficial to identify a more intricate provision and compare the obtained results with the previous ones. It is highly likely that the more intricate provisions exhibit a greater degree of divergence, showing an increased presence of noise in the form of disparities among disclosures.

Finally, actively engaging with the parties involved and soliciting their feedback is an effective way to identify potential issues or areas of concern and ensure that the document accurately reflects (and meets) their needs.

B. Due Diligence and Regulatory Compliance

Expanding upon the second aspect, it is imperative to acknowledge that the exercise of due diligence entails an intricate and protracted undertaking, necessitating the comprehensive examination and analysis of an extensive corpus of information. In fact, "[d]isclosure does not do all the work that rational-choice theory would assume, for a number of reasons. Humans are easily overwhelmed by information, so the benefits of disclosure can be

erased with information overload."[41] The volume of information to review might easily lead to noise, together with confirmation bias, namely the associates' tendency to seek out information that supports their existing beliefs or assumptions.[42]

Hence, associates can implement several measures, such as (i) developing a comprehensive due diligence checklist, which can be effective in ensuring that all relevant information is collected and reviewed, thus reducing the risk of oversights; (ii) examining documents, carefully looking for inconsistencies, discrepancies, or other red flags that may indicate potential risks or liabilities; (iii) seeking independent perspectives from colleagues or outside experts who can provide an impartial view of the target company; (iv) utilizing technology that can streamline the due diligence process thanks to software that can rapidly and efficiently analyze large amounts of data. It is essential for attorneys to implement such techniques to prevent biases, noise and oversights in due diligence, to ultimately better ensure the accuracy and comprehensiveness of their due diligence efforts.

Also, the repercussions of non-compliance with a pervasive multitude of laws enveloping companies' regulations are far-reaching in a wide range of matters, including employment, environmental safeguarding, securities and financial reporting, and consumer protection, among others. Various factors can contribute to noise in regulatory compliance, such as ambiguous and complex provisions (due to technical or complex language), inconsistent enforcement by regulatory agencies (also across industries or companies), as well as shifting regulations (as continuous evolutions require companies to remain current and adapt rapidly). Compliance activities may involve multiple individuals, each with their specific responsibilities and workflows,

41. Greenfield, *supra* note 22, at 527.

42. Phanish Puranam et al., *Due Diligence Failure as a Signal Detection Problem*, 4 STRATEGIC ORG. 319 (2006) (drawing on signal detection theory, which is a rational choice theory for decision making under uncertainty, the authors propose that the importance acquirers assign to the risks of proceeding or not with an acquisition influence how they use the information obtained during due diligence. The results support the idea that the perceived value of the acquisition opportunity influences both the impact of negative information from due diligence on acquirers' valuations and their final acquisition decisions.); *see* Viswa Prasad Gada et al., *Time to Complete the Due Diligence Phase in Mergers and Acquisitions: Impact of CEO Psychological Characteristics*, 53 APPLIED ECON. 5812 (2021) (addressing the issue of contextual bias and errors in the forensic sciences, as exemplified by the mistaken fingerprint identification of Brandon Mayfield in the Madrid Bomber case. It aligns with the findings of the National Academy of Sciences' critique in 2009, highlighting the presence of bias and inaccuracies within forensic practices, and ultimately proposing best practices to mitigate bias in forensic laboratories and its impact within the judicial system.).

resulting in additional noise. Despite these challenges, it is essential for companies to prioritize regulatory compliance and adopt a proactive approach to risk management.[43]

This may involve regular audits and evaluations, policy creation and implementation, and investment in compliance technologies and tools. Involving external legal counsel or consultants can reduce the risk of noise, since regulatory compliance is crucial for corporate law, safeguarding reputation, preventing legal liabilities, and promoting transparency and accountability.

To address the various sources of noise in regulatory compliance within corporate law, several steps can be taken. First, investing in technology and tools can be effective in streamlining compliance workflows, identifying potential issues, and ensuring consistency across compliance efforts. Compliance management software, data analytics, and automated reporting are some examples of the tools available to assist with said efforts. Still, this may be expensive because it necessitates investment in new and potentially once again noise-enhancing technologies, personnel, or training.

Second, ongoing training and education are essential for corporate attorneys to stay up-to-date on regulatory developments and best practices in compliance. This can be achieved through continuing legal education programs and industry conferences.

More generally, companies should prioritize compliance as a key aspect of their culture, emphasizing its importance across all levels, and conduct regular assessments and audits.

What I have just described might resonate with readers and remind them, to some extent, of the concepts of regulatory technology ("RegTech") and supervisory technology ("SupTech").[44] This prompts inquiry as to whether these technologies can effectively reduce the risk of noise and bolster the levels of consistency and accuracy in compliance endeavors.

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43. *See* BADDELEY, *supra* note 30, at 241 (discussing risk and uncertainty in firm decision-making).

44. *See generally* Douglas W. Arner et al., *FinTech and RegTech: Enabling Innovation While Preserving Financial Stability*, 18 GEO. J. INT'L AFF. 47, 52–54 (2017); Giorgio Gasparri, *Risks and Opportunities of RegTech and SupTech Developments*, FRONTIERS ARTIFICIAL INTELLIGENCE, July 2019, at 1, 1–3.A.I.; Douglas W. Arner et al., *The Road to RegTech: The (Astonishing) Example of the European Union*, 21 J. BANKING REG. 26 (2020) (discussing Europe's use of RegTech); Laura Grassi & Davide Lanfranchi, *RegTech in Public and Private Sectors: The Nexus Between Data, Technology and Regulation*, 49 J. INDUS. BUS. ECON. 441 (2022) (discussing ways and frameworks through which RegTech is being studied and understood in academia and elaborating on applications); Jonathan McCarthy, *The Regulation of RegTech and SupTech in Finance: Ensuring Consistency in Principle and in Practice*, 31 J. FIN. REG. & COMPLIANCE 186 (2023) (considering how best to formulate regulatory frameworks for RegTech and SupTech).

As it is well-known, RegTech refers to the use of technology to automate or streamline regulatory compliance processes and, in this context, it can help companies to identify, monitor, and manage regulatory risks, and to ensure compliance with applicable laws and regulations. More concretely, solutions may include compliance management software, data analytics tools, and automated reporting systems, which can help to identify potential issues and ensure consistency.

By definition, on the other hand, SupTech refers to the use of technology to support the supervisory and oversight functions of regulatory agencies: it can help regulatory agencies to monitor and enforce compliance with applicable laws and regulations, and to identify potential risks and issues more efficiently. Potential solutions encompass a wide array of tools and techniques, such as advanced data analytics, aimed at enabling regulators to effectively discern and recognize patterns indicative of noncompliance. Additionally, automated reporting systems offer companies the means to deliver reporting in a manner that is both consistent and punctual, thereby enhancing overall operational efficiency and ensuring the timely dissemination of crucial information.

Overall, the use of RegTech and SupTech solutions can help to improve the consistency, accuracy, and efficiency of regulatory compliance efforts and reduce the risk of noise and biases in general. The integration of behavioral economics concepts into RegTech and SupTech software has the potential to further positively impact regulatory compliance efforts within corporate law, as companies and regulatory agencies can gain a better understanding of how individuals make decisions related to compliance and develop more effective strategies to promote it. For example, RegTech and SupTech software may be designed to utilize nudges that encourage individuals to make choices that align with long-term goals, address biases and heuristics that impact decision-making, promote transparency and accountability to create a compliance culture that is more effective, and provide reminders or incentives for compliance.

Furthermore, transparency and accountability are crucial elements in promoting regulatory compliance. RegTech and SupTech software can foster these elements by providing clear explanations of regulatory requirements and allowing individuals to provide feedback on compliance efforts. The integration of behavioral economics concepts into said software can thus contribute to more effective and efficient regulatory efforts in corporate law. This is not meant to replace any other best practices, as ongoing training and education, regular assessments and audits, and a true compliance culture are crucial to regulatory compliance.

C. ESG and Corporate Purpose

The repercussions of noise in ESG are apparent in the compromised quality of data collection, reporting, and analysis, which in turn results in flawed ESG ratings and assessments.[45] The lack of standardization and the introduction of subjective judgments further exacerbate the inconsistencies in evaluating companies' ESG performance. Consequently, noise engenders skepticism and hampers the credibility of ESG practices, ultimately hindering the realization of sustainable investment objectives. Thus, it is imperative to proactively address noise through endeavors aimed at fostering transparency and standardization, all while advocating for rigorous methodologies in ESG analysis.

Resolving the challenges posed by noise in the realm of ESG necessitates a concerted effort to implement corrective measures: (i) enhancing data quality through rigorous validation processes, comprehensive data collection frameworks, and stringent reporting standards; (ii) establishing standardized evaluation criteria and guidelines to promote consistency and comparability in assessing ESG performance; (iii) implementing transparency and disclosure mechanisms that provide comprehensive information on ESG methodologies and data sources; (iv) fostering research and development ("R&D") initiatives to refine ESG analysis methodologies and promote innovation; and (v) creating a robust regulatory framework that encourages accountability and holds market participants to high standards.

By adopting said corrective measures, those in the ESG field can address noise-related challenges, strengthen its effectiveness, and ensure that responsible investing truly aligns with sustainability goals.

Disclosure in formal documents, such as non-financial reports, is crucial for reducing information asymmetry and consequently addressing noise in

45. *See* Lauren Smart, *ESG Meets Behavioral Finance: Part 1*, S&P GLOB. MKT. INTEL. (Mar. 8, 2018), https://www.spglobal.com/marketintelligence/en/news-insights/blog/esg-meets-behavioral-finance-part-1 (summarizing studies on the impact of noise in ESG and how it results in flawed assessments); TIMOTHY M. DOYLE, RATINGS THAT DON'T RATE: THE SUBJECTIVE WORLD OF ESG RATINGS AGENCIES (2018), https://accfcorpgov.org/wp-content/uploads/2018/07/ACCF_RatingsESGReport.pdf (analyzing the subjective aspects of ESG metrics); *see also* Ralf Barkemeyer et al., *Selection Bias in ESG Controversies as a Risk for Sustainable Investors*, 405 J. CLEANER PROD., June 2023, at 7, 7–9. (exemplifying the statement made in the text, the studies on the impact of cross-dispersion bias-adjusted ESG rankings and on the selection bias in ESG: while analyzing ESG controversies data from independent media outlets is an important part of ESG evaluations, an empirical research examined trends in media sampling over a 20-year period, revealing selection bias and a higher likelihood of coverage for companies in English-language countries, uncovering previously unrecognized risks for investors and highlights the trade-off between completeness and cost of ESG information).

the ESG field. Hence, it is essential to establish clear guidelines and reporting standards to ensure consistency and reliability in reporting practices: this may involve defining key ESG indicators, specifying calculation methodologies, and setting disclosure frameworks that align with internationally recognized reporting frameworks, such as the Global Reporting Initiative ("GRI") or Sustainability Accounting Standards Board ("SASB").[46]

The ESG theme is connected to the current debate on determining corporate purpose,[47] where noise can manifest in various ways. Imagine a corporation receives feedback from its customers to gauge its corporate purpose. There may be biases in the survey respondents or leading questions that influence the outcomes. This can result in an inaccurate understanding of the true desires and needs of customers, leading to a misaligned corporate purpose. In addition, if noise leads to excessively focusing on short-term performance metrics, such as quarterly profits or stock prices, it can lead to decisions that prioritize immediate financial gains over long-term sustainability or social responsibility.

To mitigate the impact of noise on decisions about corporate purpose, companies can (i) diversify data collection, gathering input from a wide(r) range of customers using multiple sources; (ii) adopt a more holistic view by considering not only short-term financial metrics but also long-term sustainability, social impact, and stakeholders' stances; and (iii) employ rigorous data analysis techniques, involving statistical methods, data validation, and verification processes to filter out noise, and identify meaningful patterns and trends. By actively addressing noise and incorporating diverse perspectives and reliable data into decision-making processes, corporations can indeed better define their corporate purpose and align their strategies with the expectations and needs of other parties involved/stakeholders.

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46. *See* Robert G. Eccles et al., *The Need for Sector-Specific Materiality and Sustainability Reporting Standards*, 24 J. APPLIED CORP. FIN. 65, 71 (2012); Ruth Jebe, *The Convergence of Financial and ESG Materiality: Taking Sustainability Mainstream*, 56 AM. BUS. L.J. 645 (2019); Li Li Eng et al., *Comparing the Informativeness of Sustainability Disclosures Versus ESG Disclosure Ratings*, 13 SUSTAINABILITY ACCT., MGMT. POL'Y J. 494 (2022).

47. David F. Larcker et al., *Seven Myths of ESG*, 28 EUR. FIN. MGMT. 869, 869 (2022) (concluding that "environmental, social and governance (ESG) considerations have dominated the discussion of corporate purpose in recent years" and these decisions would improve if based on empirical evidence).

IV. NOISE IN THE BOARDROOM

As already noticed,[48] limited research exists on decision-making in economic contexts,[49] and the study of board behavior in economic literature is frequently disregarded.[50]

The adage "first impressions last longest" holds true, and as such, although precautions may be taken to reach a decision that is as neutral as possible, the presence of noise in decision-making — particularly when such decisions are multiple and fundamental to the operation of a business — is difficult to eliminate. This stands in stark contrast to the relatively minor role played by noise in information theory, where the pivotal noisy channel coding theorem ("Shannon's theorem" or "Shannon's limit")[51] stipulates that, irrespective of the level of noise contamination in a communication channel, discrete data (*i.e.*, digital information) may be communicated with minimal error.[52] Shannon's limit specifies the maximum rate at which, for a given level of noise, data may be transmitted over a link without incurring transmission errors that are caused by random fluctuations.

In considering this matter, the involvement of independent directors or those with specialized expertise, such as in the banking field, could offer a potentially positive factor. However, the inherent presence of noise suggests that their relevance may not be as significant as initially presumed. Noise inherently encompasses human characteristics, subjective connotations, and a reflection of individual actions. The discretionary nature of directors' decisions can result in divergent choices that are susceptible to the "noise effect." The noise, which is not muted in board resolutions, is often disguised as agreement because people falsely believe that others share a similar perception to them, especially when it comes to recurring matters. The repetition of individual "noisy" decisions cultivates an acceptance towards noise, making its reiteration easier. The fluctuation of decisions indicates the deviation from the average decisions made over time under familiar circumstances. Selective attention serves as a primary source of

48. *See supra* note 21.

49. *See, e.g.*, Stefano DellaVigna, *Psychology and Economics: Evidence from the Field*, 47 J. ECON. LITERATURE 315 (2009) (providing a literature review of some of the research that does exist).

50. Van Ees et al., *supra* note 24, at 307.

51. Claude Elwood Shannon, *A Mathematical Theory of Communication*, 27 BELL SYS. TECH. J. 379 (1948), *reprinted with corrections in* C. E. SHANNON, A MATHEMATICAL THEORY OF COMMUNICATION (University of Illinois Press, 1998), https://people.math.harvard.edu/~ctm/home/text/others/shannon/entropy/entropy.pdf.

52. Peter J. Denning & Tim Bell, *The Information Paradox*, 100 AM. SCIENTIST 470, 470 (2012).

such variability, which can be attributed to either intrasubjective variability (where an individual makes different decisions regarding the same matter over time) or intersubjective variability (stemming from differing perspectives among individuals concerning the same situation). Consequently, the measurement and reduction of this noise are further complicated by group dynamics resulting from interdependence and influence among peers.[53] Such dynamics resemble a form of peer pressure, while also reflecting the wisdom of the crowd.[54] The board of directors, as a unified and knowledgeable entity, should address the challenges. Directors

53. KAHNEMAN ET AL., NOISE, *supra* note 1, at 94; *see also* Greenfield, *supra* note 22, at 530–31; Daniel P. Forbes & Frances J. Milliken, *Cognition and Corporate Governance: Understanding Boards of Directors as Strategic Decision-Making Groups*, 24 ACAD. MGMT. REV. 489 (1999) (constructing a comprehensive model of board processes, integrating the existing literature on boards of directors with the realm of group dynamics and workgroup effectiveness. The resulting model sheds light on the intricate nature of board dynamics and lays the groundwork for future empirical research, expanding and refining our understanding of the factors contributing to effective boards); Stephen M. Bainbridge, *Why a Board? Group Decisionmaking in Corporate Governance*, 55 VAND. L. REV. 1 (2002); David H. Zhu, *Group Polarization on Corporate Boards: Theory and Evidence on Board Decisions about Acquisition Premiums*, 34 STRATEGIC MGMT. J. 800 (2013) (investigating the impact of group polarization, a fundamental bias in group decision-making, on the acquisition premium decisions made by boards. The theory – validated by findings – posits that if directors have previous experience with higher premiums, their support for a focal premium will be even higher after board discussions. Conversely, if directors have prior experience with lower premiums, their support for a focal premium will decrease further following discussions. Furthermore, the study reveals that demographic homogeneity among directors and minority expertise mitigate group polarization, whereas board influence exacerbates it.).

See also ZAMIR & TEICHMAN, *supra* note 9, at 364–66 para. C.3(b) (claiming that various behavioral factors can hinder their effectiveness, and board members may find it difficult to challenge the CEO's views, leading to the "passive boards" phenomenon. They may be influenced by their nomination process, and there might also be cognitive biases such as the status quo bias, confirmation bias, and omission bias, group dynamics and the herd effect, reinforcing conformity and hinder effective decision-making.).

54. This sociological and statistical theory posits that, under specific conditions, the collective average of evaluations expressed by a diverse and independent mass of individuals, even if inexperienced and unrelated, can provide a more accurate and valid response than expert opinions. An illustrative example of this phenomenon was presented in 1907 by Francis Galton, a notable polymath and cousin of Darwin. Galton conducted an experiment during a country fair where he asked 787 villagers to estimate the weight of a prize bull. While none of them guessed the precise value (1,198 pounds), their average estimate was remarkably close at 1,200 pounds, a mere 2 pounds shy, and the median estimation (1,207 pounds) was also remarkably accurate. These villagers exemplified a "wise crowd," as despite the considerable variation in their individual estimates, they demonstrated impartiality and represented collective wisdom. This example challenged Galton's own beliefs and showcased how the collective average of independent judgments from diverse individuals effectively enhances accuracy.

may inherently resist acknowledging the influence of others (known as information cascades), and discussions on certain topics may lead to the expression of more extreme judgments than their initial inclinations (referred to as group polarization or ideological polarization). These phenomena are challenging to contain solely through the requirements of independence and professionalism.[55]

In addition to inherent disparities in individuals' innate human intuitions, their capacity to assign values to specific numerical data, evaluations of prospects for advancement, and proposals for remuneration, disparities can also arise due to variations in the units of measurement employed. Such discrepancies in judgments among people may not necessarily stem from a genuine disagreement, but rather from the adoption of distinct scales.

Currently, from a corporate law and corporate governance perspective, a prudent course of action to attenuate noise and refine decision-making processes involves enhancing awareness of the behavioral economics issues delineated above, both among individual directors and shareholders. The latter can deliberately scrutinize the actions of directors, their pivotal choices, and the circumstances under which they have expressed dissent.[56] If we consider the findings of the aforementioned study, it becomes clear that isolated dissent (where only one director dissents from the majority) has become less frequent since 2010. Conflicts arising in such instances are entirely unrelated to factors such as age, gender, educational attainment, or board size. However, they do intensify under conditions of financial hardship or when a minority director voices dissent against a specific decision.[57]

If the efficient functioning of the board of directors relies on a multitude of diverse and interconnected variables, deeply influenced by human factors and relationships, which ultimately determine its effectiveness and influence on individual behavior and on the community as a whole, the most viable solution to mitigate biases and disruptions can only be achieved through internal board dialogue, constructive debates, and fruitful discussions. These elements possess the capability to foster healthy confrontations and overcome preconceived notions or deviations. Primarily, the expression of individual judgments and the aggregation of multiple independent

55. From here, indeed, arises the interest in the concept of "behavioral independence" of directors, for which reference is made to Niccolò Usai, *L'indipendenza comportamentale degli amministratori*, ANALISI GIURIDICA ECON. 443, 447–48 (2022).

56. For a thorough empirical analysis of the dissent among both independent and non-independent directors, *see* Piergaetano Marchetti et al., *Dissenting Directors*, 18 EUR. BUS. ORG. L. REV. 659 (2017).

57. *Id*. at 692.

judgments[58] serve as the initial mechanism to prevent the contagion of a director's viewpoint onto their peers.[59] Consequently, by comparing different perspectives, a shared framework of values and magnitudes can be established, thus eliminating errors associated with the quantitative translation of judgments onto a value scale. This protocol aligns with the transposition of Kahneman, Sibony and Cass Sunstein's "mediating assessments protocol" within the domain of corporate law.

Paraphrasing a renowned quote, it can be said that while all decisions possess an inherent level of equality, there exists a nuanced distinction where certain choices hold a greater degree of significance. In fact, as the intricate tapestry of circumstances unravels, certain decisions inevitably rise above others in terms of impact, consequence, and lasting implications. These choices stand out as being 'more equal' in their transformative power and enduring resonance, as corporate political spending, through their effects on society at large.

The presence of noise introduces uncertainty and unpredictability into the decision-making processes surrounding political spending.[60] Corporations may find it difficult to accurately assess the political climate and anticipate regulatory changes, leading to hesitancy or miscalculations in their spending decisions. Moreover, noise can amplify cognitive biases, potentially resulting in suboptimal allocation of resources or an undue emphasis on specific political causes. The lack of transparency and accountability caused by noise can further complicate the evaluation and tracking of the impact of corporate political spending. Ultimately, noise can lead to unintended consequences and hinder the effectiveness of such spending, necessitating careful analysis and mitigation of its effects.

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58. Indeed, the second opinion lacks true independence if the individual expressing it is already familiar with the first one. The situation becomes even less independent when considering the third opinion, as a cascading effect might be at play. *See* KAHNEMAN ET AL., NOISE, *supra* note 1, at 259.

59. Hence, by averaging four independent judgments, it is already possible to reduce noise by half.

60. Such unpredictability can be reinforced by behavioral economics, but previous study already highlighted how unpredictable this area can be. *See* Geeyoung Min & Hye Young You, *Active Firms and Active Shareholders: Corporate Political Activity and Shareholder Proposals*, 48 J. LEGAL ST. 81, 97–106 (2019) (finding a strong link between a company's political orientation and the number of shareholder proposals on environmental or social issues. Firms that contribute more to the Republican Party are often targeted by Democratic-leaning shareholders, even after considering factors like corporate social responsibility and labor relations. Unexpectedly, corporate political spending attracts shareholders with opposing political preferences, leading to increased activism.).

The decision to reduce corporate political spending ultimately depends on the specific circumstances and goals of each company. While noise can introduce challenges and uncertainties, corporate political spending can still serve as a means for companies to participate in the political process and advocate for their interests, hence it requires further effort in determining the appropriate level of corporate political spending.

In conclusion, considering that this context cannot be regarded as a form of reward or incentivization, which are more suited to addressing corporate crises and their prevention,[61] it seems more appropriate to emphasize the necessity of (i) enhancing directors' awareness of behavioral economics, ensuring they understand such aspects and their consequences, as "building a board is somewhat like solving [this] simultaneous equation"[62]: "C-B-S-R", namely competency, behavior, strategy and recruitment;[63] (ii) strengthening the requirements about independence and diversity on corporate boards,[64] as well as their enforcement; (iii) encouraging the expression of independent judgments before commencing board discussions, as well as accountability, transparency and disclosure in decision-making; (iv) incorporating references to this issue within the Corporate Governance Codes, which seem better suited to accommodate such references compared to, for example, board regulations; and (iv) recommending this "behavioral aspect" to be periodically evaluated as part of the board assessment process, in line with the best practices outlined in the Corporate Governance Codes. In conclusion, while there may not be a single legal provision that can completely eliminate the potential for noise in corporate governance, a combination of said tools can help mitigate the risks and promote more effective and equitable decision-making.

A . . . . And Cacophony in the Courtroom: Navigating Noise, Fiduciary Duties, and the Battle of Litigation

Within corporate law, a particular facet arises wherein fiduciaries encounter impediments when endeavoring to discharge their fiduciary obligations amidst a backdrop of noise-related disturbance. Noise and its

61. Niccolò Usai, *Economia comportamentale e diritto della crisi: il ruolo della "*mala gestio *cognitiva" nel ritardo nell'emersione delle difficoltà dell'impresa*, RIVISTA DELLE SOCIETÀ 443, 447–48 (2022).

62. RICHARD LEBLANC & JAMES GILLIES, INSIDE THE BOARDROOM: HOW BOARDS REALLY WORK AND THE COMING REVOLUTION IN CORPORATE GOVERNANCE 224 (2005).

63. *Id.*

64. *See also* ZAMIR & TEICHMAN, *supra* note 9, at 369, para. 3(c) nn.80–86 ("Male domination of boards is of particular interest from a behavioral perspective, as well, given that a growing body of work has demonstrated that men are more likely than women to exhibit overconfidence in their investment decisions. This observation has been linked to testosterone and other hormonal factors driving human behavior.").

inherent disruption cast a shadow over the meticulous execution of fiduciary duties, posing formidable challenges for these responsible guardians. The intricate interplay between the fiduciary's liability and the cacophony that pervades their operating environment requires a heightened level of diligence and adaptability to surmount these formidable obstacles, avoiding any unintended deviation from their duties of loyalty and care. The lack of obvious and predictable patterns in noise can make it difficult for fiduciaries to identify and address its impact, potentially introducing further risks and uncertainties into their decision-making processes.

Therefore, fiduciaries must be aware of the influence of noise on their fiduciary duties and take appropriate measures to mitigate its effects. This may include adopting robust risk management strategies, seeking expert advice, and maintaining transparency and accountability in their decision-making processes to ensure they act in the best interests of the principal and fulfill their fiduciary obligations.

However, it's important to note that this particular noise is not the only one: noise can also impact the test that courts apply to assess fiduciary duties.[65] When/if the presumption par excellence — namely the business judgment rule, which assumes that fiduciaries acted reasonably and in the best interests of the company unless there is evidence to the contrary[66] — is

65. *Id.* at 367, para. C.3(c) (recalling Hill and McDonnell's proposal on the creation of an intermediate review standard between the duty-of-care and duty-of-loyalty standards to address the tendency of boards to defer to management. To succeed in a legal case, plaintiffs would need to demonstrate: first, the presence of a structural bias that indicates the board's decisions are biased against the company's best interests, and second, that due to this bias, directors displayed gross negligence in the specific case. This limited scope of liability could address concerns related to increased judicial scrutiny of corporate decisions while encouraging board members to take a more proactive role.).

See generally JESSE H. COPER ET AL., CASES AND MATERIALS ON CORPORATIONS 74–130 (Aspen Law & Business 2000) (including relevant case law) (discussing the duties at hand under traditional corporate law); *see also* ROBERT B. THOMPSON, *The Story of Meinhard v. Salmon: Fiduciary Duty's Punctillo*, CORPORATE LAW STORIES 105–34 (J. Mark Ramseyer ed., Thomson Reuters/Foundation Press, 2009); MARCO VENTORUZZO, COMPARATIVE CORPORATE LAW 297 (West Academic Publishing 2015); Marc I. Steinberg, *To Call a Donkey a Racehorse— The Fiduciary Duty Misnomer in Corporate and Securities Law*, 48 J. CORP. L. 1 (2022) (explaining the concept of "fiduciary" duty).

66. Greenfield, *supra* note 22, at 526 ("One possible legal implication . . . is that courts should be less eager to depend on the business judgment rule . . . in adjudicating claims arising from alleged firm mismanagement. Judicial focus on whether the managerial decision-makers are adequately informed and whether they are burdened by conflicts of interest will not capture defects in decision-making arising from overconfidence (or other biases), even when such defects have potentially disastrous effects on the firm. Behavioural research thus suggests that a more searching inquiry by

rebutted, courts will then scrutinize the substance of the fiduciaries' decisions.[67] This is precisely where noise can come into play, as courts will need to consider if it influenced the decision-making process.

In cases where a fiduciary is conflicted, courts apply the entire fairness review to assess whether the directors have met the standard of conduct by demonstrating that the transaction was entirely fair.[68] Here, the burden of proof is on the fiduciary to show fair dealing and fair price, and — once again — if noise significantly affects the decision-making process of the fiduciaries, it could undermine their ability to demonstrate precisely those elements: fair dealing and fair price.[69]

More precisely, fair dealing tests are designed to ensure that the process is compliant to disclosure of material facts, negotiation with candor, and absence of pressure on the corporation. Noise can undermine the test in various detrimental manners. First and foremost, noise lacks predictability,

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courts into the substance of business decisions may be appropriate, at least in those instances in which effective (and cognitively unbiased) court scrutiny can counteract defects in decision-making ex post or deter them ex ante."); *see also* ZAMIR & TEICHMAN, *supra* note 9, at 359–60, para. C.2 (discussing a study by Stallard and Worthington that investigated hindsight bias by presenting participants with a case involving board members' responsibility for a corporation's failure. The hindsight group knew the outcome, while the foresight group did not. The results showed a significant difference, with the hindsight group more likely to judge the board as negligent. Judging decisions in hindsight discourages managers from taking reasonable risks due to fear of legal consequences. This hampers the pursuit of potentially valuable projects. The BJR acknowledges the inherent bias in retrospectively assessing corporate decisions and its potential harm to stakeholders, including shareholders. Biased courts make the idea of neutral evaluation impractical. Hence, the BJR serves as a safe harbor in corporate law, providing protection for a wide range of business decision.).

67. *See generally* VENTORUZZO, *supra* note 65, at 298.

68. *See id.* at 320.

69. For some critiques on the test, aiming at "reforming its doctrine of entire fairness as we now know it by retiring the doctrine's substantive fairness review prong and insisting on fully-informed consent as the only way for validating tainted transactions." *See* Amir N. Licht, *Farewell to Fairness: Towards Retiring Delaware's Entire Fairness Review. Law Working Paper N° 439/2019* (Dec. 2019), https://www.ecgi.global/sites/default/files/working_papers/documents/finallicht_3.pdf.

It is worth reminding that a recent study examined the court review of related party transactions (RPTs) as a mechanism to address value diversion in public companies. The court review, often referred to as the "fairness test," varies across jurisdictions and contexts. The study argues that relying solely on the court's review of substantive merits without strong procedural safeguards may not effectively prevent value diversion, considering behavioral insights from economists and psychologists. Additionally, the study suggests that the fairness test, which compares RPTs to arm's length transactions, is insufficient in preventing value diversion. As a result, the study proposes a recalibration of the test and introduces a new framework. *See generally* Alperen Afşin Gözlügöl, *Blinded by 'Fairness': Why We Need (Strong) Procedural Safeguards in Screening Self-Dealing and Obtaining a Fair Price Is Not the Answer*, 23 EUR. BUS. ORG. L. REV. 633 (2022).

leading to inconsistencies in the application of the fairness test, as it may disproportionately or randomly affect certain facets of the process, thereby compromising the whole evaluation. Moreover, the ramifications of noise extend to inaccurate assessments, as its prevalence engenders widespread errors capable of inadvertently influencing the final determination of fairness. For instance, inadvertent omissions or misrepresentations of crucial factual elements due to noise can lead to a distorted and inaccurate evaluation of fairness. Furthermore, while noise is distinct from biases, the failure to comprehend or address its impact adequately can foster a perception of bias or inequity.

In order to effectively mitigate the adverse effects of noise on the fairness test, it is imperative to adopt measures aimed at granting consistency, employing robust procedures, clear guidelines, and appropriate checks and balances. Additionally, ensuring transparency and facilitating effective communication play pivotal roles in addressing any apprehensions raised by stakeholders pertaining to noise and its potential ramifications on the fairness of the overall process. Acknowledging the presence of noise and its contributing factors, while implementing techniques to diminish their impact, fairness tests can attain heightened reliability in addressing procedural concerns.

Noise can significantly influence the fair price test or arm's length contracting principle. Arm's length contracting entails the negotiation and establishment of a price for goods or services, with the assumption that the involved parties possess no inherent relationship or undue influence. Nevertheless, the existence of noise in such negotiations can have a detrimental impact, disrupting the process and resulting in an agreement that fails to accurately reflect the prevailing market value or uphold fairness for all parties concerned. For example, if there is noise in the form of unexpected changes in market conditions or unforeseeable events that affect the value of the goods or services being negotiated, it can lead to a price that is not truly reflective of market value. Additionally, if there is noise in the negotiation process, such as miscommunication or misunderstandings, it can also affect the final agreed-upon price.

Therefore, to ensure that the fair price test is truly fair, it is important to account for any potential noise and try to mitigate its effects as much as possible. This can involve using objective pricing benchmarks, such as market prices or appraisals, to establish a fair price or using other forms of dispute resolution to help facilitate clear and effective communication among parties.

As a consequence, it is self-evident that noise can also potentially impact fiduciary litigation — namely on legal disputes where fiduciaries are sued for violations concerning their fiduciary duties. Given their sensitive nature (and the high level of accountability expected), any external factors that

could potentially interfere with the objective assessment of the case must be accounted for. In particular, when evaluating fiduciary litigation, noise could introduce inaccuracies that may affect the determination of conflict of interest and the application of appropriate processes for reviewing conflicted transactions. For example, if there is noise in the information or evidence presented during the litigation, it could affect the presence (or absence) of a conflict of interest or the adequacy of the cleansing techniques.

In the event that noise infiltrates the process, potentially hindering the accuracy of discerning whether one or more fiduciaries possess a conflict of interest, a flawed application of the relevant rules may emerge.

Similarly, noise extends to the evaluation of whether the company applied appropriate processes for reviewing conflicted transactions. Should noise distort the pertinent information pertaining to the processes followed, an inaccurate application of cleansing techniques may arise or an inadequate assessment of their sufficiency may befall.

In summary, noise can introduce uncertainty and inaccuracies into the evaluation of fiduciary litigation. It has the potential to impact the determination of conflicts of interest and the assessment of the application of appropriate processes, thereby influencing the outcome of the litigation. So, to tackle the issue of noise and its negative impact on the assessment of fiduciary litigation and the identification of conflicts of interest, it is crucial to take some steps. First, we recommend improving data collection by implementing robust methods for gathering relevant information, such as utilizing multiple sources, employing standardized templates, and ensuring the accuracy and completeness of the data. Second, clear and specific criteria (advanced analytical techniques, such as machine learning algorithms) should be established to identify conflicts of interest and evaluate the application of appropriate processes. Involving experts with deep knowledge and experience in fiduciary matters to provide their insights and expertise can also be beneficial, as they can help interpret complex situations and provide guidance to make accurate determinations. Furthermore, transparency should be enhanced by recording the rationale behind decisions made and maintaining an audit trail for future reference. Regular review and improvement of the evaluation processes based on feedback and the identification of any recurring issues are also crucial. Finally, training and awareness programs should be provided to individuals involved in the evaluation of conflicts of interest to help them understand noise, its potential effects, and how to mitigate its impact through consistent application of evaluation criteria. By implementing these measures, noise can be

minimized, the accuracy of conflict-of-interest determinations can be enhanced, and the evaluation of fiduciary litigation can be improved.[70]

B. . . . And the Crescendo Effect: Unmasking the Chaotic Harmony of Superstar CEOs

Managing the phenomenon of noise poses challenges in both companies with superstar CEOs, namely the CEOs who are highly influential and widely recognized (such as Steve Jobs, Jeff Bezos, Elon Musk, Bill Gates, or Mark Zuckerberg),[71] and in "regular companies." Nonetheless, various

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70. About mitigating noise and improving accuracy in evaluating conflicts of interest and fiduciary litigation, *see generally* Eric J. Johnson & Amos Tversky, *Affect, Generalization, and the Perception of Risk*, 45 J. PERSONALITY & SOC. PSYCH. 20 (1983) (presenting an extended theory of human semantic processing based on M.R. Quillian's theory of semantic memory search and priming, enhancing our understanding of semantic processing and offers insights into human cognition); Allan M. Collins & Elizabeth F. Loftus, *A Spreading-Activation Theory of Semantic Processing*, 82 PSYCH. REV. 407 (1975) (examining the impact of the effect on risk judgments in four experiments with 557 participants who were presented with paragraphs resembling newspaper reports describing fatal or nonfatal accidents, as well as positive events. The manipulation of the affect through tragic event reports led to increased estimates of risk frequency, while the positive affect induced by happy events decreased a perceived risk frequency. Interestingly, the effect was independent of the similarity between the report and the estimated risk. Overall, the affect had a significant influence on participants' risk judgments.).

71. *See* Sherwin Rosen, *The Economics of Superstars*, 71 AM. ECON. REV. 845, 845–46 (1981) (analyzing the economic "superstar" concept characterized by a highly skewed distribution of income, market share, and public attention). *See generally* Kevin J. Murphy, *Executive Compensation*, *in* 3 HANDBOOK OF LABOR ECONOMICS 2485 (Orley Ashenfelter & David Card eds., Elsevier Science Pub., 1999) (discussing the relationship between executive compensation, and company and CEO performance); Emmanuel Saez, *Income Concentration in a Historical and International Perspective*, *in* PUBLIC POLICY AND THE INCOME DISTRIBUTION (Alan Auerbach, David Card & John Quigley eds., Russell Sage Foundation, 2006) (summarizing studies of top income and wealth shares in North America and Europe); Ulrike Malmendier & Geoffrey Tate, *Superstar CEOs*, 124 Q'LY J. ECON. 1593 (2009) (analyzing the impact of CEO superstar status on firm performance in the US using prestigious awards as indicators: it finds that award-winning CEOs subsequently underperform compared to their past performance and non-winning CEOs. Superstar CEOs get higher compensation, spend more time on external activities, and engage in earnings management, especially in firms with weak governance. The study concludes that media-induced superstar status has negative consequences for shareholders.).

See Assaf Hamdani & Kobi Kastiel, *Superstar CEOs and Corporate Law*, (ECGI Law, Working Paper No. 695, 2023) https://www.ecgi.global/sites/default/files/working_papers/documents/superstarceosandcorporatelaw.pdf (highlighting the power imbalance between superstar CEOs and boards of directors, as well as the deference shown by shareholders towards these CEOs, even tolerating questionable practices. The authors provide insights into governance issues, the connection between superstar founders and dual-class structures, and the need for

factors can pose challenges when attempting to tackle noise within the latter classification. Nonetheless, various factors can pose challenges when attempting to tackle noise within the former classification.

First, significant challenges arise from the influence and authority that superstar CEOs wield within the company.[72] Their reputation, track record, or charisma often grant them significant sway, making it harder for others in the firms to question or challenge their decisions. Even when noise negatively impacts their judgment, power dynamics can hinder the organization's ability to address and rectify the situation effectively.

Second, companies with superstar CEOs are subject to intense scrutiny from the public, media, and investors. Instances of noise, biases, or deviations receive heightened attention, potentially creating negative perceptions. As the public image of a superstar CEO is closely intertwined with the company's reputation, managing the impact of noise on external perceptions becomes crucial and more challenging in these circumstances.

Third, superstar CEOs may face difficulties in managing their own biases when making critical decisions. The perception of being a successful leader can lead to overconfidence or an illusion of invincibility, making them more susceptible to biases and less receptive to questioning. This exacerbates the effects of noise, impeding effective decision-making.

Finally, companies with superstar CEOs often attract top talent and high-performing individuals. However, the presence of noise can affect the motivation and job satisfaction of these talented employees. If they perceive a lack of fairness or predictability in the company's functioning, talent retention challenges may arise.

In conclusion, although addressing noise can be challenging for any company, the influence, expectations, and dynamics associated with superstar CEOs can make it particularly complex. However, by implementing effective governance, robust processes, and fostering a culture of open communication and feedback, it is possible to mitigate the impact of

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legal intervention to address the influence of superstar CEOs, emphasizing the implications for the Caremark doctrine in terms of board oversight and shareholder tolerance of misconduct.).

72. ZAMIR & TEICHMAN, *supra* note 9, para. C.3(a) (highlighting how CEO overconfidence has often been linked to negative firm outcomes, such as poor investment decisions, stock price crashes, merger choices, and earnings management. However, moderate overconfidence can counter risk aversion and lead to better decisions from the perspective of risk-neutral shareholders, especially in innovative industries. It can also provide internal managerial benefits by fostering conviction and rallying the management team.) (reinforcing the importance of some policies aimed at strengthening the board oversight of senior management is structural in nature. Such policies (as the CEO-Chairman duality) "alter the institutions governing the firm in order to bolster the power of the board.").

noise and ensure the smooth functioning of the company, regardless of the CEO's status.

Let us now adapt these considerations to an illustrative example, specifically a case involving Elon Musk, the esteemed CEO of Tesla and SpaceX. Under his exceptional leadership, Tesla has become renowned for its innovative and ground-breaking electric vehicles, establishing him as a superstar CEO known for visionary thinking and the driver of Tesla's success. Nevertheless, noise can influence Musk's decision-making process, potentially leading to suboptimal choices such as selecting an unsuitable supplier or pursuing flawed product strategies. At the same time, it can distort the evaluation of his performance as CEO, creating inaccurate assessments of his effectiveness, particularly when influenced by noise in financial metrics. Diverting attention and resources from critical initiatives and R&D endeavors, noise can disrupt the organizational focus, impeding Tesla's ability to innovate and maintain a competitive edge. Lastly, given Musk's high-profile status, any noise-related incidents can garner significant attention and adversely affect the firm's reputation, be it manufacturing defects, recalls, or safety concerns, ultimately impacting customer loyalty, investor confidence, and the overall success of Tesla. Thus, effectively dealing with "his noise" necessitates the implementation of robust processes, vigilant decision-making, continuous monitoring, as well as transparent communication with stakeholders to safeguard trust and credibility amidst unforeseen deviations or accidents that may arise.

V. NOISE POLLUTION IN THE COURTROOM: HOW NOISE DISTURBS THE RULE OF PRECEDENTS

Stepping back for a moment, we can also delve into a thoughtful examination that complements the focus of scholarly literature. This approach also enables us to progress by exploring widespread scenarios in corporate law and financial markets, which will be expounded upon in this paragraph.

The way in which common law and civil law legal systems diverge fundamentally in their approaches to the interpretation and enforcement of laws can engender consequential effects on the concept of noise.

The distinguishing features of common law and civil law systems contribute to distinct forms of noise. In common law systems, the reliance on precedents established through judicial decisions and case law grants significant weight to previous court rulings as precedents, thereby shaping interpretation and implementation of the law. However, variations in judicial interpretations among judges or courts can yield inconsistent precedents, introducing noise into the system. This lack of uniformity poses challenges for legal professionals and stakeholders, who face difficulties in predicting

and applying the law consistently. In other words, this engenders an element of noise within the legal landscape, as similar cases may yield disparate outcomes across different jurisdictions or even within the same jurisdiction over time. Moreover, the dynamic nature of common law allows legal principles or best practices to evolve over time through new court decisions. While this adaptability ensures the relevance of the law to changing needs, it also engenders noise. Legal principles may undergo shifts or reinterpretations, leading to uncertainty and unpredictability. Consequently, legal outcomes may deviate from established norms or present novel interpretations, causing further noise, such as that among practitioners with different backgrounds in terms of legal education. Conversely, civil law systems typically embrace codified laws,[73] and this tends to instill a certain degree of uniformity and predictability within a given jurisdiction. However, such systems are not immune to noise, as it may arise from vague or ambiguous provisions, inconsistencies between legal codes and their practical enforcement, or even disparities in interpretation of the principles among different courts (or eminent practitioners and scholars). The presence of ambiguous language within provisions may contribute to generating noise and give rise to several interpretations, leading to multiple understandings of the law and its application to facts, and exacerbating the unpredictability of legal outcomes.

Thus, the divergent characteristics of common law and civil law systems shape the nature and extent of noise: while common law countries mainly experience noise arising from inconsistent or evolving case law precedents,

73. In this dichotomy, the role and positioning of European agencies within this context, as well as the impact of noise on European directives and regulations, are not taken into consideration solely because they do not fall within the scope of the present study. The influence of noise on them is a complex issue that requires comprehensive analysis beyond the immediate focus of this research. Nonetheless, recognizing and addressing these aspects would provide a more holistic understanding of the broader dynamics: when directives and regulations are being developed, they typically rely on various sources of information, including research studies, expert opinions, public consultations, and data analysis but, if noise is present in these sources, it can lead to inaccurate or misleading information being considered, resulting in flawed or biased decisions. For example, if there is widespread error or accidental deviation in the data used to inform a particular regulation, it may lead to incorrect conclusions about the impact of certain practices or technologies. Similarly, if biases exist in the information sources, such as biases in research studies or expert opinions, it can influence the direction and content of the regulations. Moreover, noise can also arise during the implementation and enforcement of directives and regulations. If there is a lack of obvious and predictable deviations in how these regulations are applied, it can create inconsistencies and confusion among stakeholders. This can undermine the effectiveness of the regulations and hinder their intended outcomes.

By incorporating multiple perspectives, conducting thorough assessments of available information, and actively addressing biases and inaccuracies, the EU can strive to develop more effective and fair directives and regulations.

civil law countries may experience noise related to the interpretation of legal provisions and the varying significance placed on certain crucial elements (such as articles from legal scholars', case notes, or *pro veritate* opinions).

In the context of areas or legal practices where precedents hold significant sway, such as debt or equity capital markets, the question arises regarding the extent to which noise plays a pivotal role. Specifically, this prompts an examination of noise's influence on the risk factors section in IPO registration documents or bonds' T&Cs, to determine whether it interferes with the integrity and effectiveness of the legal processes involved. Given that this field is characterized by a heavy reliance on established precedents, the noise can end up being relatively lower compared to other areas: in fact, the reliance on precedents helps establish a more predictable and standardized framework for legal analysis and decision-making. More concretely, when dealing with said IPO registration documents' risk factors section, legal professionals often refer to established industry practices, regulatory requirements, and previous offerings as references. Precedents provide a benchmark for drafting and reviewing these documents, reducing the likelihood of noise.

However, the presence of noise cannot be completely eliminated even where precedents are highly influential: variations in the interpretation and application of legal principles, as well as in the drafting and review process, resulting in subtle differences (e.g., the MAC clause in Covid times) can still occur, affecting the accuracy of the documents.

In order to mitigate the potential impact of noise, legal professionals operating in the field of capital markets undertake a thorough due diligence review,[74] meticulously examining relevant factors and consulting regulatory guidelines. In their endeavor to ensure compliance and accuracy, they establish close collaboration with specialized teams, such as underwriters or financial advisors. Furthermore, they engage in meticulous review processes, drawing upon their extensive expertise and effectively identifying and rectifying any inadvertent errors that may have inadvertently entered the documents. Overall, while the reliance on precedents in said areas helps reduce noise and biases to some extent, diligence, attention to detail, critical thinking, seeking expert opinions, and maintaining ethical standards and best practices are still crucial to minimize them.

74. *See supra* Part III.B.

VI. TUNING OUT THE NOISE: ENHANCING DECISION MAKING IN AN AI-DRIVEN ERA

Efforts should be undertaken to actively mitigate and, if possible, eliminate the excessive cacophony around law and decisions. Needless to say, tuning out the noise involves selecting better judges,[75] understanding the problem, recognizing it in a timely manner, and implementing measures to regulate noise levels either *ex ante* or *ex post*. Undoubtedly, the endeavor to curtail this disruptive noise is crucial for maintaining a conducive environment and fostering effective decision-making processes.

Preventive interventions aim to modify the decision-making environment by using nudges to reduce noise and exploit it to arrive at a better decision, or by enhancing decision-makers' awareness or the overall decision-making structure. Subsequent eliminations systematically correct errors, but, for most problems, the characteristics of the best judges are difficult to distinguish, and approaches that reduce noise are often of a psychological nature.

However, it is imperative to implement certain decision hygiene techniques,[76] such as information sequencing, to prevent the initial information (and impressions) acquired from exerting excessive influence on the final decision.[77] Another important tool is the aggregation of multiple independent judgments, as it helps counter the tendency for one individual's ideas to cascade onto others. By employing judgment guidelines, we can effectively reduce variability in final judgments, thereby promoting consistency. Additionally, utilizing shared scales based on an external viewpoint can help rectify errors that may arise when translating judgments into numerical values. Lastly, employing complex judgment structuring (which involves breaking the judgement down into its constituent elements) allows for a comprehensive and thorough decision-making process. This approach — namely, the anticipated "mediating assessments protocol" — constitutes, along with the LSU and LSU-E approaches mentioned above,[78] a genuine multi-stage method that enhances structured decision-making. Nevertheless, it is crucial to recognize that the elimination of noise in the process is not devoid of its drawbacks. Consequently, it becomes crucial to strike a balance between noise reduction and respecting

75. KAHNEMAN ET AL., NOISE, *supra* note 1, at 225.

76. *See* VELLA, *supra* note 10.

77. Indeed, the second opinion lacks independence if the individual expressing it is already acquainted with the first opinion. And the third opinion, even more so, is prone to succumb to a cascading effect.

78. *See* Dror & Kukucka, *supra* note 5, at 1.

the inherent dignity and unique characteristics that human judgment is better equipped to capture.[79]

AI also has the potential to play a significant and positive role in silencing the noise, assuming it is equipped with sufficient information,[80] and possesses the ability to contribute to the underlying reasoning behind choices.[81] Its contribution in this context cannot be disregarded, however, it is essential to proceed systematically. A study dating back to 1954[82] demonstrated that we can sequentially minimize the influence of noise on the inherent limitations of human judgment by employing simple rules, models, systems, and expert input. In other words, as aptly summarized by Goldberg, models created by men beat men themselves:[83] computational models outperform human judgment by eliminating subjective biases and systemic noise. More recently, the Organization for Economic Cooperation and Development ("OECD") presented a valuable report offering policy recommendations for the development of "behaviorally-informed" regulations, aimed at neutralizing individual judgments.[84]

Within the framework of machine learning techniques applicable to various decision-making processes, AI is a pertinent aspect.[85] When AI reaches a high level of sophistication, equipped with substantial data that enables it to identify immediate and reliable patterns, it can generate

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79. Ultimately, modal values are in a constant state of evolution. If we attempt to fortify everything, we leave no breathing space for the emergence of new values. Some actions designed to curb noise are excessively rigid, as they would impede moral transformation, KAHNEMAN ET AL., NOISE, *supra* note 1, part VI, 325.

80. John Armour & Horst Eidenmuller, *Self-driving corporations?*, 10 HARV. BUS. L. REV. 87 (2020); Francesco Navarrini, *"Do we need boards at all?": prospettive di intelligenza artificiale nei consigli d'amministrazione*, CORP. GOV'T AND RSCH. & DEV. ST. 79, 88 (2020).

81. ARTIFICIAL INTELLIGENCE AND LIFE IN 2030, STAN. U. (Aug. 2019), https://ai100.stanford.edu/2016-report.

82. *See generally* PAUL E. MEEHL, CLINICAL VERSUS STATISTICAL PREDICTION: A THEORETICAL ANALYSIS AND A REVIEW OF THE EVIDENCE (Univ. of Minnesota Press, 1954).

83. Lewis R. Goldberg, *Man versus Model of Man: A Rationale, Plus Some Evidence, for a Method of Improving on Clinical Inferences*, 73 PSYCH. BULL. 422 (1970).

84. *See* Peter Lunn, REGULATORY POLICY AND BEHAVIORAL ECONOMICS, OECD PUBLISHING (2014); BEHAVIORAL INSIGHTS AND PUBLIC POLICY: LESSONS FROM AROUND THE WORLD, OECD PUBLISHING, PARIS (2017). *See generally* OECD, TOOLS AND ETHICS FOR APPLIED BEHAVIORAL INSIGHTS: THE BASIC TOOLKIT (2019), https://www.oecd.org/regreform/tools-and-ethics-for-applied-behavioural-insights-the-basic-toolkit-9ea76a8f-en.htm;

85. *See* VELLA, *supra* note 10, at 63 (concerning the "significant empowerment of AI in the decision-making process" in a cacophonous world).

judgments devoid of extraneous influences. For instance, in the case of directors, the noise stemming from their decisions could be reduced or silenced if AI is provided with data regarding their subjective characteristics, especially with those that influenced their past decisions. This can be shared with AI (to the extent possible under personal data protection regulations), enabling it to learn[86] and form the foundation of its own decision-making process. Moreover, AI systems can automatically identify and eliminate erroneous or inconsistent data points through data cleaning and preprocessing, thereby enhancing the reliability and accuracy of large datasets. Also, AI algorithms can be trained to detect anomalies by learning patterns from normal data behavior, enabling the identification and flagging of significant deviations as potential noise instances. It is well-known that, by analyzing patterns and correlations, AI systems can also identify potential biases and raise alerts for human reviewers or developers to address them.[87] For instance, in the recruitment process, it can flag biased language in job descriptions or detect discriminatory patterns in candidate screening.[88] AI can be trained to actively debias algorithms and models by reducing the impact of biased features or data points too; so, by recognizing and compensating for such biases, AI systems can generate fairer outcomes (as well as helping selecting the most suitable profiles).[89] For example, in loan approval systems, AI can learn to ignore biased attributes like race or gender when evaluating loan applications, focusing on relevant financial factors instead.[90]

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86. *See generally* Matthew Hutson, *AI Learns to Write Computer Code in "Stunning" Advance,* SCIENCE (Dec. 8, 2022, 2:00 PM), https://www.science.org/content/article/ai-learns-write-computer-code-stunning-advance (citing an instance in which AI can learn a decision-making process).

87. *See* ANNETTE ZIMMERMANN, *Stop Building Bad AI*, *in* DARON ACEMOGLU, FAIRNESS IN MACHINE LEARNING: LESSONS FROM POLITICAL PHILOSOPHY REDESIGNING AI: WORK, DEMOCRACY, AND JUSTICE IN THE AGE OF AUTOMATION (MIT Press 2021).

88. *See* Andy Charlwood & Nigel Guenole, *Can HR Adapt to the Paradoxes of Artificial Intelligence?* 32 HUM. RES. MGMT. J. 729 (2022) (viewing AI as a transformative technology with potential impacts on HR and people management, and claiming that – while bias and fairness concerns can be addressed – the current AI industry and trends in work organization pose risks to work quality. Also, ethical approaches to AI involve containing potential negative effects and engaging all parties in AI system design and deployment.).

89. *See* Peter Hogg, *Artificial Intelligence: HR Friend or Foe?* 18 STRATEGIC HR REV. 47 (2019) (highlighting that the development of human talent has become a key priority for global CEOs, particularly in the face of talent shortages, making investment in candidate selection, professional growth, and well-being essential).

90. *See generally* Jeffrey Dastin, *Amazon Scraps Secret AI Recruiting Tool That Showed Bias against Women*, REUTERS (2018), https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G (illustrating various studies

AI can also improve predictive modeling, by incorporating techniques like regularization and ensemble learning,[91] which reduces the impact of noisy data during the learning process. Furthermore, in natural language processing tasks, AI systems can leverage advanced language models — such as transformer-based models like Generative Pre-trained Transformer ("GPT")[92] — to better interpret and understand noisy input,

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and articles discuss the application of AI in reducing bias and promoting fairness in recruitment processes). *See also* Aylin Caliskan et al., *Semantics Derived Automatically from Language Corpora Contain Human-like Biases*, 356 SCIENCE 183 (2017); MARGARET MITCHELL ET AL., *Model Cards for Model Reporting,* in PROCEEDINGS OF THE CONFERENCE ON FAIRNESS, ACCOUNTABILITY, AND TRANSPARENCY 220 (2019), https://doi.org/10.1145/3287560.3287596; Ziad Obermeyer et al., *Dissecting Racial Bias in an Algorithm Used to Manage the Health of Populations*, 366 SCIENCE 447 (2019); GORAN DOMINIONI, BIASED TRIALS: INSIGHTS FROM BEHAVIORAL LAW AND ECONOMICS 65–104 (SPRINGER, 2020) (discussing implicit racial biases in tort trials); Solon Barocas et al., FAIRNESS AND MACHINE LEARNING (2022), http://fairmlbook.org/; AI NOW INSTITUTE (2023), https://ainowinstitute.org/; REUBEN BINNS, FAIRNESS IN MACHINE LEARNING: LESSONS FROM POLITICAL PHILOSOPHY, 81 PROCEEDINGS OF MACHINE LEARNING RESEARCH 1–11 (201[8]), https://ssrn.com/abstract=3086546; Nick Bostrom & Eliezer Yudkowsky, THE ETHICS OF ARTIFICIAL INTELLIGENCE (2011), https://nickbostrom.com/ethics/artificial-intelligence.pdf.

91. On the former point (regularization), "[t]raditional time domain force identification methods require prior knowledge about the force profile to apply the appropriate regularization term. Generally speaking, ℓ1 and ℓ2 regularization are applied for sparse-type and continuous-type forces respectively. However, prior knowledge about the force type may be unavailable in engineering practice." So, there are two methods within the Bayesian framework to address this problem: the joint and marginal posterior modes of the force history. These methods estimate the force history, precision parameters, and an unknown parameter q based solely on vibration measurements. Numerical and experimental validation demonstrates that the proposed methods, with data-driven determination of q, can adapt to force profiles and consistently yield satisfactory results. *See* Qiaofeng Li & Qiuhai Lu, *Time Domain Force Identification based on Adaptive Lq Regularization*, 24 J. VIBRATION & CONTROL 5610 (2018). On the latter point (ensemble learning), some authors propose a comprehensive model to enhance the AI integration into in-class teaching evaluation, combining statistical modeling and ensemble learning techniques, utilizing computer vision and intelligent speech recognition. Experimental results demonstrate the effectiveness of the model, with ensemble learning module achieving low root mean square error for student concentration and participation. Statistical modeling module shows higher accuracy in evaluating teachers' media usage and type, while ensemble learning performs better in assessing teachers' style. *See* Junqi Guo et al., *An AI-Application-Oriented In-Class Teaching Evaluation Model by Using Statistical Modeling and Ensemble Learning*, 21 SENSORS 241 (2021).

92. These models can effectively handle noisy input, disambiguate meanings, and generate more accurate translations. *See* SANDRA KUBLIK, GPT-3: THE ULTIMATE GUIDE TO BUILDING NLP PRODUCTS WITH OPENAI API (Packt Publishing 2022) (examining ChatGPT and discussing the potential impact of this technology on academia and essay preparation automation); Brady D. Lund et al., *ChatGPT and a New Academic Reality: Artificial Intelligence-Written Research Papers and the Ethics of the Large Language*

contributing to improved accuracy in applications such as translation and sentiment analysis. Additionally, through continuous learning and feedback loops, AI systems can adapt and refine their models based on user feedback, thereby enhancing their ability to distinguish between genuine data and noise over time.

Lastly, there is what is called objective ignorance, which is an expression of one of the most documented cognitive biases: overconfidence. If the individuals called upon to decide are willing to give up making decisions in favor of an AI system when its recognition level is higher than the self-recognition that comes from reaching a coherent and correct decision, they may not be willing to do so when the system in question does not guarantee high validity.[93]

In the latter circumstance, they will prefer to rely on their intuition. As long as algorithms aren't perfect — and in many fields objective ignorance will forever deny this possibility — human judgment will not be replaced.[94] While AI dazzles, humans still steal the show.

At the very same time, we must admit that noise can indeed pose several challenges and have an impact on the utilization of AI in corporations,

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Models in Scholarly Publishing, 74 J. AM. SOC'Y INFO. SCI. & TECH. 570 (2023); Lance B. Eliot, *Generative Pre-Trained Transformers (GPT-3) Pertain to AI in the Law* (Nov. 30, 2021), https://ssrn.com/abstract=3974887. Sentiment analysis, which aims to determine the sentiment or emotion behind text, can also benefit from AI systems' ability to understand and interpret nuanced language, leading to improved sentiment classification accuracy. For instance, the use of AI-generated synthetic context for moral sentiment detection and quantification, shedding light on issues related to US military bases and local populations. *See* Ming Qian et al., *Morality Beyond the Lines: Detecting Moral Sentiment Using AI-Generated Synthetic Context*, A.I. IN HCI 84 (2021).

93. Furthermore, we need to take into account the bias of the person who creates the algorithm, which has an impact on the structure and operation of the algorithm. *See* CATHY O'NEIL, WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY (Broadway Books, 2016); Malte Ziewitz, *Governing Algorithms: Myth, Mess, and Methods*, 41 SCI., TECH. & HUM. VALUES 3 (2016). Both contributions discuss the impact of algorithms on our lives, but they approach the topic from different angles. The second one focuses on the perception of algorithms as powerful yet difficult to understand entities. It raises questions about the factors that contribute to this perception and suggests that algorithms can be seen as sensitizing devices that challenge our assumptions about agency, transparency, and normativity. Thus, it provides a critical backdrop for understanding algorithms as computational artifacts and tools for rethinking entrenched assumptions. On the other hand, the first one emphasizes how these models can reinforce discrimination and create negative consequences for disadvantaged individuals. It calls for algorithmic modelers to take responsibility and for policymakers to regulate their use.

94. Christopher Larkin, AI WON'T REPLACE HUMAN INTUITION, FORBES TECHNOLOGY COUNCIL (Sept. 27, 2022), https://www.forbes.com/sites/forbestechcouncil/2022/09/27/ai-wont-replace-human-intuition/?sh=6621e42067bf.

including chatbot systems like ChatGPT. During the training phase, if the data used to train AI models contains noise or biases, the system may inadvertently learn and perpetuate these biases, resulting in inaccurate outputs (without expressly considering ethical concerns). To address these issues, corporations should focus on meticulous data collection and preprocessing, establish mechanisms for ongoing monitoring and auditing of AI systems, and implement strategies to mitigate biases and improve accuracy. Meanwhile, AI sandboxes could be fostered too, creating a controlled environment that allows businesses to test new AI technologies with reduced regulatory constraints to promote innovation by providing legal certainty and faster time-to-market for AI innovations.[95]

Furthermore, incorporating human oversight and intervention can help identify and rectify noise-related problems, ensuring responsible and effective use of AI in corporate contexts. This is why it is crucial to enhance human judgment rather than replace it.[96]

While AI's ability to address biases is significant, the data processing and noise mitigation capabilities of AI make it well-suited to tackle noise-related challenges, perhaps even more so than bias. As mentioned in the

95. WOLF-GEORG RINGE, WHY WE NEED A REGULATORY SANDBOX FOR AI (May 12, 2023), https://blogs.law.ox.ac.uk/oblb/blog-post/2023/05/why-we-need-regulatory-sandbox-ai. Additionally, a sandbox enables quicker responses to technological advancements compared to traditional legislation. It also safeguards consumer protection by testing and mitigating risks. Collaboration among regulators, businesses, and stakeholders in the sandbox can lead to effective regulations that balance innovation and safety. While the proposed EU AI Act mentions a sandbox, its current form lacks the potential for genuine innovation. As its benefits outweigh the costs, a regulatory sandbox surely represents a valuable tool for responsible AI governance.

96. "By 'augmenting human intellect' we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems." *See* D.C. Engelbart, *Augmenting Human Intellect - A Conceptual Framework: Summary Report, Stanford Research Inst*. (1962) (presenting a conceptual framework for augmenting human intellect and decision-making abilities, thus providing insights into the synergy between human intelligence and AI technologies); *see also* MILES BRUNDAGE ET AL., THE MALICIOUS USE OF ARTIFICIAL INTELLIGENCE: FORECASTING, PREVENTION, AND MITIGATION, APOLLO - U. CAMBRIDGE REPOSITORY (2018), https://doi.org/10.17863/CAM.22520 (highlighting the potential risks and malicious use of AI, and emphasizing the importance of human judgment in ensuring the responsible and safe deployment of AI systems); STUART RUSSELL, HUMAN COMPATIBLE: ARTIFICIAL INTELLIGENCE AND THE PROBLEM OF CONTROL (Viking 2019) (discussing the importance of aligning AI systems with human values and augmenting human judgment, and exploring the potential risks and challenges associated with AI and advocating for the development of AI that is beneficial and aligns with human values); Mitsuru Igami, *Artificial Intelligence as Structural Estimation: Deep Blue, Bonanza, and AlphaGo*, 23 ECONOMETRICS J. S1 (2020) (exploring the role of human expertise and judgment in the development of AI systems, discussing how AI algorithms, such as Deep Blue (chess), Bonanza (checkers), and AlphaGo (Go), incorporated human knowledge and insights to enhance their performance).

introduction, this is a solution which — being slightly more suitable to address noise-related challenges than biases — makes it even more appropriate to discuss noise independently from biases.

In fact, AI can be more helpful in solving noise-related challenges for its data processing capabilities, for its automation and efficiency, for its noise detection and filtration skills, for its scalability and consistency, as well as for its iterative learning and improvement. As AI systems excel in quickly processing and analyzing large datasets by identifying patterns, correlations, and anomalies in the data that may not be apparent to humans, they filter out noise and extract valuable insights that can aid decision-making processes. AI can automate the data analysis process, streamlining decision-making by eliminating human errors and biases that may contribute to noise, thereby enhancing accuracy and efficiency. Given that AI algorithms can be trained to recognize and handle different types of noise, AI models can easily detect and filter out noisy data points, reducing their impact on decision-making and leading to more accurate and reliable insights from the data. Together with its scalability, that detection capability allows AI to handle noisy data across various domains and ensures that noise is effectively managed. The iterative learning process of AI systems, that constantly adapt themselves based on feedback and new data, enables AI models to improve their noise detection and filtration capabilities over time.

On the contrary, while AI can play a role in mitigating biases in decision-making processes, there are certain challenges and limitations associated with using AI to address them, as biases in training data, the multidimensional and context-dependent nature of biases, the lack of transparency and interpretability of some AI models, and the fact that AI models operate within broader socio-technical systems. More specifically, biases can be deeply ingrained in societal structures and historical data, reflecting systemic inequalities and prejudices. Hence, if AI models are trained on biased data, they can unintentionally learn and replicate those biases, leading to unfair or discriminatory outcomes. Also, different stakeholders may have different perspectives on what constitutes bias, making it difficult to develop universally agreed-upon definitions or algorithms to address biases comprehensively. Moreover, some AI models, such as deep learning neural networks, can be highly complex and difficult to interpret. Lack of transparency can undermine trust and accountability, especially when biases are detected after the fact. Lastly, AI models operate within broader socio-technical systems, and biases can be reinforced or perpetuated through various stages of the pipeline such as data collection, preprocessing, algorithm design. As a consequence, addressing biases effectively requires systemic changes that go beyond AI algorithms alone and encompass diverse perspectives, inclusive data collection practices, and ethical considerations throughout the entire AI lifecycle.

VII. CONCLUDING REMARKS.

In conclusion, this paper delved into the intricate relationship between biases and noise, as recognizing and addressing them is crucial to ensuring the integrity of decision-making processes. It shed light on the need to recognize and address these factors to strive for a more equitable society where fairness and impartiality are upheld for all. Throughout the exploration of this topic, particular attention has been given to the concept of noise, which presents unique implications and solutions that differentiate it from biases, with a specific focus on its implications in corporate law.

The comprehensive examination conducted in this article has led to three important conclusions.

First, to be effective in regulating and enforcing compliance across diverse industries and domains, the secret to conquering this "noisy nemesis" lies in building bridges with disciplines. Meticulous data collection, ongoing monitoring, and some bias mitigation strategies are the sturdy pillars that keep biases and noise at bay.

Second, noise must be acknowledged as a phenomenon with multiple implications, even in the realm of corporate law. Thus, it is imperative for individuals engaged in, pursuing studies in, or involved with the realm of corporate law to maintain a steadfast cognizance of the inherent possibility of "auditory disturbances" (*i.e.*, noise) within their professional undertakings and to implement measures to minimize them.

Third, when properly trained, AI holds significant potential in addressing and mitigating the impact of noise. In fact, AI has the capability to effectively recognize and cancel out noise, perhaps even surpassing its ability to mitigate biases. As such, AI could serve as a reliable ally in the pursuit of good governance. Still, noise can pose challenges for AI in corporations, as noise/biases in training data can lead to biased outputs, and noise in user interactions can result in inaccurate responses and ethical concerns. Hence, human oversight takes the spotlight. Enhancing our judgment, rather than giving it the old switcheroo with AI, is the key ingredient to tackle these challenges head-on. A little wit and wisdom go a long way in ensuring AI stays on the right track.

Containing noise in the boardroom by leveraging adequate processes in decisions may almost seem like a logical and consequential conclusion, giving us the (futile) impression of being one step away from entering an anechoic chamber.

However, this is not the case, as noise is everywhere.

When judges are entrusted with assessing a decision that may be influenced by noise, it essentially means intentionally introducing more noise into the process. This additional noise is connected to the high level of variability observed in evaluations made by experts, in this case, judges.

Judges should ideally rely on objective criteria, yet sometimes their decisions differ significantly even when compared to similar cases. Therefore, we end up with noise squared.

Noise sneaks in like an uninvited guest, causing quite a commotion. Just as the wise Hellenist Jean-Pierre Vernant observed, the connection between speech and noise is undeniable. Think about it — the μῦθος (*mythos*), whispered through chance encounters and conversations, passed down without a face. Plato himself dubbed it Φήμη (*phēmē*), the noisy chatter. Even in the corporate world, noise poses challenges for AI systems. To fight this cacophony, meticulous data collection, vigilant monitoring, and bias mitigation strategies are essential. Additionally, human oversight plays a vital role in rectifying glitches caused by noise and ensuring responsible AI usage. Hence, by amplifying human judgment instead of displacing it, we can restore harmony to the entire symphony.